

501. Inversion of hydrolyzates to increase the profits of hydrolysis plants

By Kozlov, A. I.; Kutruueva, I. A.; Parmenova, I. V.

From *Sbornik Trudov. Gosudarstvennyi Nauchno-issledovatel'skii Institut Gidroliznoi i Sul'fitno-spirovoy Promyshlennosti* (1966), 15, 53-7. Language: Russian, Database: CAPLUS

In hydrolyzates, 10-12% of the reducing substances are not sugars. A large fraction of the nonsugars is dextrans, the remainder consisting of furfural, hydroxymethylfurfural, humic substances, and colloidal lignin. Two methods have been developed recently for the inversion of hydrolyzates obtained from wood, which contain ~0.5% H₂SO₄. According to one of them, inversion is carried out for 6-8 hrs. at 100° under atm. pressure. In the other, overpressure is applied, the temp. is 130°, and the reaction time is 30-40 min. As detd. by plant trials, inversion under atm. pressure appears to be preferable, as **caramelization** can occur at a higher temp. The advantages of inversion are an increased yield of sugars, an improved quality of the hydrolyzates in processing into EtOH and (or) feed yeast, and reduced water pollution. According to preliminary est., the prodn. costs of EtOH are reduced by 3%, those of yeast production by 4-5%.

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502. Formation of furyl products induced by heat in musts and wines, and their evaluation as caramel. Proposal of a "caramel index or number"

By Garoglio, Pier G.; Boddi-Giannardi, Gila

From *Rivista di Viticoltura e di Enologia* (1967), 20(4), 147-64. Language: Italian, Database: CAPLUS

The Italian laws relating to viniferous products (musts, wine, brandy, special wines, etc.) were reviewed. A **caramelization** or caramel index or number is proposed based on the following anal. method for the detn. of furfural developed by the authors: adjust 100 ml. of sample to pH 7-8 with 20% K₂CO₃, CaCO₃, or NaHCO₃, distill, collecting 40 ml. of distillate in 8-10 min. in a graduated cylinder immersed in cold water. To the distillate add 20 drops of freshly distd. C₆H₅NH₂ and 4 ml. HOAc, mix and leave 15 min. in the dark at <20°. A rose-red color indicates the presence of furfural, which is detd. from a standard curve for freshly distd. furfural. The sample should have 10-100 µg. of furfural. Unknown samples must be appropriately detd. Fresh and sweet wines and concd. musts free from caramel give no colors. Aged wines, brandies from aged wines, and brandies of other fruits normally give pos. results for furfural, as do aq. or alc. exts. of oak from which the aging barrels are made.

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503. Thin-layer chromatographic determination of "E 150" or caramel

By Maglitto, Carmelo; Gianotti, Luciano; Gandini, Claudia; Secchi, Gianfranco

From *Bollettino dei Laboratori Chimici Provinciali* (1967), 18(1), 35-43. Language: Italian, Database: CAPLUS

To det. E 150 (caramel) dye in wines, liqueurs, brandy, and sirups, ext. 200 ml., previously freed of alc. at reduced pressure and <40°, twice with 40 ml. of 1:1 EtOAc-petroleum ether (30-50°). Break the emulsion by stirring and adding Na₂SO₄. Evap. the ether ext. to dryness in vacuo at <40°, using Na₂SO₄ if needed to insure the absence of water. Take up in 5 ml. EtOAc, and transfer to an Al₂O₃ column. Elute with EtOAc, and collect the eluate in a 50 ml. flask. Spot on a silica gel thin-layer plate pre-treated by developing in 1:1 MeOH-EtOAc and air-drying, concg. the eluate 30-fold first. Develop with a soln. of 90 ml. EtOAc dild. to 200 ml. with ligroine, dry with warm air, and spray successively with barbituric acid (1 g. dissolved in 15 ml. boiling water, and dild. to 100 ml. with 2N AcOH) and 10% p-toluidine in EtOH. Within a few sec. compare the streaks or spots, which may be in the order red, violet, rose, yellow, orange, yellow, and rose, and whose R_f value and intensity depend on the caramel type and the concn. of the furaldehydes detected. Results show that **caramelization** produces furaldehydes, and the presence of colored spots on the plates indicates that caramel dyes have been added to the sample being tested. The spot at R_f 0.11 is red, due to hydroxymethylfurfural; the spot at R_f 0.17 is yellow, indicating the presence of an another aldehyde.

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504. Changes in chemical composition of corn flakes during roasting

By Ivanov, I. E.

From *Konservnaya i Ovoshchesushil'naya Promyshlennost* (1967), 22(3), 17-18. Language: Russian, Database: CAPLUS

During high-temp. roasting of raw corn flakes, the dextrin content increased; this increase was due to hydrolysis of starch. Some changes occurred in the protein also. The color changed, indicating formation of **caramelization** products. In this study, the optimum roasting temp. of the flakes was 475°K.

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505. Device for measuring out crystalline citric acid

By Bershadskaya, B. S.; Mikhonoshchenko, N. E.

From [U.S.S.R. \(1966\)](#), [SU 188053 19661020](#), Language: Russian, Database: CAPLUS

The device for measuring out cryst. citric acid during the **caramelization** process is described. For a more equal metering, the device is equipped with a sprocket wheel placed beneath the body in such a way that its teeth project into the body of the app. through the discharge openings.

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506. Color additives. Calcium hydroxide USP for use in manufacturing caramel

By Anon.

From [Federal Register \(1967\)](#), [32, 7173](#). Language: English, Database: CAPLUS

cf. CA 59: 5684g. $\text{Ca}(\text{OH})_2$, USP, is added to the list of alkalis that may be used under the Federal Food, Drug, and Cosmetic Act to assist **caramelization** in the manuf. of caramel.

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507. Method for concentrating brewer's wort

By Williamson, Alan G.; Parker, William Ernest

From [Can. \(1967\)](#), [CA 752360 19670207](#), Language: English, Database: CAPLUS

The temp. at which **caramelization** occurs in the concn. of brewer's wort, with concurrent loss of desired flavor characteristics, becomes lower as the sp. gr. increases. The use of short (~10 min.) concn. periods under reduced pressure and temps. below the **caramelization** point of the liquor at its final concn. in each period allowed wort contg. 10% solids to be converted in 4 stages to a concn. contg. 82% solids. The latter could be shipped economically to distant breweries.

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508. Keeping quality of Indian plantation white sugars. I. Coloring matter developed in sugar crystals during storage

By Ramaiah, Nanduri A.; Nemade, B. I.

From [Sharkara \(1966\)](#), [7\(4\)](#), [140-7](#). Language: English, Database: CAPLUS

Spectrophotometric and chromatographic studies of sugar crystals which have deteriorated during storage indicate that the coloring matter is caramel. **Caramelization**, by heating of 99.98% pure sucrose, produced material exhibiting absorption at the same wavelengths (285 m μ and 415 m μ) at which deteriorated com. sugar samples showed characteristic absorption max. The R_f values of the chromatographic spots of caramel and those of the coloring matter of deteriorated sugar were substantially identical. Slow **caramelization** of plantation white sugars at warehouse temps. is responsible for development of coloring matter.

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509. A process for manufacture of Khandsari sugar without sulfur

By Gupta, Suresh Chandra; Ramaiah, Nanduri A.; Agarwal, Shri K. D.

From [Proceedings of the Annual Convention of the Sugar Technologists' Association of India \(1966\)](#), [34\(2\)](#), [237-42](#). Language: English, Database: CAPLUS

Preliminary studies showed that the addn. of 0.04 part superphosphate to 100 parts clarified cane juice inhibited **caramelization** in the open pan evapn. process and permitted the production of white sugar crystals. The destruction of reducing sugars was inhibited.

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510. Dry-process fiberboard. I. Effect of cooking conditions on hot-water solubles and their control

By Niiro, Osamu; Uesugi, Takahisa; Saito, Mitsuo

From [Hokkaidoritsu Eisei Kenkyushoho \(1965\), 43\(March\), 10 pp.](#) Language: Japanese, Database: CAPLUS

A randomized-block exptl. design was used to evaluate statistically the effects of raw materials (13 different species of wood chips), cooking pressures (7 different levels), and cooking times (4 different periods) on the amt. of materials sol. in hot water produced during manuf. of dry-process hardboards by the Asplund method. Of the 3 variables studied, pressure had the greatest effect, but became important only above 7 kg./cm.2 and should, therefore, be held at 6 kg./cm.2 to avoid **caramelization**. Differences among wood species were also significant, lauan chips (Shorea) giving the least and karamatsu (Larix leptolepis) the max. amts. of water solubles. A cooking time of 5-10 min. seemed adequate, but the duration of cooking had a relatively minor effect, as had the interactions between the 3 process variables studied. Both the total amt. of hot-water solubles and the proportion of reducing sugars in them increased with increasing pressure and time of cooking. The most significant increases in reducing sugars upon hydrolysis included mannose in ezomatsu (Picea jezoensis); arabinose in todomatsu (Abies sachalinensis); galactose in karamatsu; glucose in nemagaridake (Sasa senanensis); and xylose in mizunara (Quercus mongolica), shinanoki (Tilia japonica), shirakaba (Betula platyphylla), bunanoki (Fagus crenata), and sennoki (Kalopanax septemlobus).

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511. Lactic acid

By Weck, Georg; Eberhardt, Karl H.

From [No Corporate Source data available \(1966\), DE 1224687 19660915](#), Language: Unavailable, Database: CAPLUS

Lactic acid is prepd. from albumin-free whey by fermentation with lactic acid bacteria in the presence of a buffer (alkali or alkaline earth metal salt of an org. or inorg. acid) at pH 3-7. For example, 100 l. of whey with a lactose content of ~4.5% is freed from albumin at 83°, and then 1.8 kg. of tri-K citrate in aq. soln. is added to the whey. After cooling to about 50°, 80 g. of Ca pantothenate is added, 200 ml. of an active culture of Bact[erium] bulgaricum [Lactobacillus bulgaricus] (acclimated to an albumin deficient nutrient) is inoculated into the whey (38°) and fermented to completion at 38° with a later further addn. of Ca pantothenate, if necessary. After 190 hrs., the lactic acid concn. is 4.0-4.2%. The method avoids diln. with water and **caramelization** during concn. The particular optical isomer obtained depends on the organism used.

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512. Some observations on the keeping quality of carbonation sugars and role of sulfur dioxide

By Ramaiah, N.A.; Nemade, B. I.

From [Proc. Ann. Conv. Sugar Technologists' Assoc. India \(1965\), 33\(2\), 217-22](#). Language: English, Database: CAPLUS

Sugars manufd. by the double carbonation and sulfitation processes are esp. desirable because of their luster and whiteness. The sugars have a color grade of ISS 30. In 6 to 9 months the color deteriorates, so samples from different factories were studied. The SO₂ content of the sugars and sirups was estd. by the iodometric method. Color was detd. with a Spekker spectrophotometer. A vacuum oven, controlled up to 30 in. Hg and any temp. up to 200°, was used. Sugars of grain sizes A, C, and E were placed under 29-in. vacuum at 50°, and samples were removed at different time intervals and analyzed for SO₂ content and color. The color of the C grain sample increased from 0.03 to 0.074 in 42 hrs., while the SO₂ content remained the same at 22 ppm. In other expts. the crystals were dissolved in double-distd. H₂O to make a sirup of 40 Brix. N was passed in to liberate SO₂, but after 2 hrs. there was no change in SO₂ content or color. Deteriorated sugars which were distinctly colored were examd. The SO₂ content of the sirups was increased deliberately by introducing the purified gas. Some expts. were conducted with buffered sirups while others were unbuffered. In one expt. with the latter, the SO₂ content increased from 0.5 to 332 mg./100 cc. and the pH decreased from 5.5 to 1.5. The color was not materially altered. It was concluded that the color of these sugars has no relation to their SO₂ content. Poor keeping quality is due to low-temp. **caramelization** of the reducing sugar content, catalyzed by the alk. constituents of the crystals. Juices produced in the latter part of the season contain a larger amt. of K₂CO₃ which enters the crystals and enhances **caramelization**. This increases deterioration

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513. Conservation of aroma in roasted coffee. Metallgesellschaft A.-G.

By Nafe, Reinhold

From [No Corporate Source data available \(1965\)](#), BE 665786 19651018, Language: Unavailable, Database: CAPLUS

Addn. of Belg. 660,994. While the coffee beans are still warm from roasting, a spray of a warm en-robing soln. is applied. The beans may have been already covered, during roasting, by a thin layer of well-caramelized protective material. Thus, beans are roasted by hot air in a fluid bed and, as they are being discharged to the cooling zone, they are sprayed with an 80% sirup of cane, beet, or grape sugar or of honey or dextrose at 140°. **Caramelization** may be increased by temporarily heating the cooling air. The beans emerge with a transparent, glossy coating of attractive appearance.

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514. Improvement in release properties of fluorine-containing polymers

No Inventor data available

From [No Corporate Source data available \(1965\)](#), FR 1414727 19651022, Language: Unavailable, Database: CAPLUS

Release properties of F-contg. polymers were improved by coating with a fluid silicone polymer or by forming a mixed coating of these polymers and heating, preferably for several hrs. at 200-300°. Thus, an Al plate was coated with Teflon 30 using an emulsion. This was further coated by brushing on a 10% C₆H₆ soln. of a 300,000-centistoke poly(dimethylsiloxane), followed by 6 hrs. heating at 250°. The plate was covered with sugar and heated to **caramelization**. After cooling, the caramelized sugar was easily removed. Good release properties required liquid silicones with a 1.8-2.2:1 hydrocarbon radical-Si no. ratio.

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515. Determination of moisture in ground paprika by drying and according to the acetyl chloride method

By Palotas, J.; Lorant, B.; Mihalik, D.

From [Nahrung \(1966\)](#), 10(1), 37-43. Language: German, Database: CAPLUS

Drying paprika powder for 4-5 hrs. at 105° gave incorrect values for H₂O content. More suitable values were obtained by means of the trichloroethylene-distn. procedure of Cocking-Middleton (CA 30, 8136); no **caramelization** took place. Correct values were also obtained by means of the acetyl chloride titrn. method of Smith and Bryant (CA 29, 39402).

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516. Browning produced on heating fresh pork. II. Nature of the reaction

By Pearson, A. M.; Tarladgis, B. G.; Spooner, Mildred E.; Quinn, J. R.
From [Journal of Food Science \(1966\), 31\(2\), 184-90](#). Language: English, Database: CAPLUS, DOI:10.1111/j.1365-2621.1966.tb00476.x

cf. CA 60, 7366f. Studies were made to det. whether the browning occurring on heating fresh pork is produced by **caramelization** or a sugar-amino acid interaction. Model and meat systems were examd. In model systems, amino acid-sugar reaction was the predominant (but not exclusive) factor, as shown by blocking the amino group by acylation or the carbonyl group by HSO_3^- or H_2NOH . Meat systems were studied similarly, except for the use of yeast fermentation or glucose oxidase to remove free sugars in some tests. In meat, also, the amino acid-sugar reaction appeared to be the major factor, pyrolysis accounting for only a small (but significant) amt. of browning.

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517. Purification of technical grade lactic acid

By Boroda, T. A.; Romazanovich, N. P.; Polovko, V. N.; Chistyakova, E. A.; Likhitskaya, V. S.
From [Pishchevaya Prom., Min. Vysshego i Srednego Spets. Obrazov. Ukr. SSR, Mezhdovedstv. Resp. Nauchn.-Tekhn. Sb. \(1965\), 1, 96-102](#). Language: Russian, Database: CAPLUS

Lactic acid (I) was heated at 50-60° for 15 min.--2 hrs. with active C alone or together with an oxidizing agent. Active C gave a decolorization effect of 37-48%, which in the presence of H_2O_2 was 55-7% and in the presence of KMnO_4 60-8%. The time increase from 15 min. to 2 hrs. did not result in a higher decolorization effect due to the decompn. of I. By heating I over 60°, the decolorization effect decreased, due to a more advanced decompn. of I, **caramelization** of not fermented sugars, and formation of melanoidins. 10 references.

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518. Stabilization of L-ascorbic acid in caramel excipients

By Somovilla, Nicolas M. Urgoiti
From [No Corporate Source data available \(1966\), US 3231383 19660125](#), Language: Unavailable, Database: CAPLUS

Losses of L-ascorbic acid (I) during the **caramelization** process are averted by prior neutralization with CaCO_3 . Alternately, finely pulverized I may be homogenized with the caramelized mass. Thus, 2 kg. CaCO_3 stabilized 7 kg. I in 100 kg. sucrose.

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519. Continuous inversion of [wood] hydrolyzates at the Bobruisk and Ivdel [wood] hydrolysis plants

By Likhonos, E. F.; Bel'kova, E. A.; Druzhinina, A. I.
From [No Corporate Source data available \(1965\), \(1\), 10-12](#). Language: Russian, Database: CAPLUS

The operation of the plants with and without hydrolyzate inversion is discussed. Inversion of the main (head) fractions of the hydrolyzates reduces from 0.17 to 0.10% the content of dextrans in the neutralization tanks, and the content of Br-binding compds. from 0.42 to 0.38%. At the same time, the yield of EtOH/ton oven-dry raw material is increased from 181 to 187 l., i.e. by 3.3%. At the Bobruisk plant, continuous inversion under pressure was also tried. Because in some instances **caramelization** was observed, inversion under pressure is not recommended.

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520. The color problem of raw sugar for export market

By Gupta, S. C.; Ramaiah, N. A.
From [Indian Sugar \(1965\), 14\(11\), 719-29](#). Language: English, Database: CAPLUS

The use of Na_2HPO_4 at 0.01 to 0.05%, added to clarified sugar cane juice, reduced the destruction of reducing sugars thereby reducing the **caramelization** reaction leading to dark-colored raw sugar.

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521. Application of infrared moisture balance for the determination of the moisture content in final molasses

By Cheng, Y. C.

From [Taiwan Tangye Shiyanso Yanjiu Huibao \(1965\), No. 38, 119-27](#). Language: Chinese, Database: CAPLUS

The sample was heated 25 min. at 45° by using an input voltage of 93-70 v. Too rapid heating accelerated **caramelization** and caused decompn. of sugar. When the heating was properly carried out, the results were easily reproducible, the decompn. of reducing sugar was below 0.3%, and **caramelization** negligible. In comparing the results with those obtained by the standard oven method, the av. difference was within 0.54%.

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522. Method and apparatus for making dextran

By Werther, Hanna; Werther, Hans D.; Mueller, Peter; Behrens, Ulrich; Ringpfeil, Manfred; Gabert, Anton; Krueger, Konrad; Toporski, Walter; Heyne, Bruno; Klipp, Willi; et al

From [No Corporate Source data available \(1965\), DD 31904 19650305](#), Language: Unavailable, Database: CAPLUS

Dextran (I) is sepd. from its synthesis culture in a modified Henze steam cooker (a distillery app.) provided with a nozzle in the lower pointed conical half for injecting steam and compressed inert gas (air), along with solvent (MeOH) for pptg. I. Lumping of pptd. I, local overheating, and **caramelization** are thus prevented. After the pptd. I settles, supernatant solvent is pumped off, a small amt. of H₂O is added to the cooker during agitation of its contents by a jet of air from the nozzle, and finally air is closed off and steam admitted while distg. off residual MeOH. A concd. aq. soln. of I is drawn off at the bottom.

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523. Kinetics of coloring-matter formation during decomposition of sugars

By Sapronov, A. R.; Kolcheva, R. A.

From [Sakharnaya Svekla \(1965\), 39\(1\), 22-5](#). Language: Russian, Database: CAPLUS

Formation of coloring matter when sugars decomp. while being heated is rather complex. During this process, intermediate products are formed, which have characteristic spectra. During decompn., colored products are formed that change in chem. and phys. properties, including optical d. Results of a spectrochem. investigation and adsorption on active C and ion exchangers indicate the compn. of products of **caramelization** of sucrose, of melanoidines, and of products of alk. decompn. of monosaccharides.

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524. Changes of light malt in making a coloring one

By Shvets, V. N.; Mal'tsev, P. M.; Velikaya, E. I.

From [Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya \(1964\), \(5\), 76-8](#). Language: Russian, Database: CAPLUS

Optimum temp. for the accumulation of color materials in light malt, humidified to about 50%, was 190°. Extractable matter of the malts obtained decreased, and the amt. of reducing sugars taking part in the formation of melanoidin and in **caramelization** increased with temp. Amino-N was completely bound in a protein-carbohydrate complex after a 1-hr. extrn. of malt at 160°. Wort obtained from the malts examd. had a higher foaming ability, greater foam stability, and lower pH than that from the untreated malt. Roasted and caramelized malts improved foaming and increased foam stability of beer. The max. amt. of acid products developed at 190°. The amt. of aromatic substances in the malts obtained was 2-5 times as high as in the initial malt, the greatest amt. of these substances accumulated at 200 and 210°, but the extractivity and coloring capacity of the malt decreased considerably.

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525. The formation of coloring substances in malt extract subjected to heat treatment

By Mal'tsev, P. M.; Velikaya, E. I.; Shvets, V. N.

From [Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya \(1964\), \(4\), 52-4](#). Language: Unavailable, Database: CAPLUS

Samples of malt exts. were subjected to heat treatment at various temps. from 110° to 210°. The changes in the product were detd. by chem. analyses and the results are tabulated showing the degree of color intensity, the content of amino N, reducing properties, and pH. The formation of melanoidins and the **caramelization** process were more intense in the saccharified malt ext. compared with the nonmodified ext. The optimum temp. for the accumulation of colored matter was 190° in the 1st case and 180° in the 2nd case. The pH 6.5 of malt ext. dropped to 2.65-2.80 at 210°. The intensity of the formation of colored matter was increased when protein of malt ext. was hydrolyzed.

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526. Manufacturing pectolytic fermentation preparations by use of a spray drier

By Kalunyants, K. A.; Vaganova, M. S.

From [No Corporate Source data available \(1964\), 30\(6\), 2-5](#). Language: Unavailable, Database: CAPLUS

A typical liquid pectolytic enzyme prepn. would contain about 8% solids, would have a pH of 5.35, would contain sugars 7.05, total protein 5.41 mg./ml., and show a pectolytic activity of 197.5 units/ml. Drying by direct application of heat can be done only at 75-85°, which is a time-consuming process; raising the temp. to 100° leads to a partial **caramelization**. Spray-drying offers some improvement; the air used for atomizing may be heated as high as 200° without significant damage to the liquid ext. A further improvement is gained by the addn. of lactose (I) to the ext. prior to spraying; the optimum amt. of I is approx. 50% of the ext. dry matter. The sprayed product is only slightly hygroscopic, can be easily ground, and loses very little enzymic activity during its prepn.

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527. Quantitative changes in reducing sugars after boiling down meat broths

By Vol'fson, G. G.

From [Voprosy Pitaniya \(1964\), 23\(4\), 76-7](#). Language: Unavailable, Database: CAPLUS

Approx. 40% of the glucose and 20% of the glucose 6phosphate were lost in boiling meat broths to dryness. Loss of glucose increased to 80% after a 1-hr. heating of the residue to 130°, whereas the amt. of glucose 6-phosphate did not change in this stage. This loss of sugars is a result of the formation of melanoidins. **Caramelization** may be responsible for further loss of glucose in heating to 130°.

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528. Influence of recirculation of molasses on its formation and exhaustion

By Yande, D. J.; Kulkarni, G. B.; Page, B. V.

From [Proc. Ann. Conv. Sugar Technologists' Assoc. India \(1962\), 30\(2\), 169-80](#). Language: Unavailable, Database: CAPLUS

By keeping the recirculation of molasses at a min., color development owing to colored compds. and **caramelization** was avoided.

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529. Fruit toffees. I. Effect of addition of glucose on texture and of processing temperature on retention of ascorbic acid and carotene in mango toffee

By Kerawala, D. N.; Siddappa, G. S.

From [Food Science \(Mysore\) \(1963\), 12\(8\), 221-3](#). Language: Unavailable, Database: CAPLUS

Mango toffee of pH 5.13, having 0.24% titratable acidity (as anhyd. citric), 6.75 reducing and 67.29 total sugars (as invert), 5.95 protein, 8.15 ether ext., 0.54 crude fiber, 1.66 total ash, 1.62 HCl-sol. ash, 8.62% moisture, 4.8 ascorbic acid (I), 1.14 Fe, and 268 mg. % Ca, 9,348 total carotenoids and 6,539 γ /100 g. β -carotene (II) were prepd. by concg. Badami mango pulp of about 18° Brix to 32-33°, adding other ingredients, cooking to 125°, trayed, rolled, cooled, cut, and wrapped after standing overnight. Loss of II was 1.7%, and I 59%. The recipe used was 100, 45-48, 13-15, 7-8, 3-4 parts of mango pulp, cane sugar, skim-milk powder, hydrogenated fat, and glucose powder, resp. Higher percent glucose caused stickiness and marked **caramelization** in the final product.

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530. Polarographic investigation of caramel obtained from sucrose

By Polyachenko, M. M.; Barabanov, M. I.

From *Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya* (1963), (5), 52-4. Language: Unavailable, Database: CAPLUS

Colored substances produced by the **caramelization** of sucrose (heated 10 hrs. at 160°) were sepd. by column chromatography and their polarographic behavior studied. The colored substances gave a half-wave potential of 1.3 v. in a supporting electrolyte buffer of H_3BO_3 0.08, KCl 0.08, and NaOH 0.004 moles/l. The wave height was proportional to concn. between 1.6 and 4.8 millimoles/l. The polarographic behavior of the colored substances was ascribed to the sulfiting process in sugar production.

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531. Assay and pharmaceutical application of caramel

By Ragettli, J.

From *Gyogyszereszet* (1961), 5, 127-30. Language: Unavailable, Database: CAPLUS

By the paper strip chromatographic technique, the procedure of **caramelization** was followed. No **caramelization** occurs until 170°. Between 170 and 180° the decompn. begins with the appearance of anhydrides; by overheating, the unwanted sugar-huminic compds. are formed.

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532. Quantitative investigations on the production of organic acids during alkaline destruction of reducing sugars--a mechanism for carmelization

By Ramaiah, N. A.; Agarwal, S. K. D.; Kumar, M. B.

From *Proc. Intern. Soc. Sugar-Cane Technologists* (1962), 11, 932-40. Language: Unavailable, Database: CAPLUS

By conductimetric titration of org. acids, it was found that alk. degradation reached an equil. between the acid and the sugar with about 20% reducing sugar remaining at 80°. Added acids reduced the time to reach equil. Color (carmelization) resulted from reactions of the acids with reducing sugar; at least 6 products with mol. wts. higher than glucose were found by paper chromatography.

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533. Determination of colored substances in sugar manufacturing products

By Sapronov, A. R.

From *Sakharnaya Svekla* (1963), 37(8), 32-5. Language: Unavailable, Database: CAPLUS

The dark color of intermediate and final products of sugar manuf. is caused mainly by degradation of invert sugar by alkalis (I), formation of melanoidins (II), and **caramelization** of sugar by heat (III). The d. of the color is detd. by spectrophotometric analyses at wave lengths (D_1) 250, (D_2) 282, and (D_3) 300 μ . Formulas are proposed for the estn. of each individual class (I), (II), and (III). Samples of sugar beet molasses produced by various factories were analyzed by this method. The content of (I) was 70-80%, and the sum of (II) and (III) was 20-30%. The d. of the color was due to the concn. of (I) and (II), but the effect of (III) on the d. of the color was not significant. Since the role of (III) in developing the color is not significant, it is possible to eliminate the formula for (III). In this case, the d. of the color is detd. at wavelengths 250 (D_1) and 300 μ (D_3).

~5 Citings

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534. Color additives. Caramel; listing for food use and exempting from certification

By Anon.

From [Federal Register \(1963\), 28, 6497-8](#). Language: Unavailable, Database: CAPLUS

Caramel, under the Federal Food, Drug, and Cosmetic Act, is the amorphous, dark-brown material resulting from the controlled heat treatment of dextrose, invert sugar, lactose, malt sirup, molasses, starch hydrolyzates and fractions thereof, or sucrose. The acids HOAc, citric, H_3PO_4 , H_2SO_4 , and H_2SO_3 , the alkalis NH_4OH , KOH, and NaOH, and the salts NH_4 , Na, or K carbonates (including bicarbonates), phosphates (including di- and monobasic), sulfates, and sulfites may be used to assist **caramelization** and polyglycerol esters of fatty acids may be used as antifoaming agents. It conforms to the following specifications: Pb, 10 p.p.m. max.; As, 3; and Hg 0.1.

~0 Citings

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535. Spectrophotometric investigation of sucrose **caramelization**

By Sapronov, A. R.

From [Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya \(1963\), \(No. 1\), 33-7](#). Language: Unavailable, Database: CAPLUS

Sucrose **caramelization** products (caramelan, caramelen, and caramelin) gave a spectrophotometric absorption curve in the region from 206 to 330 m μ with max. at 225 and 282 m μ . The intensity of the max. depended upon the prepn. of the caramel. The 1st reaction product had a large max. at 225 m μ , but increasing the deg. of reaction gave a more intense peak at 282 m μ . Caramelan and caramelen in aq. soln. appeared to be in mol. dispersion, but caramelin was in a colloidal dispersion state.

~0 Citings

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536. The kinetics of **caramelization of sugars**

By Ramaiah, N. A.; Agarwal, S. K. D.

From [Proc. Ann. Conv. Sugar Technol. Assoc. India \(1960\), 28, 101-10](#). Language: Unavailable, Database: CAPLUS

Solns. of glucose, fructose, or mannose were heated with alkali at const. temps. in the range 50-80°. The course of the reaction was studied either by measuring the increase with time of the absorbance of the soln. at 420 m μ , or by detg. the unreacted reducing sugar in a small rapidly cooled sample by the Ionescu-Vargolici method. The latter method was preferred in the absence of stoichiometric data on **caramelization**. The order of reaction was calcd. by different methods (from results obtained in the 1st half of the reaction) and was shown to be approx. 1st-order in all cases. A number of graphs, tables, and equations are reproduced, including details of the disappearance of each sugar in 1.115M alkali at 60° from initially 0.5M solns. Rate consts. calcd. from the latter figures were $4.4 \times 10^{-4} \text{ sec}^{-1}$ for glucose and $7 \times 10^{-4} \text{ sec}^{-1}$ for fructose; whereas the glucose value was reasonably const., the fructose value fell from 10 to 5 during the 1st half of the reaction. It is concluded that the **caramelization** of sugars is catalyzed by alkali, which is subsequently neutralized by some of the reaction products, and that the alkali does not react directly with the sugars.

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537. Some factors affecting the degree of precipitation of sucrose with barium hydroxide

By Kalinenko, L. G.; Litvak, I. M.

From [Tr. Kievsk. Tekhnol. Inst. Pishchevoi Prom. \(1960\), \(No. 22\), 7-15](#). Language: Unavailable, Database: CAPLUS

By the conventional lime treatment, some sugar remains in the molasses and must be discarded when the raffinose builds up to 4-6%. The $\text{Ba}(\text{OH})_2$ treatment forms a saccharate of very low soly. without pptg. raffinose and other carbohydrates. This results in a more complete sugar recovery from the sirup. Foreign literature lists many technological methods and patents, but does not provide a detailed description. Most patents make the process too expensive. At the present time, only 3 sugar refineries in Europe and 1 in the U.S.A. use the $\text{Ba}(\text{OH})_2$ treatment. The exptl. program used by the authors consisted of (1) establishing the conditions under which sugar could be recovered most efficiently from pure sugar solns. and from beet sugar sirup, (2) studying the conditions for filtration, washing, satn., and elimination of Ba from solns., and (3) standardizing the method of controlling the process. The expts. were made in closed containers equipped with a speed-regulated stirrer. The temp. of the ingredients, wash water, etc., was kept const. throughout each expt. Increases in the reaction time ranging from 5 to 25 min. did not affect the yield. A temp. above 75° did not increase the yield but sometimes caused discoloration owing to **caramelization**. The proper $\text{Ba}(\text{OH})_2$:sugar ratio was established. The optimum conditions of the process are: time 5 min., temp. 75° , concn. of $\text{Ba}(\text{OH})_2$ soln. 1.3-1.4 mole to 1 mole of sugar, concn. of sirup 25-30%.

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538. Influence of the nickel content in contact catalysts on hydrogenation of glucose

By Sultanov, A. S.

From *Khim. Khlopchatnika, Akad. Nauk Uzbek. S.S.R., Inst. Khim. Rastitel. Veshchestv* (1959), 151-5. Language: Unavailable, Database: CAPLUS

cf. CA 49, 7497b; Hill and Selwood, 43, 8831d. Glucose (I), dissolved in 20% EtOH, was hydrogenated for 1 hr. under 50-60 atm. pressure at $50-150^\circ$ with the use of Ni catalysts (II) prepd. in the form of pressed tablets 4 mm. in diam. contg. 5.3, 10.6, 15.9, 21.2, and 26.5% Ni supported on Al_2O_3 . The study of the % Ni vs. % hydrogenation isotherms showed that the temp. of 120° was optimal, hydrogenation below this temp. was considerably slower, and higher temps. led to marked decompn. and **caramelization** of I. The rate of reaction increased with increase of Ni in II, but concns. above 10-12% resulted in rapid deterioration of tablets. Supported Ni catalysts, prepd. and activated under similar conditions but contg. various amts. of Ni, differed not in their "activity" but in their "effectiveness."

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539. Increasing the activity of a skeleton-type nickel catalyst for hydrogenation reactions

By Lainer, D. I.; Emel'yanov, L. G.

From *Trudy Gosudarst. Nauch.-Issledovatel. i. Proekt. Inst. po Obrabotke Tsvetnykh Metal* (1960), (No. 18), 262-77. Language: Unavailable, Database: CAPLUS

The purpose of this investigation was to develop a skeleton catalyst for the hydrogenation, in aq. medium, of waste carbohydrate materials, (cotton waste, sunflower husk, corn cobs, etc.) in order to produce polyhydric alcs., (e.g. xylitol). Polysaccharides in waste materials would be hydrolyzed first into pentoses (xylose) and hexoses (glucose). Highest practical temp. for hydrogenation was $120-140^\circ$. The control catalyst was Lyubarskii's catalyst made by activating an alloy Ni 48, Al 50, Cr 2 (2.5-2.8%) with alkali. Tests were made by repeated hydrogenation, with 1 3-g. sample of catalyst, of 19 portions of glucose (16% soln.) under H pressure (60 atm.) at 120° , during 1 hr.; 136 alloys were tested. The following 3rd ingredients were added to Ni-Al alloys: Fe, Cr, Cu, Mn, Mo, Ti, Zr, and Co; all form solid solns. with Ni and widen its lattice sufficiently for activation. Cu gave adequate mech. strength, but adequate activity was obtained only at 140° , which was too close to the **caramelization** temp. of sugars. Best results were obtained with Ti (3-4 wt. %) and with a combination of Cr and B (1.0-1.82 and 0.2%, resp.). These catalysts are pyrophoric. A catalyst with 2.75% Ti had an activity 3 times that of the Lyubarskii catalyst (after short initial lag period), and maintained its activity much longer (Lyubarskii after 92 hrs. of work had an activity of 65, while the catalyst with 2.75% Ti had an activity of 85% after 128 hrs.). Catalysts with 1.0-1.5% Cr had higher activity and stability than standard Lyubarskii catalyst with 2.5-2.8% Cr; however, their mech. strength was inadequate. B was tried for increasing mech. strength, it also considerably improved the activity and stability of the catalyst. Best results were obtained with Cr 1.0 and B 0.2%. The mechanism of activity loss during work is discussed. This loss is owing to oxidn. of Ni as well as to action of org. acids (formed from reactions). Improvement in the catalyst activity, owing to addn. of Ti, is ascribed to the increased amt. of NiAl_2 in Ti-contg. alloys. NiAl_2 can be leached out fully with alkalies; other Ni-Al compds. are leached out only partly (NiAl_3 , NiAl_5 , and Ni_2Al_3), or not at all (NiAl , and Ni_3Al). Improving the stability of the catalyst with Ti will be investigated in subsequent research.

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540. Some technological problems in processing spoiled beets and control of technological process in production

By Rychkal, A. G.

From [Sakharnaya Svekla \(1961\)](#), 35(No. 1), 34-6. Language: Unavailable, Database: CAPLUS

The quality of beets varies so much and methods of obtaining juice from them are so numerous that recommendation of one single method is impossible. Even neutral pH varies depending on temp. Thus, the pH of diffusion of carbonatation juice, as well as other beet sugar products, must be detd. at the temp. of processing. With spoiled beets, defecation must be conducted very carefully since all sugar decompn. occurs at that stage. To decrease Ca salts, Na_2CO_3 is used quite frequently. However, Na_2CO_3 is molasses forming, and large losses of sugar occur in molasses. Na_3PO_4 is a more efficient compd. for complete pptn. of Ca salts. To prevent formation of Ca salts, the pH of second carbonatation must be maintained at 9.5-9.8. After second carbonatation, the juice is filtered, and its pH lowered to 7.5-8. Decrease of pH of sirup at evapn. station when spoiled beets are processed is due to continuous decompn. of invert sugars, amino acids, and [caramelization](#). This also results in formation of coloring matters. Sulfitation should be applied on juice of high natural alky. as well on juice of low alky. obtained from damaged or stored beets. For juice of low natural acidity, no deep sulfitation should be applied, and application of Na_2CO_3 for pptn. of Ca salts should be avoided.

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541. Extraction of a flavone glycoside from the leaves of *Bupleurum aureus* and its chemical study

By D'yakonova, L. N.

From [Aptechnoe Delo \(1960\)](#), 9(No. 6), 12-15. Language: Unavailable, Database: CAPLUS

A glycoside was isolated in 1.53% yield from dried, powd. *B. aureus* leaves by extrn. with hot H_2O after a preliminary CHCl_3 treatment. Solubilities and color reactions were characteristic of a flavone glycoside. By elementary analysis, m.p., and comparative paper chromatograms in the system $\text{BuOH}:\text{AcOH}:\text{H}_2\text{O}$ (4:2:4), it was identified as rutin. After hydrolysis in dil. H_2SO_4 , an insol. fraction was sepd. and identified as quercitin. A paper chromatogram of the sol. portion developed by [caramelization](#) at 150° was identical with that of a glucoserhamnose mixt.

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542. Properties of the nonsugars in molasses

By Shul'man, M. S.; Semenovskaya, V. E.

From [Trudy, Tsentral. Nauch.-Issledovatel. Inst. Spirt. i Likero-Vodoch. Prom. \(1959\)](#), (No. 8), 107-10. Language: Unavailable, Database: CAPLUS

cf. preceding abstr. Nonsugar samples are obtained by 2-stage fermentation and subsequent steaming of molasses (I). A considerable quantity of reducing matter is found which increases after inversion in the absence of fermentable sugars. This is confirmed by a comparison of the polarographic wave height of the nonsugar with that of I from which it had been sepd. The bulk of the matter which was reduced at the dropping-Hg electrode before inversion of I consists of nonsugars. Solns. of I ash, i.e., of the inorg. components of the nonsugar, are not reduced. Therefore, wave height before inversion is detd. exclusively by org. compds. The products of [caramelization](#) are reduced and increase the wave height after inversion.

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543. Physical-chemical characteristics of equilibrium in sucrose solutions containing calcium- and magnesium-chlorides

By Bakasova, Z.; Druzhinin, I. G.

From [Izvest. Akad. Nauk Kirgiz. S.S.R. 1, Ser. Estestven. i Tekh. Nauk \(1959\)](#), No. 1, 3-20. Language: Unavailable, Database: CAPLUS

The soly. of a ternary system $C_{12}H_{22}O_{11}CaCl_2 \cdot H_2O$ was investigated by the isothermal method at 25 and 40°. The isotherm had 3 branches. Branches going from the axis of abscissa correspond to crystn. of hydrate salts of $CaCl_2$. Branches extending from the axis of ordinates correspond to pptn. of pure sucrose. The middle branches correspond to the pptn. of the binary compd., $C_{12}H_{22}O_{11} \cdot CaCl_2 \cdot 2H_2O$. Theoretically this binary compd. contains sucrose 69.94, $CaCl_2$ 22.7, and H_2O 7.36%. Analysis shows $C_{12}H_{22}O_{11}$ 68.12, $CaCl_2$ 22.5, and H_2O 9.38%. The soly. of the system $C_{12}H_{22}O_{11}MgCl_2 \cdot H_2O$ was studied at 25 and 40°. In this system only initial components could be crystd. in the solid phase, therefore, the isotherms have only 2 branches. In the intermediate region of satn. of sucrose with $MgCl_2$ there was a growing tendency to form metastable sirupy solns. Study of the heating curves of the binary system, $C_{12}H_{22}O_{11} \cdot CaCl_2 \cdot 6H_2O$, showed that binary, $C_{12}H_{22}O_{11} \cdot CaCl_2 \cdot 2H_2O$ was formed. It lost H_2O steadily up to 130-8°. These sucrose-contg. binary compds. began to decomp. and there was further **caramelization** above 132-150°. The formation of $C_{12}H_{22}O_{11} \cdot MgCl_2 \cdot 2H_2O$ was detd. in the system $C_{12}H_{22}O_{11} \cdot MgCl_2 \cdot 6H_2O$ by the heating-curve method. A region of existence of the binary dihydrate was detd. on the basis of the phys. chem. diagram "compd.-temp." for this system in the temp. range 128-135°. An anhyd. compd. exists above 135°. The binary compd. decomp. above 180-5°, and the products contg. sucrose begin to caramelize. Evapn. of satd. aq. solns. becomes complete above 200-50° and $2MgCl_2 \cdot MgO \cdot H_2O$ is formed. The formation of $C_{12}H_{22}O_{11} \cdot MgCl_2 \cdot H_2O$ appears clearly at high temps., whereas in solns., formation of the binary complex is made difficult by sirup formation and by complicated processes of solvation of sucrose under the effect of hydrated salts of $MgCl_2$. The Ca and Mg salts promote sirup formation and create greater hindrance to sepn. of sugar, industrially. To prevent this, Ca and Mg must be removed carbonates as during the 1st satn. in the industrial process.

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544. Chemical processes of internal combustion of lignite

By Mel, P. K.; Gorshkova, A. M.

From *Trudy Vsesoyuz. Nauch.-Issledovatel. Inst. Torf. Prom.* (1957), (No. 15), 130-56. Language: Unavailable, Database: CAPLUS

Lignite was heated to 100°. The high-mol. polysaccharides and proteins were partly decompd. in the presence of H_2O , and H_2O -sol. compds. were obtained. Micro.ovrddot.organisms further hydrolyzed the lignite at elevated temps. The hydrolysis products were more readily oxidized, mainly in the presence of inorg. compds. Secondary reactions of **caramelization** and dehydration were initiated. These processes depended on the concn. of the dissolved compds. of the lignite. The intensity was max. at 15-50% moisture content. The role of compds. other than hydrocarbons was pointed out.

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545. Biochemical and technological studies on Malayan pineapple, with particular reference to the Singapore canning variety

By Conaty, F. N. G.

From *Malayan Agricultural Journal* (1959), 42, 2-13. Language: Unavailable, Database: CAPLUS

The 4 varieties of pineapple known in Malaya are the Singapore Canning, Selangor Green, Sarawak, and Mauritius. The Singapore Canning and Selangor Green varieties are well balanced in sugar and acid content and have good shape and color. Therefore, they form the bulk of the raw material for Malayan canned pineapple. The total sugar and anhyd. citric acidity (in %) in the 4 varieties were detd. to be, resp.: Singapore Canning 9.02, 0.64; Selangor Green 9.04, 0.46; Sarawak 13.18, 0.78; Mauritius 15.33, 0.55. The ratio of sol. solids (sugars by n) to acidity (as % anhyd. citric acid) is called "true maturity." In the Singapore Canning variety this ratio increased from 14.3 to 20.8, with increased fruit maturity, as judged by toe skin color. Sol. solids are unevenly distributed throughout the various portions of the individual fruit. Total sugars of core and surrounding pulp was 8.22 and 8.92, resp., and in the shell pulp 6.07%. Citric acid was 0.27, 0.70, and 0.56%, resp. Acidity is distributed relatively evenly throughout 4 fruit sections (from bottom = 1 to top = 4) at all levels of maturity. Sugar was in all cases higher in 1 than in 4, e.g., 11.5 and 8.6%, resp., at 75% maturity. Juice was produced by preheating crushed and broken material to 160-90°F. after which it was extd. Preheating inactivates the enzymes, arrests the onset of fermentation, and aids in juice recovery. The bulk of cloudy matter (assocd. with proteins) ppts. with heating. Best quality is obtained if the pH is adjusted to 5.0 before addn. of sugar for sirup prepn. Concn. of juice to 70° Brix was achieved by using a Majonnier low-temp. (64°F.) evaporator. Heating to 190°F. after evapn. resulted in browning and **caramelization**. Preservation by heat requires flash pasteurization and chilled storage. Freezing at 16°F. immediately after evapn., and subsequent storage at 32-6°F. yielded an unchanged product of good keeping quality.

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546. Contraction mechanism and electrolyte balance of the isolated surviving rat heart as related to the action of insulin

By Meyler, F. L.; Offerijns, F. G. J.; Willebrands, A. F.; Groen, J.

From [Nederlands Tijdschrift voor Geneeskunde \(1959\), 103, 1479-86](#). Language: Unavailable, Database: CAPLUS

Isolated rat hearts perfused with the soln. of Gamble (NaCl 7.5 g., KCl 0.35 g., CaCl₂ 0.15 g., NaHCO₃ 1.7 g., NaH₂PO₄ 0.05 g., MgCl₂ 0.1 g., and glucose 2.0 g./l.) lived for 6 hrs. compared to hearts perfused with Tyrode soln. It is concluded that the results are due to the more nearly physiologic compn. of the Gamble soln. Exhaustion during perfusion with Tyrode was accompanied by rhythm disturbances; with Gamble soln. there was a gradual decrease in amplitude and frequency of beats. Insulin (0.5 unit/ml. in Gamble soln.) decreased frequency and amplitude in most cases. Normal conditions were restored by perfusion with insulin-free soln. The effect of insulin is more apparent the longer the heart is perfused. K in intracellular liquid decreased significantly during perfusion, particularly during the first 5 min. Disturbances in heart beat were also accompanied by diminished intracellular K. It was also observed that autoclaved glucose solns. were unsatisfactory, possibly as a result of **caramelization**. Perfusion with essentially inorg. liquids having no colloidal substances cause an immediate increase in intracellular H₂O.

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547. Blood substitutes for transfusion from solutions containing caramellike substances

By Ohtake, Yasuo

From [No Corporate Source data available \(1958\), JP 33007099 19580822](#), Language: Unavailable, Database: CAPLUS

In an example, 100 g. dextrin or sol. starch was treated with 200 ml. 1-2% NaOH at pH 9 and kept for 10 days at room temp. to obtain a red-brown caramel-like soln. About 100 ml. of this soln. mixed with 2-3 g. active C was let stand for several hrs. and then filtered. The filtrate was passed through a cation-exchange resin, and the effluent was acidified with HCl to pH 2. The soln. mixed with 2-3 g. acid clay was kept for several hrs., filtered, and the filtrate passed through an anion-exchange resin to obtain an aq. caramellike soln. This was adjusted to contain 10-20% solids for intravenous injection.

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548. Isolating caramel coloring compounds from caramelized sugars

By Meyer, Alvin L.; Cleland, James E.

From [No Corporate Source data available \(1959\), US 2902393 19590901](#), Language: Unavailable, Database: CAPLUS

The usual acidproof types of com. caramel color, widely used in carbonated beverages, consist of about 70% solids and 30% H₂O. Of the total solids present, only about 25% are color bodies having high tinctorial power, the remainder being uncaramelized sugar or intermediate products resulting from the "burning" procedure. The pure caramel color compd. is isolated by adding to the aq. dispersion of caramelized sugar, sufficient H₂O-sol. alcs. to produce 2 liquid phases. The lower, heavier phase contains almost all of the color bodies, while the upper phase contains substantially all of the uncaramelized sugar, **caramelization** catalyst, etc. After sepn. of the layers, the lower layer can be redispersed in H₂O, stripped of residual alc., and concd. by evapn. under reduced pressure at <150°F. The concd. dispersion can be packed as a liquid, or spray-dried to powder form and packed as such. The upper layer can be stripped of alc. by evapn., thereby obtaining a sirup containing uncaramelized sugar, catalyst residues, etc. After adding fresh make-up sugar to the latter, sufficient to replace the sugar converted to caramel color and process losses, the resulting is re-caramelized and recycled through the sepn. and sirup make-up steps a no. of times, usually until the ash content of the sirup accumulates to approx. 11.0%, upon which the sirup is discharged from the system or diverted to the production of less-crit. caramel colors. Most of the alcs. removed by evapn. are recoverable for re-use. Cf. C.A. 52, 5700e.

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549. Nonenzymic browning

By Telegdy-Kovats, L.; Rajky, A.

From [Nahrung \(1958\), 2, 893-909](#). Language: Unavailable, Database: CAPLUS

Pure glucose solns. (5-20%) were heated at 85-130° in closed ampules. The concn. of ketose, the fluorescence, and the amts. of 0.01N alkali required to neutralize the soln. all increased, and the surface tension decreased with the duration of heating. These changes were greatest at the highest temps. The heated solns. were fractionated on a falling curtain electrophoresis, and the components of each fraction were identified by paper chromatography. Fructose, hydroxymethylfurfural, hydroxyacetylfuran, and dihydroxyacetone were definitely identified as some of the products. Mechanisms for their formation are suggested. Temps. used in this work were not sufficiently high to give browning, but they form the 1st steps in caramelization. 30 references.

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550. Analytical and chromatographic studies of the Maillard reaction. V. Interactions of glucosamine and N-acetylglucosamine with ammonia, amines, and amino acids

By Taufel, K.; Romminger, K.; Rudolf, Irene

From *Ernaehrungsforschung* (1958), 3, 373-85. Language: Unavailable, Database: CAPLUS

cf. C.A. 51, 11415e. D-Glucosamine (I) and I-HCl react with NH_3 on chromatographic paper resulting in a slowly migrating spot which disappears on acidification of the developer. Reaction of I with liquid NH_3 gives a product believed to be amino-D-glucosylamine. Aspartic acid, asparagine, and glutamic acid react with I and I-HCl on paper to give N-glycosidic compds. which are easily hydrolyzed in acid. Phenylalanine, lysine, and arginine do not react with I. N-Acetyl-D-glucosamine (III) is chem. inert as compared to I and I-HCl. I decomp. on warming in sol. leading to **caramelization** and changed reactivity. These changes are favored by amino acids (IV) present, particularly glycine. A suitable chromatographic spray reagent for I, I-HCl, and III, especially in the presence of IV, is prep'd. by mixing 10 parts alc. 2% diphenylamine, 10 parts alc. 2% aniline, and 1 part concd. H_3PO_4 . After spraying, the paper is heated to 100° for color development.

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551. Molasses pigments as an oxidation-reduction system

By Malkov, A. M.

From *Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya* (1959), (No. 2), 45-50. Language: Unavailable, Database: CAPLUS

The oxidn.-redn. properties of reduced and nonreduced molasses pigments were studied by using a sucrose- Fe^{++} - H_2O_2 model. The reduced pigments and sugar **caramelization** products were found to contribute to the oxidn. of sucrose to a greater degree than nonreduced pigments. Fe^{++} inhibited the autoxidn. of reduced pigments, and increasing amts. of Fe^{++} increased the reducing substances in molasses. Addn. of KCN to the system inhibited the breakdown of sucrose by both reduced and nonreduced pigments. Because of the oxidn.-redn. properties of molasses pigments, it was suggested that they may play a detg. role in oxidn.-redn. processes in alc. fermentation and yeast culture.

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552. Sugar losses due to decomposition and **caramelization** during heating

By Khomchuk, G. A.; Tverdokhlebov, L. S.

From *Sakharnaya Svekla* (1958), 32(No. 11), 19-21. Language: Unavailable, Database: CAPLUS

Losses resulting from thermal decompn. of sugar may reach high proportions. To decrease these, it is necessary to decrease the period of heating by proper arrangement of evaporators and rapid flow of juices. The heating surface should not be excessive in evaporators and should not exceed 240-250 sq. m./100 tons of beets. The steam temp. should not exceed 135°. All products beyond thick juice must have pH 7.0-7.3. The losses of sugar in pressure evaporators are higher than in evaporators operated under high vacuum.

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553. New extraction process improves paprika color

By Todd, Eric C.

From *Food Engineering* (1957), 29(No. 8), 82-3. Language: Unavailable, Database: CAPLUS

A new com. process for extg. oleoresin color from fresh chili peppers is described; previous processes used dried peppers. The product is free from gums and the scorched odor and bitter taste caused by **caramelization** of sugars extd. in the conventional process. Prepd. fresh peppers are disintegrated in the presence of water to produce a puree, the protein denatured, and the supernatant liquor contg. sugar and gums discarded. The pptd. curd is concd. by centrifuging and extd. with acetone. The ext. is filtered with diatomaceous earth, and the acetone removed in vacuo.

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554. Origin of the carbon dioxide produced in the browning reaction of evaporated milk

By Dutra, R. C.; Tarassuk, N. P.; Kleiber, Max

From [Journal of Dairy Science \(1958\)](#), 41, 1017-23. Language: Unavailable, Database: CAPLUS, DOI:10.3168/jds.S0022-0302(58)91045-2

To det. the relative importance of lactose **caramelization** in the browning of evapd. milk, uniformly labeled lactose was added to milk samples before sterilization. The CO₂ produced in the browning reaction was recovered as BaCO₃ and its specific activity was detd. It was found that about 4% of the total CO₂ produced by sterilization of milk at 242°F. for 15 min. can be traced to **caramelization** of lactose.

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555. Determination of the color of honey

By Barbier, E. C.; Valin, J.

From [Annales des Falsifications et des Fraudes \(1957\)](#), 50, 400-11. Language: Unavailable, Database: CAPLUS

Sucrose heated for **caramelization** to 200° did not give a satisfactory color standard for comparison with honey because the degree of carbonization was highly variable. A soln. of 25.4 g. I and 25 g. KI in H₂O to make 1000 cc. gave on diln. a good color scale. Honey corresponding to a "water-clear" rating corresponded to less than 19.5 mg. I/l.; white honey to 19.5-81.5, yellow to 81.5-342, gold to 342-1430, amber to 1430-6000, and dark to 6000-25,400. For measuring, and compensation for, turbidity, a BaSO₄ suspension standard was used. Certain honeys, which have a reddish tint, cannot be matched against I alone. A dil. soln. of phenol red in a buffered soln. of a pH above 8.4 was placed behind the I tube until the colors matched.

~2 Citings

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556. Treating of potatoes to prevent **caramelization** during frying

By Janis, Martin A.; Bremforder, Ernest G.

From [No Corporate Source data available \(1956\)](#), US 2762709 19560911, Language: Unavailable, Database: CAPLUS

Potato slices are treated to prevent **caramelization** upon subsequent deep-fat frying by passing them through a treating zone contg. water at 150-60°F. The rate of movement of the slices is such as to allow contact at the temp. indicated for 2.5-8 min. Fresh hot water is admixed with the blanching water at a rate of at least 0.1 gal./hr./lb. of slices, and blanching water tailings are withdrawn at approx. the same rate.

~1 Citing

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557. The heat-treatment of milk

By Kay, H.

From [Milchwissenschaft \(1957\)](#), 12, 198-202. Language: Unavailable, Database: CAPLUS

Curves are shown defining the min. time required at various temps. to effect the following: ultra-, short-time, and long-time sterilization, killing of spores, development of cooked flavor, browning, vitamin destruction, coagulation of whey proteins, destruction of peroxidase and phosphatase, and killing of lactobacilli, coli, and tuberculosis organisms. Heat-treatment is required in the processing of all products to fulfill hygienic requirements; in market milk to improve in addn. keeping qualities without damage to the cream line and without development of a cooked flavor; and in sour- and yoghurt-milk production to effect the most extensive coagulation of albumin without the simultaneous occurrence of browning or **caramelization**. In cheese-making curd impairment through excessive heat must be avoided.

~1 Citing

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558. Products of sugar degradation and their effect on the properties of caramel

By Sokolovskii, A. L.; Nikiforova, V. N.

From [Zhurnal Prikladnoi Khimii \(Sankt-Peterburg, Russian Federation\) \(1957\), 30, 1261-3](#). Language: Unavailable, Database: CAPLUS

cf. C.A. 46, 5967d. Sepn. of the products of degradation of sugars during **caramelization** was effected by paper chromatography. Hydroxymethylfurfural (I) formed in appreciable quantities in dil. sugar solns., but very little in concd. (70%) solns. and then only after prolonged heating. Condensation products (II) formed in appreciable amts. in concd. soln. Apparently H₂O accelerates irreversible processes, i.e. dehydration resulting in I and humus (cf. C.A. 44, 5212c). To study the effect of these products on the properties of caramels they were added in relatively pure states during the process of **caramelization**. I was prepd. by EtOAc extrn. from sugar solns. refluxed 20 hrs. and decolorized with activated C. Humus was prepd. as a slightly-sol. brown powder or as a colored soln. by dialysis of a heated soln. of sucrose. II was obtained by fermentation of a 7-8% sucrose soln. The addn. of I (0.37 and 0.73%) and of humus (0.25 and 0.1%) gave caramels which crystd. after 1-2 days. Caramels with 1.3% II crystd. after 6 days and those with 10% II did not crystallize after 6-8 months. The presence of fructose tends to form hygroscopic material.

~0 Citings

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559. Removal of haze from alcoholic liquors

By Bronn, W.

From [Branntweinwirtschaft \(1957\), 79, 347-54](#). Language: Unavailable, Database: CAPLUS

Identification reactions for sources of haze were described. Ca, Mg, Fe, Al, and sulfate inorg. materials were identified by ppts. and color reactions. Tartaric acid and salts give color with gallic acid and H₂SO₄. Citric acid was heated with thionyl chloride, H₂SO₄ added, and the soln. concd. till SO₃ vapors sep., then fluorescence in UV light occurs in water made alk. with NH₃. Etheral oils, terpenes, etc., were shown by phys. properties. Dextrins were best hydrolyzed and tested for carbohydrates by the anthrone reagent or redn. of Cu solns. Tannins can be detected with Fe alum or α,α -dipyridyl. For albumin the xanthoproteic reaction or biuret reaction can be used. **Caramelization** products and vegetable dyes are identified by properties of their solns.

~0 Citings

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560. Spot reaction experiments

By Feigl, Fritz

From [Journal of Chemical Education \(1957\), 34, 457-8](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ed034p457

(1) A few mg. of a dry mixt. of KNO₃ and sugar heated in a microtube to **caramelization** on a steam bath gives a red spot test on filter paper moistened with Griess reagent (equal vols. 1% soln. sulfanilic acid in 30% AcOH and 1% soln. 1-naphthylamine in 30% AcOH) to identify HNO₂. (2) In the absence of H₂O, 10 mg. of Bz₂O₂ and 1 drop concd. HNO₃ heated on a steam bath gives a red spot test for HNO₂ immediately with Griess reagent. Nitrates of aliphatic bases give a similar test after 2 min. (3) One-2 mg. of thiourea with 1 drop 10% Bz₂O₂ in C₆H₆ heated to dryness on a water bath and transferred to a glycerol bath at 120° gives a black spot test in 2 min. on filter paper moistened with Ni(OH)₂. Thioketo groups give an analogous reaction on oxidation to SO₂. (4) A microdrop of concd. thioglycolic acid with several mg. of Bz₂O₂ at 100° gives a black spot test with Pb(OAc)₂ paper. The H₂S test is characteristic of aliphatic thiol compds.

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561. New equipment, better QC spark gains for sterilized milk

By Shuval, Hillel

From [Food Engineering \(1956\), 28\(No. 7\), 72,75,179-81](#). Language: Unavailable, Database: CAPLUS

Certain chem. and phys. changes occurred in milk during complete sterilization. Lactose was partly oxidized and formed org. acids, and was caramelized to some degree. Protein breakdown occurred to a slight degree, and the viscosity increased. Little loss of vitamin D and carotene occurred during sterilization, but vitamin A was reduced 12%, B₁ 20-50%, and C almost completely destroyed. During storage in the light, vitamin A content dropped as much as 40% in 2 months, B₂ 60% in 3 months, and C was rapidly destroyed. There was no significant difference between sterilized and pasteurized milks as far as availability of proteins, butterfat, lactose, and minerals were concerned. Bitterness was encountered in the sterilized milk at times, but no cause has been detd.

~0 Citings

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562. The determination of organic acids in wines

By Sapondzhyan, S. O.; Gevorkyan, Kh. S.

From [Vinodelie i Vinogradarstvo SSSR \(1956\)](#), 16(No. 8), 10-15. Language: Unavailable, Database: CAPLUS

Citric acid was detd. by modified methods of Kometiani (C.A. 26, 669) and Saburov, et al. (C.A. 34, 1407⁸). Evap. 25 ml. of dry wine on a water bath to 0.5 vol., cool, and add 5-10-ml. portions of 5% KMnO₄ until MnO₂ appears. Let stand 10 min. at 20-5°. Dissolve the MnO₂ with Mohr's salt, let stand overnight at 8-10°, filter, and wash the ppt. with ice water. Dissolve the ppt. in 95% EtOH, add 100 mg. H₂C₂O₄ and 0.5g. KI, heat at 65-70° for 20 min., dil. to 200 ml. with water, and titrate with 0.01N Na₂S₂O₃. Before detg. citric acid in sweet wines, sep. org. acids by pptn. with Pb(OAc)₂ (1-1.2 ml. of 5% Pb(OAc)₂/g. of the titrated acid). To decolor colored wines neutralize 25 ml. of wine and treat with 1-5 ml. of a 1:1 mixt. of 15% ZnSO₄ soln. and 4% NaOH soln. Boil dry wine for 5 min., but heat sweet only to the b.p. Det. lactic acid by a modified iodometric method (Valyuzhenich, Trudy Nauch. Issledovatel. Plodoovoshchnogo i Enokhimicheskogo Inst. 2,123(1931): Neutralize the wine with 0.1N NaOH, evap. to dryness, dissolve the residue in hot water, transfer to a 100-ml. volumetric flask, add 1 g. CaO/0.1 g. sugar in the wine and 5 ml. of 10% CuSO₄, mix 10-15 min., dil. to the mark, and filter. To 50 ml. of filtrate add 2-2.5 ml. concd. H₂SO₄, oxidize with 0.05N KMnO₄ (1 drop per sec.), and heat 5-10 min. Distil AcH in a soln. of bisulfite. Oxidize excess bisulfite with 0.1N I. Add 1-2 ml. satd. Na₂CO₃, and titrate the formed bisulfite with 0.01N I. To det. tartaric acid evap. 50 ml. of wine to 0.5 vol., neutralize with 0.1N NaOH, add 1-1.2 ml. of Pb(OAc)₂/g. titrated acid and an equal vol. of 96% EtOH, let stand 1 hr., filter the org. salts, decomp. the Pb salts by H₂S, filter, wash with H₂S + water, and boil the filtrate for complete removal of H₂S. Det. the concd. soln. of acid chromatographically. Dry wines do not require the preliminary treatment with Pb(OAc)₂. To increase the accuracy of acidimetric detn. of tartaric acid it is necessary to add twice as much 96% EtOH and to wash the obtained ppt. of KHC₄H₅O₆ with KCl in aq. EtOH soln. until complete removal of AcOH.

~0 Citings

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563. Heat-treatment of wine stocks of various composition

By Kazumov, N. B.; Alaverdyan, M. B.; Akhnazaryan, R. N.

From [Izvest. Akad. Nauk Armyan S.S.R., Biol. i Sel'skokhoz. Nauki \(1956\)](#), 9(No. 9), 103-7. Language: Unavailable, Database: CAPLUS

White heavy wines (I) and tight table wines (II) were subjected to heat-treatment at 60° for 35-40 days. Analyses show that I contain more peroxide, polyphenols, and acetals than II. The tannins and coloring substances of the wine stock play an important part in the change brought about by heat-treatment. The bouquet and flavor of Madeira is formed under the influence of the temp., the O of the air, and peroxides acting on the tannins, and coloring substances. It is assumed that oxidation of catechols takes place in the compds. of the quinone type. The presence of sugar in the wines brings about a Madeira with a caramel tone.

~0 Citings

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564. Canning of evaporated and fresh milk

By Borg, Edward M.

From [No Corporate Source data available \(1957\)](#), US 2776213 19570101, Language: Unavailable, Database: CAPLUS

Samples of heat-treated milk from several batches are exposed to a beam of "black light," i.e. light from a Hg lamp through a red-purple filter. Each batch is graded according to fluorescence in the color range white to bright yellow, corresponding to max. and min. [caramelization](#) of the milk. Batches of milk with opposite degrees of fluorescence are then mixed to obtain a uniform product of optimum flavor characteristics.

~0 Citings

565. Radiation preservation of milk and milk products. IV. Radiation-induced browning and some related chemical changes in milk

By Wertheim, J. H.; Proctor, B. E.; Goldblith, S. A.

From [Journal of Dairy Science \(1956\)](#), 39, 1236-45. Language: Unavailable, Database: CAPLUS, DOI:10.3168/jds.S0022-0302(56)94841-X

cf. C.A. 50, 10940d. Ionizing radiations were found to induce the sensitivity of milk to nonenzymic browning, even when the milk was heated for only a few min. at 100°. Radiation-induced changes of lactose were found to be largely responsible for induced browning sensitivity as well as for the production of thiobarbituric acid reactants. The interreaction of lactose with casein in a model system during irradiation increased the intensity of both reactions. The precursors of both reactions seemed to be produced by the indirect action of ionizing radiations, and the intensity of these reactions was found to increase with dose. The relative quantity of browning precursors was measured as the increase in optical d. of digested milk after heat treatment. This value was taken as an objective indicator of radiochem. changes within the lactose-protein complex of irradiated milk. Radiation-induced browning was prevented when carbonyls were eliminated from the irradiated system. Two types of nonenzymic browning were observed. One of these closely resembled the Maillard type of browning of heated milk and exhibited fluorescence in ultraviolet light. A 2nd radiation-induced sensitivity to **caramelization** was observed in systems that were free of amino groups. These precursors did not fluoresce after browning. The formation of furans could not be observed in either type of browning. Irradiation of lactose solns. per se as well as in the presence of amino compds. caused formation of reductone-like substances. The findings on detn. of carbonyls suggest that these reductones may be in equil. with their dehydro form. These studies on radiation-induced browning indicate that the formation of labile sugar chains need not necessarily be preceded by the formation of N-glycosides. The formation of labile sugar chains with subsequent dehydration, the formation of reductones, and subsequent browning may be catalyzed by oxidative free radicals.

~1 Citing**566. Ultrasonic pulverizer**

By Lecher, Joseph

From [No Corporate Source data available \(1956\)](#), US 2752097 19560626, Language: Unavailable, Database: CAPLUS

The app. described uses a dry or nearly dry gas or a mixt. thereof to vibrate the precrushed dry solids at ultrasonic frequencies. It is suitable for many uses, such as coating ultrafine particles with surface-active compds., treating of wood pulp to dry and deoxidize it, and deodorization of many substances. By varying the gaseous atm., hydrolysis of starch to sugar, **caramelization** of sugar or milk powder, etc., may also be accomplished with aid of the app.

~3 Citings**567. Internal corrosion of tin plate cans by acid foods**

By Cheftel, H.; Monvoisin, J.; Swirski, Malwina

From [Journal of the Science of Food and Agriculture \(1955\)](#), 6, 652-5. Language: Unavailable, Database: CAPLUS, DOI:10.1002/jsfa.2740061102

The anodic behavior of Sn vs. Fe in the corrosion of Sn plate by acid foods can be predicted theoretically by employing Nernst's equation. Theories concerning the discrepancy between the amt. of H evolved and that corresponding to the metal dissolved are discussed, and an electrochem. mechanism is suggested to account for the phenomenon. Slight **caramelization** acts as a powerful agent in the acceleration of Sn-plate corrosion by certain fruit products. Caramel from sucrose exerts no accelerating effect, caramel from dextrose does. The accelerating activity of caramel from different sugars may be assocd. with the presence of reducing groups therein.

~0 Citings**568. Effect of the medium reaction on the adsorption of coloring matter in sugar production by activated carbon**

By Barabanov, M. I.

From [Trudy Kiev. Tekhnol. Inst. Pishchevoi Prom. \(1953\)](#), (No. 13), 29-31. Language: Unavailable, Database: CAPLUS

In acid media the adsorption by activated C is higher than in alk. The decreasing order in which the substances are adsorbed in acid media is: decompn. product of the glucose by lime, sugar **caramelization** products, then melanoid. In alk. medium at pH 9.0 the adsorption order for molasses is: melanoid, molasses coloring matter, then caramel.

~0 Citings

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569. Determination of ethanol in sweet wines and similar beverages. I

By Cortes, Mareca; Salcedo, M. de Campos

From [Annales des Falsifications et des Fraudes \(1955\)](#), 48, 479-83. Language: Unavailable, Database: CAPLUS

If wines contg. more than 30 g./l. sugar are distd. with borate buffer at ordinary pressure, the borate has no buffer action; the pH decreases before distn. and **caramelization** of the sugar leads to errors. The wine should be neutralized with N NaOH against phenolphthalein and added with 25 cc. of phosphate buffer pH 8, composed of 96.9% $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$, 11.876 g./l. and 3.1% of KH_2PO_4 , 9.078 g./l. The distn. is carried out at 45 cm. Hg pressure.

~0 Citings

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570. Discrimination of brewed sake from synthetic sake. I. Caramelizing reaction of sugar in alkalinity

By Sato, Shin; Harada, Tetsuo

From [J. Soc. Brewing \(Japan\) \(1954\)](#), 49, 535-40. Language: Unavailable, Database: CAPLUS

The buffer action of brewed sake (I) was higher than that of synthetic sake (II). When 2 cc. 0.1N NaOH was added to 10 cc. sake after neutralization, pH values attained were 9.0-10.5 for I and 11.0-11.5 for II. Therefore, the types of sake could be distinguished easily by detg. the buffer action in alky. The caramelizing reaction was governed by the pH of the reaction mixt.; 0.3% sugar was sufficient to develop color, and amino acids suppressed color development by acting as a buffer. Sake (10 cc.) was neutralized with 0.1N NaOH, 2 cc. 0.1N NaOH added, the mixt. heated for 10 min., and the transmittance of the reaction mixt. at 430 m μ was compared after cooling. Transmittances were 90-80 for I and 25-55 for II.

~0 Citings

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571. Glucosamine 6-(dihydrogen phosphate)

By Anderson, J. M.; Percival, Elizabeth

From [Chemistry & Industry \(London, United Kingdom\) \(1954\)](#), 1018. Language: Unavailable, Database: CAPLUS

The title compd. (I) was prepd. by stirring dry glucosamine-HCl (II) with metaphosphoric acid for several hrs. with MeCN added to prevent excessive **caramelization**. After removal of MeCN the crude product was isolated by washing the residue with isopropanol and anhydrous ether and the residue treated once more by the above procedure. The product thus obtained was hydrolyzed with HCl at 100°. The residue obtained on evapn. to dryness contained I and II. These were sepd. by pptg. the Ba salt of I with ethanol. Repeated dissolution and repptn. gave a cream-colored product identified as I by chromatography, microanalysis, and periodic acid oxidation.

~0 Citings

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572. The cerebrospinal fluid **caramelization test**

By Sole, A.

From [Deutsche Medizinische Wochenschrift \(1955\)](#), 80, 869. Language: Unavailable, Database: CAPLUS

Spinal fluid (3-5 ml.) was autoclaved for 1 hr. at 1.5 atm. and the glucose content was estd. qualitatively from the degree of browning. No **caramelization** was obtained at or below 40 mg. % glucose. The test was used in the diagnosis of tuberculous meningitis in which low glucose values were observed.

~0 Citings

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573. The effect of added adenylic acid upon the keeping time of preserved blood prepared in different media

By Svetsitskaya, M. B.

From [Byulleten Eksperimental'noi Biologii i Meditsiny](#) (1955), 39(No. 2), 39-42. Language: Unavailable, Database: CAPLUS

Addn. of adenylic acid (I) delays hemolysis. Since I undergoes gradual decompn., periodic addns. are necessary to prolong the hemolysis as much as possible. Since sterilization of the medium, neutral Na citrate and glucose, causes the latter's **caramelization**, other media were tried: acid Na citrate plus glucose, and acid sodium citrate plus glucose plus saccharose. A single addn. of I does not prolong the hemolysis; saccharose appears to accelerate the process. Instead of addg. I to the blood at the time the latter was mixed with the preserving medium, the addn. was carried out 30 days later. The amt. of I was tested at frequent periods and fresh quantities were added while the disintegration was still slight; thus it was possible to prolong the hemolysis for 10-14 days longer than when no I was added or when the addn. took place at the time the blood was processed.

~0 Citings

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574. Role of iron in the coloration of gur

By Jatkar, S. K. K.; Dangre, A. J.

From [Deccan Sugar Technol. Assoc. 10th Ann. Conv.](#) (1953), (Pt. 1), 65-8. Language: Unavailable, Database: CAPLUS

Some analytical results are given which show that the color of gur increases with the Fe content, though **caramelization** and other factors may play a minor part. The Fe forms dark compds. with tannins.

~0 Citings

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575. The browning reaction in foods

By Heintze, K.

From [Deutsche Lebensmittel-Rundschau](#) (1955), 51, 69-75. Language: Unavailable, Database: CAPLUS

The enzymic and the nonenzymic browning of foods and the **caramelization** of sugars are discussed. 47 references.

~0 Citings

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576. Conditioning of honey

By Helvey, T. C.

From [Industries Agricoles et Alimentaires](#) (1953), 70, 401-4. Language: Unavailable, Database: CAPLUS

An app. (illustrated) is described for improving the color and flavor of honey by removal of colloidal substances and colored materials at reduced pressures. The η of the honey is reduced by diln. to 60% sugar content at 70°. This soln. is passed through an exchange-resin column at pH 4.3 where colloidal impurities are removed. Colored materials (carotenoids and anthocyanins) are removed by activated C and subsequent filtration. Passage through a cation-exchange resin column adjusts the pH to 3.2 and the soln. is then concd. **Caramelization** is avoided by rapid cooling after evapn. Volatile esters lost during the process can be recovered and returned to the honey.

~0 Citings

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577. Thermal treatment of strong dessert wines

By Gerasimov, M. A.; Politova-Sovzenko, T. K.

From [Biochim. Vinodeliya, Akad. Nauk S.S.S.R., Sbornik](#) (1950), 3, 147-70. Language: Unavailable, Database: CAPLUS

Strong grape wines (18.5-20% alc.) were heat-treated at 70° for 60 days and at 40-45° at 10 and 30 days, in 0.75-l. glass bottles with no access to O, with access to O (13 mg. O/l.), satd. with O (86 mg. O/l.), and with 1/2 the bottle air chamber (275 mg. O/l.). After that their chem. (alc., aldehydes, acetal, volatile esters, titratable acidity, volatile acids, tannins, sugar, and total N), phys. (the relative color change, transparency, **caramelization**, e.m.f. E_H , r_H , and pH), and organoleptic characteristics (flavor, bouquet, and taste) were detd. The chem. changes with the time of treatment were typical for the formation of Madeira wine. At 70°, the greatest changes were with the largest amt. of O; aldehydes increased from 37.8 to 120.0, acetal from 21.2 to 41.2, volatile esters from 405 to 756.8 mg./l., while E_H decreased from 377 to 272, e.m.f. from 132 to 23.5 mv., and r_H from 20.04 to 16.48. Organoleptic qualities depended on temp., duration of the treatment, and presence of O during the processing. In the presence of a large quantity of O dissolved in wine a typical bouquet and taste of the Madeira type of wine is formed. The heat-treatment without O causes the formation of the dessert-type of wine. Duration of the treatment with normal access of O is a function of the temp.: at 40, 45, 50, and 60° a good-quality port wine is formed during 25, 20, 15, and 10 days, resp. However, the best-quality dessert wines are formed when processed without O: good products were obtained by 3-day treatment of wine at 70° followed by 10 days at 40-45°. Oxidation-reduction reactions are mainly responsible for the formation of the particular type of wine.

~0 Citings

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578. Preparing polyalcohols by reduction of sugars

By de Nooijer, Christiaan N. J.; Koome, J.

From [No Corporate Source data available \(1953\)](#), NL 72054 19530415, Language: Unavailable, Database: CAPLUS

The catalytic hydrogenation of sugars and carbohydrates such as dextrans to polyalcs. with Ni catalysts at elevated pressure and temp. is improved by leading an aq. soln. of the sugar in a thin layer, together with H, downwards over a catalyst contg. more than 20% Ni metal. Preferably the catalyst is prepd. by pptg. Ni from a soln. of a Ni salt as a hydrosilicate, mixing the ppt. with a carrier, such as white bauxite, β - Al_2O_3 , sintered kieselguhr, or clay, forming the mixt. into pellets, etc., by pressure, drying, and reducing. The pressure during the hydrogenation may vary from 50 up to 150 atm. and the temp. is above 100°, e.g. 120-50° for sugars, and 180-220° for carbohydrates. As starting materials solns. of glucose, sirups obtained by hydrolysis of starch such as massecuite, dextrin-contg. sirups, slightly hydrolyzed starch, or potato starch itself may be used. It is advantageous to carry out the catalytic treatment in 2 or more stages of increasing temps. E.g. massecuite with a dry content of 85% glucose + 15% dextrin, in a 30% water soln. is carried over a Ni hydrosilicate-bauxite catalyst contg. 40% Ni, and the hydrogenation effected in 3 stages in vertical columns with a catalyst bed 1 m. high and 5 sq. cm. in. diam., pressure 150 atm., 0.5 kg. soln./l. catalyst/hr., 1000 l. H/kg. soln. In the 1st stage at 120-30° the glucose content is diminished to 70%, in the 2nd at 140-50° to 1.6%; in the last stage the dextrin is hydrogenolyzed (i.e. hydrolyzed and simultaneously hydrogenated). The dry matter in the end product consists of 99% sorbitol, 0.8% dextrin, and 0.1% glucose. No **caramelization** takes place, only traces of Ni dissolve in the soln., and the yield is nearly quant.

~0 Citings

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579. To perfect sugar refining

By Volokhvyanskii, V. M.

From [Sakharaya Promyshlennost \(1946-1955\) \(1953\)](#), 27(No. 3), 17-21. Language: Unavailable, Database: CAPLUS

Several modifications can considerably improve the refining process. Increased heating surface and vacuum in vacuum chambers for drying pressed refined sugar will decrease time of drying. Alkalization of all hot waters used in the refinery will decrease inversion. Regular maintenance of steam valves to vacuum pans will prevent leakage of steam into calandrias and therefore will eliminate **caramelization** of sugar while filling the pan with sugar liquor. Uniform cycle of centrifugals will maintain uniform moisture in refined wet sugar, which will permit better pressing. Artificial cooling of low-grade massecuites with subsequent reheating is recommended. Cooling of refined sugar massecuites in crystallizers will decrease purity of final refinery run-off.

~0 Citings

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580. Effects of inorganic compounds on the formation of color in sugar solutions

By Ledon, A. Carreras; Larraneta, J. C. Pita

From [Boletin Oficial de la Asociacion de Tecnicos Azucareros de Cuba \(1952\)](#), 10, 11-20. Language: Unavailable, Database: CAPLUS

cf. C.A. 44, 7075e. Studies have been made of the effect of 2% Na_2SO_3 , or 2% $\text{Na}_2\text{S}_2\text{O}_4$, or a mixt. of 1% Na_2SO_3 + 1% TiO_2 on the absorption spectrum of a mixt. of 48% sucrose, 8% glucose, and 44% S.ovrddot.orenson buffer, made up to 56° Brix, at pH 5.9, 7.0, or 8.0, during heating at 60° for 20 hrs. The sugar soln. was used alone for tests on **caramelization**, or with the addn. of 1.2% Na glutamate and 0.4% asparagine (concns. in the final sirup) to test melanoidin formation, or with 0.01% each of tannic acid and Fe filings to test other coloration effects. In some cases difficulties were experienced in regard to turbidity (especially with the TiO_2), but repeated centrifuging usually yielded an apparently clear liquor. The absorption spectra between 350 and 650 $\text{m}\mu$ are illustrated, together with comparative curves for the sirup heat-treated without the inorg. addns., i.e. alone or with only the org. addns. Small graphs are also given of the ratio of the extinction coeffs. at 500 $\text{m}\mu$ of the mixts. with and without the inorg. addn. Further graphs show the effect of the different pH conditions in each case. The results show that $\text{Na}_2\text{S}_2\text{O}_4$ is the most efficient product studied for decolorizing power; its effect is greatest at pH 8, especially in regard to melanoidins and tannins. Na_2SO_3 reduces color formation only with melanoidins at pH 8.0 and tannins at pH 7.0; with **caramelization** and tannins at pH 5.9 its effect is doubtful. In other cases, color is increased. The TiO_2 + Na_2SO_3 mixt. reduces color only with melanoidins and tannins at pH 8.0; in other cases the color is increased. It is known that TiO_2 absorbs amino acids selectively, but the other effects were unexpected.

~0 Citings

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581. Comparative spectrophotometric study of the factors affecting the formation of colored substances during the manufacture of sugar

By Ledon, A. Carreras; Larraneta, J. C. Pita

From [Boletin Oficial de la Asociacion de Tecnicos Azucareros de Cuba \(1950\)](#), 8, 457-66. Language: Unavailable, Database: CAPLUS

Absorption curves, detd. by a Beckmann spectrophotometer over the range 350-600 $\text{m}\mu$, are illustrated; these curves show the effects of **caramelization** (heating for 20 hrs.) at varying temps. and pH in glucose, fructose, or sucrose solns. or in a mixt. contg. 64% sucrose and 3% each of glucose and fructose. Color formation is directly proportional to temp. (at const. pH) for most of the range of wave length; the color increases markedly with pH, especially at pH 8. Melanoidin formation with asparagine has been followed similarly; the absorptions show an exponential relation to asparagine concn. The changes with pH show a max. in the curve at pH 7. The pigment produced by tannic acid plus Fe in the presence of sugar has been examd. also; the effect of temp. on this reaction is masked partly by **caramelization**. These curves are all continuous, with the highest absorptions at 350 $\text{m}\mu$ and the lowest at 600 $\text{m}\mu$. The slopes are of a uniform character for **caramelization** and tannic acid-iron, but show characteristic slight changes about 400-450 $\text{m}\mu$ for the melanoidins. Curves for sugar-industry liquors (fresh and heated juice, molasses, etc.) show considerable similarities, indicating the probable identities of their pigments with the lab.-produced substances.

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582. Rapid method for determination of moisture in white sugar, raw sugar, and refined sugar

By Zaleski, J.; Rzendowska, F.; Brzeski, M.

From [Gas. Cukrownicza \(1952\)](#), 54, 61-3. Language: Unavailable, Database: CAPLUS

In the Russian and international method, dry about 10 g. of the sugar, ground if necessary, in a dish 50 mm. wide, 30 mm. high, with a ground-edge lid, to const. wt. at 100° in a vacuum oven (40 cm. pressure) or at 105° in an ordinary oven; the dish, with the lid on, is cooled in a desiccator before weighing; heating is continued until the difference in weight is ≥ 0.001 g. The time required for the detn. is about 4 hrs. in the vacuum oven or 5 1/2 hrs. in the ordinary oven. Tests at lower vacuum showed no improvement. Tests at higher temps. showed that accurate results were still obtainable at 130° (ordinary oven) when only 15-min. heating was required. No **caramelization** was observed, and no significant increase in invert sugar content was found; a slight color increase was observed. A no. of comparative detns. at 105° and 130° are tabulated for various sugars and show good agreement. Therefore the rapid method is recommended to save time.

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583. Polarographic behavior of pyruvic acid in the presence of grape juice

By Markman, A. L.; Tur'yan, Ya. I.; El'gort, V. M.

From [Zhurnal Prikladnoi Khimii \(Sankt-Peterburg, Russian Federation\) \(1953\)](#), 26, 500-4. Language: Unavailable, Database: CAPLUS

In grape juice as well as in solns. of glucose the half-wave potential of pyruvic acid is shifted to the neg. side; enolization of pyruvic acid cannot be observed under these conditions. The shift increases with increased amount of grape juice or glucose. The cause of the shift appears to be the presence in the soln. of products of **caramelization** of sugars, which contain some pyruvic acid. In fermenting juice (pH 3.2-3.4) the half-wave potential of pyruvic acid ranges from -1.06 to -1.10 v. At the same pH in the absence of juice the potential is -0.8 to 0.84 v.

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584. Rapid determination of pre-existent sugars in flour

By Cuneo, R.

From [Selezione tec. molitoria \(1953\)](#), 4, 15-19. Language: Unavailable, Database: CAPLUS

Caramelization of sugars when heated with alkali is used to measure total and reducing sugars present in flour. These with the gluten quality, permit the estn. of the baking quality. For total sugars a suspension of flour in H₂O is made at 20° and rapidly filtered. Sucrose is converted to invert sugars by heating with 0.01N HCl. This is neutralized. One part N NaOH is added to 4 parts of the ext. This is brought to boiling, cooled, and the color read in a photoelec. colorimeter. Results are expressed as invert sugar. By omitting the inversion the same procedure can be used to det. reducing sugars. The difference gives sucrose. Total pre-existent sugars can be run in 30 min., thus it is not necessary to stop diastatic activity.

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585. The natural concentration of deuterium in honey

By Helvey, T. C.

From [Science \(Washington, DC, United States\) \(1953\)](#), 117, 276-7. Language: Unavailable, Database: CAPLUS, DOI:10.1126/science.117.3037.276

D was detd. by using a mass spectrometer, on several fractions from partially cryst. 1951 buckwheat honey from the Finger Lakes region. The fractions were: M (water volatile at room temp.), M₂ (crystal water, obtained by heating until the first signs of **caramelization**), S (caramelized honey remaining from M₂), D (crystals, mainly dextrose, sepd. by vacuum filtration), L (supernatant from D contg. 36% more levulose than dextrose). Mole % excess D in fractions were: M 0.0025, M₂ 0.0025, S 0.0041, D 0.0031, L 0.0044, wax 0.0028. The values obtained were based upon a water standard contg. 0.0148 mole % D.

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586. Nitrogen-containing feed supplement

By Stiles, Hugh R.

From [No Corporate Source data available \(1952\)](#), US 2603567 19520715, Language: Unavailable, Database: CAPLUS

NH₃ is caused to react with sugar-contg. materials, such as cane or blackstrap, inverted, or wood-sugar molasses, hydrol syrup, condensed distillers molasses solubles, and condensed citrus solubles, to give products contg. N which may be efficiently utilized by ruminants. The NH₃ is passed into the sugar-contg. materials at 60-80° for 6-12 hrs. Higher temps. give faster ammoniation. Thus at 140°, 5-15 min. are required, but at still higher temps., there is danger of **caramelization**. Continuous ammoniation of citrus molasses was effected by pumping a mixt. of 13.5 lb. NH₃ and 538 lb. molasses at the rate of 30.3 lb. of mixt./hr. and at a pressure of 125 lb./sq. in. through 180 feet of 1/8-in. pipe in the form of a coil and heated to 120°. The residence time of the reaction mixt. in the reactor was 13.7 min. The product contained 3.12% total N and 0.81% free NH₃. Growth data are given in 2 tables illustrating the usefulness of these products.

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587. Detection of cider in wine with o-nitrobenzaldehyde

By Seris, G.

From [Annales des Falsifications et des Fraudes \(1951\)](#), 44, 426-9. Language: Unavailable, Database: CAPLUS

Cider contains 0.4-0.5% sorbitol which can be condensed with $\text{o-O}_2\text{NC}_6\text{H}_4\text{CHO}$ (I). Heat 100 cc. wine with 4 g. active charcoal 30 min. at 100° , filter, and wash with hot H_2O . Evap. the filtrate, avoiding caramelization, cool, add 0.3 to 0.4 g. I, 5 cc. HCl, triturate, rinse with 5 and 2 cc. HCl. Shake 2 times at 30-min. intervals; after 15 hrs. add 2 cc. H_2O , mix., centrifuge, wash by centrifugation with .5 cc. MeOH, repeat 3 times, dissolve the dried sediment in 5 cc. Me_2CO , and weigh after spontaneous evapn. The sorbitol compd. m. 217° . Pure wine does not contain sorbitol.

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588. Effect of inorganic compounds on the formation of color in sugar solutions

By Larraneta, Julio C. Pita; Ledon, Alvaro Carreras

From [Boletin Oficial de la Asociacion de Tecnicos Azucareros de Cuba \(1951\)](#), 10(No. 1), 11-20. Language:

Unavailable, Database: CAPLUS

Action of Na_2SO_3 (I), $\text{Na}_2\text{S}_2\text{O}_4$ (II), and (III) a mixt. of I and finely divided TiO_2 on the color of solns. of sucrose contg. glucose, amino compds. (asparagine, Na monoglutamate) or Fe along with tannic acid was studied at 60° and pH values 5.9, 7.0, and 8.0 for 20 hrs.; color formation was measured by extinction. II at pH 8.0 is most effective for color inhibition, especially for suppression of color due to melanoidins and tannin. I prevents color formation due to melanoidins only at pH 8.0, and color due to tannins only at pH 7.0; it has little effect on tannins and caramelization at pH 5.9. In the case of caramelization at pH 7.0 and tannin at pH 8.0 it rather favors coloration. III generally gives unsatisfactory results. It inhibits color by melanoidins and tannin at pH 8.0; its selective adsorbing power on amino acids is large, but in other respects it intensifies color. Its undesirable actions could perhaps be diminished by using it in a coarser granulation (40 mesh).

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589. Chemical nature of taste and aromatic factors in milk and dairy products

By D'yachenko, P. F.

From [Molochnaya Promyshlennost \(1951\)](#), 12(No. 4), 42-6. Language: Unavailable, Database: CAPLUS

Glycerides of lower acids and lecithin contribute to the flavor and taste of butter. Lack of proteins causes a watery taste in milk; intermediate products of protein hydrolysis also contribute to taste, especially in cheese. The acid taste of fermentation products is largely due to lactic acid. Inorg. salts and vitamins may have contributory effects. The change of taste in heated milk or related products may be caused by denaturation of cystine-like links with liberation of SH groups as well as by caramelization with formation of melanoidins in which basic amino acid groups condense with lactose carbonyl groups. In cheese, much of the taste is caused by free amino acids along with fatty acids, alcs., and esters. The specific factors operative in creamery butter are not well understood, but the degree of dispersion of the plasma appears to be important; if the particle dispersion is too high taste properties are lowered. Much of the butter aroma is caused by diacetyl. The rancid butter taste is caused in part by methyl ketones, formed by oxidation of fatty acids; the acid taste is caused by chem. changes among the phosphatides, through the formation of peroxides. Choline, from decompn. of lecithin, causes a herring-like taste. A lard-like taste in butter is caused by oxidation of diene and triene fatty acids (0.8-2% in usual butter).

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590. Preparation of potassium iodide

By Njegovan, V. N.

From [Arhiv za Kemiju \(1949\)](#), 21, 210-14; in English, 214-15. Language: Unavailable, Database: CAPLUS

KI free from solid by-products is prepd. from I_2 and KOH with HCOOH or HCHO as a reducing agent according to the following equations: (1) $6\text{KOH} + 3I_2 = 5KI + KIO_3 + 3H_2O$, (2) $KIO_3 + 3HCOOH \rightarrow KI + 3H_2O + 3CO_2$, and (2') $KIO_3 + 3HCHO \rightarrow KI + 3HCOOH$. I_2 is introduced into a 20% soln. of KOH until the color becomes light brown. Considerable KI ppts. The reaction mixt. is then treated with a small amt. of 80% HCOOH and warmed to 70° . More HCOOH is added in small portions with const. stirring and continuous heating until the reaction is complete (free from $HCOO^-$ and IO_3^-). The dark-brown soln. is then adjusted to pH 9, filtered through C, evapd., and the residue dissolved in H_2O and recrystd. several times. Traces ($\geq 0.01\%$) of formate are removed from the final KI soln. by addn. of I_2 until the soln. is slightly acid. The soln. is then boiled until the $AgNO_3$ reaction for formate is neg. After removal of HCOOH the soln. is boiled several hrs. at const. concn. with Fe until no iodate is present. Short cuts in the above process are generally unsatisfactory. Thus, addn. of known amts. of I_2 to the KOH soln. contg. the HCOOH to be consumed, leads to rapid evolution of gases (CO_2 and H_2O), and in the violent reaction I_2 is vaporized. Slow reduction (8-12 hrs.) is essential to minimize losses of I_2 . The purity of the final product depends very much on the purity of the KCOOH and KOH. In reductions with HCHO optimum proportions of the reactants are in accord with the equation: $4KOH + 2I_2 + HCHO \rightarrow 4KI + 3H_2O + CO_2$. I_2 is added very slowly with slow heating, since the reaction is more rapid than with HCOOH. The soln. is decolorized rapidly, then develops a dark shade at once. Excess I_2 must be added if decolorization is too fast and the darkening does not follow (indicating that not all KOH is consumed). No more I_2 is added when the light-brown shade appears; a large excess of I_2 is undesirable. HCHO is present in the final soln. of KI (the test with Nessler's reagent is sensitive to 1:500,000) and must be removed with excess of I_2 to avoid formation of formose and **caramelization** in the final product.

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591. Studies on the **caramelization** test

By Kalyanasundaram, A.; Rao, D. L. N.

From [Sugar \(1951\)](#), 46(No. 3), 40-1. Language: Unavailable, Database: CAPLUS

Pucherna's test (C.A. 25, 1697) was modified by mixing in a Pyrex test tube 6.5 g. of refined sugar contg. 0.03% of reducing sugars with 3.5 cc. of pure glycerol, $n = 1.461$, and 0.1 cc. of a 6.5% aq. soln. of the impurity to be tested. The mixt. was well stirred and heated in an oil bath to $160 \pm 2^\circ$ for 15 min. The test tube was then quickly cooled and the soln. dild. to 100 cc. The resulting solns. were analyzed for polarization, sucrose, reducing sugars, and color. The results are shown in tables and graphs. Under the above conditions pure sucrose, without any addns., gave only slight inversion and developed no color. The glycerol has no effect. The refined sugar itself suffered a destruction of 0.9%, but developed no color. Impurities of nonacid character, such as $AcONa$, Na_2CO_3 , Na_2HPO_4 , KBr , K_2CO_3 , KCl , and $NaCl$, caused only slight destruction of sucrose, up to 4.7%, and no or little coloration. H_3PO_4 , NH_4Cl , and $(NH_4)_2SO_4$ caused destruction of 48.4, 71.5, and 40.3%, resp., and pronounced color formation. The effect of H_3BO_3 was intermediate. H_2SO_4 produced charring, and further expts. were made with more dil. solns. of H_2SO_4 and H_3PO_4 . Increasing small quantities of 0.006 to 0.05 g. of H_2SO_4 and of 0.003 to 0.1 g. of H_3PO_4 per 100 g. of sugar caused increasing decompn. of sucrose and increase in color. The reducing sugars increased by treatment with up to 0.025 g. of H_2SO_4 or H_3PO_4 , and were gradually destroyed beyond that concn. The effect of H_3PO_4 on the destruction of reducing sugars and on color formation was much smaller than that of equal quantities of H_2SO_4 .

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592. Infusion solutions. IV. Ringer-Tyrode solutions

By Michaels, I.; Munzel, K.

From [Pharmaceutica Acta Helvetiae \(1950\)](#), 25, 153-60. Language: Unavailable, Database: CAPLUS

cf. C.A. 44, 3207g. Ringer-Locke solns. contg. $MgCl_2$ can be autoclaved in sealed containers without alteration in pH and turbidity. Ringer-Tyrode solns. contg. $NaH_2PO_4 \cdot 2H_2O$ can be prepd. free from turbidity after autoclaving by the passage of CO_2 through the solns. prior to sealing and heating. A phosphate-buffered Ringer soln. contg. $Na_2HPO_4 \cdot 12H_2O$ can only be prepd. free from turbidity after autoclaving by the addn. of a somewhat large proportion of H_3PO_4 and this will be too acid for use. "Artificial Serum" of the *Materia medica militaris* can be autoclaved without **caramelization** if high quality glucose and alkali-free containers are used.

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593. Spectrophotometric comparison of the factors that affect the formation of colored substances during manufacture of sugar

By Ledon, Alvaro Carreras; Lananeta, Julio C. Pita

From [Boletín Oficial de la Asociación de Técnicos Azucareros de Cuba \(1950\)](#), 8, 457-66. Language: Unavailable, Database: CAPLUS

Mixts. of sucrose, fructose, and glucose solns. of 70° Brix were heated 20 hrs. at different temps. and at various pH with or without asparagine, tannic acid, or Fe. The results are presented in graphs showing extinctions in the range 350-500 mμ. The principal effect of temp. is to increase the amt. of pigment (caramel) while slightly altering the natures of these pigments. The effect of pH on the production of caramel is more marked than that of temp. especially at pH 8, where it is 10 times greater than at pH 5.9, probably on account of the change in the structures of glucose and fructose. Formation of melanoidines (from asparagine) is much greater in the presence of glucose than of fructose owing to production of N-glucosides. The pigmentation of melanoidines is max. at pH 7, with different minima at pH 5.9 and at pH 8, probably due to varying elec. charges of the amino acids in acid and alk. media. The action of tannic acid on Fe increases with temp., but above pH 7 this effect is masked by an intensified production of caramel. In all cases absorption by heat-produced (20 hrs. at 60° and pH 5.9) colored substances increases continuously from a max. of 350 to a min. above 600 mμ, without presenting absorption bands. A curious fact is that the effect of **caramelization** is less in the presence of metallic Fe, probably due to formation of internal complexes contg. Fe⁺⁺. The extinction curves produced in the lab. were compared with curves of various factory products. A general resemblance was noted, but the characteristics of the melanoidine curve were obviously impressed on the curve for fresh hot juice. The effects of tannic acid and Fe on the same juice at 80° were also recognizable.

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594. Kinetics of color development in invert sugar solutions

By Doss, K. S. G.; Ghosh, S. K.

From [Proceedings of the Annual Convention of the Sugar Technologists' Association of India \(1949\)](#), 18(Pt. I), 26-9. Language: Unavailable, Database: CAPLUS

Caramelization of invert sugar solns. at pH 7.0 and 95° is autocatalytic. In an alk. medium at room temp. it follows an approx. linear equation; in this case the energy of activation is 23,700 cal. per mole.

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595. Hydroxymethylfurfural in grape wines

By Prostoserdov, N. N.; Taranova, R. D.

From [Vinodelie i Vinogradarstvo SSSR \(1949\)](#), 9(No. 11), 43-4. Language: Unavailable, Database: CAPLUS

Hydroxymethylfurfural, derived from fructose by concn. or **caramelization** in uncontrolled thermal treatment, was detected colorimetrically with 1,3,5-C₆H₃(OH)₃, in 16 of 24 port wines of different origins, 6 of 8 madeira-type wines, and in a malaga wine.

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596. A rapid method for the estimation of starch in cereal products

By de Souza, Amaro Henrique

From [Revista Brasileira de Farmacia \(1949\)](#), 31, 279-85. Language: Unavailable, Database: CAPLUS

Errors present in certain methods (**caramelization** by hydrolysis at elevated temp., presence of optically active compds. in the enzymes) were avoided thus: The powd. and ether-washed material (2 g.) was heated to boiling with 60 ml. water, cooled to 55°, and 20 ml. filtered pancreatin soln., contg. 0.5 g. enzyme, was added. After 30 min. at 55° there was added 5 ml. HCl, dild. 1-1, and the mixt. kept at the same temp. for an addnl. 30 min.; it was then cooled, neutralized, and filtered into a 100-ml. volumetric flask, and the glucose in a 25-ml. portion detd. by Fehling's method.

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597. Behavior of sucrose in technological processes. I. Model experiments in acid solution

By Taufel, Kurt; Burmeister, H.

From [Fresenius' Zeitschrift fuer Analytische Chemie \(1949\), 129, 352-65](#). Language: Unavailable, Database: CAPLUS

Sucrose was hydrolyzed in dil. acid and the products were detd. Besides **caramelization** or the formation of humic ppts., heating sucrose solns. is likely to result in the formation of biacetyl, furfural, hydroxymethylfurfural, and methylglyoxal. With hydrolysis the reducing power of the soln. diminishes owing to a decompn. of fructose. When heating an acid soln. of sucrose is extended, the loss in reducing power is almost always assocd. with loss of fructose. There is evidence of the formation of polyhexoses from glucose and fructose. When, with increased duration of the heating, there is an increase in reducing power, it is improbable that this results from formation of strongly reducing decompn. products. Easily hydrolyzable polyglucoses do not appear until after 8 hrs.' heating but more difficultly hydrolyzable products, eventually similar to dextrin, are formed more readily and in greater quantities. The formation of difficultly hydrolyzing polyglucoses or polyfructoses is not recognizable in the usual analytical data and, as a result, there is often a deficit of the sugar content with respect to the sugar added.

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598. Relation between gas changes and color and flavor of evaporated milk

By Tarassuk, N. P.

From [Proc. 12th Intern. Dairy Congr. \(Stockholm\) \(1949\), 2, 423-31](#). Language: Unavailable, Database: CAPLUS

Sterilization results in a disappearance of O₂ and formation of CO₂ both of which parallel the time and temp. of heating, cooked and caramelized flavor, and the degree of brown discoloration. Deaeration or reducing the content of O₂ to 0.2% in the free space of the can by N₂ caused an improvement in the color and flavor of the evapd. milk upon sterilization. Aq. solns. of lactose brown upon heating but the ratios of the production of CO₂ and O₂ uptake is different from that of the evapd. milk. The browning of lactose solns. can be inhibited almost entirely by heating in an atm. contg. less than 0.1% O₂. Browning by heat is more complex than just **caramelization** of lactose.

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599. Contribution to the study of the evolution of glucides during the carmelization of malt

By Chabot, L. Georges; Cosaert, Michil

From [Fermentatio \(1949\), 3, 33-48](#). Language: Unavailable, Database: CAPLUS

The detn. of different sugars in carmelized malt is an evaluation of its quality. C. and C. endeavor to show the relation between glucide liberation and the degree of carmelization by detn. of the color of the malt. The color, odor, and colloids present are dependent upon the properties of the carmelized malt. These properties are essentially due to the formation of glucides and particularly to the combining of the latter with amino acids to give melanoidins. The current practice of employing carmelized malt results in beer having particular colloidal characteristics. These properties are said to augment digestion in the presence of reducing bodies which function in the carmelized malt. The reduction in the course of heating gives melanoidins. The reducing bodies act as protective colloids and anti-oxidants in the presence of the O in the beer. The power of the reductones in carmelized malt to act as intermediary products during degradation of the glucides is discussed. The reductones are characterized by the strongly reducing dihydroxyvinylene group. Vitamin C was compared with various kinds of malt by adding AgNO₃ plus NH₄OH and noting the presence of a ppt. or color change after 5, 10, and 15 min. Three different types of beer were similarly studied. The methods employed are given in detail.

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600. Preservation of fruit preparations and pulps by sulfur dioxide

By Vas, Karoly

From [Magyar Kemikusok Lapja \(1949\), 4, 280-5](#). Language: Unavailable, Database: CAPLUS

Expts. proved that not only glucose, but also the various decompn. products of sugars formed in the heating of liquids contg. sugar (as acetol, furfural, 5-hydroxymethylfurfural, methylglyoxal, glyceraldehyde, dihydroxyacetone, or biacetyl) react with SO₂ and form products inactive against microbes. Neither sucrose nor fructose formed addn. compds. with SO₂, but under heating they decompd. to compds. which bind SO₂. Temp. has a significant influence on the inhibiting effect. Various solns. contg. different sugars did not ferment on inoculation with *Zygosaccharomyces* (sepd. from concd. orange juice) if 150 mg. SO₂ was present in 1 l. at 37°. Under the same conditions but at 25° 300 mg. and at 15° 500 mg. SO₂ were needed for quant. preservation. Practically the amt. of applied SO₂ can significantly be decreased by diminishing carbonyl groups in the liquids, by increasing the applied temp., by diminishing the pH values possibly below 3.5, and, generally, by avoiding any such procedures (as inversion, or **caramelization**) which may result in the formation of any compds. being able to inactivate SO₂.

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601. Polyphenols in the seed of the carob bean (*Ceratonia siliqua*)

By Munoz, Cruz Rodriguez; Claver-Aliod, Mariano

From *Anales de Edafologia y Fisiologia Vegetal* (1949), 8, 59-68. Language: Unavailable, Database: CAPLUS

cf., *Anales inst. espa~n. edafol. ecol. y fisiol. vegetal* (Madrid) 7, 201 (1948). Polyphenols and polyphenolase were found in the seed coats of *C. siliqua* and *Gloditsia triacanthos*. The procedure used was that for the isolation of vitexin. The increase of the depth of color of the exts. in water with time and with increasing alky. was studied. Tests for **caramelization** were neg.

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602. Evaluation of physical methods in the desulfuration of musts

By Gentilini, Luigi

From *Annali della Sperimentazione Agraria* (1949), 3, 351-81. Language: Unavailable, Database: CAPLUS

Samples of 1 l. each of a must contg. 0.733 g./l. free and 0.910 g./l. combined SO₂ and 1.500 g./l. K₂SO₄ were treated with various phys. methods of desulfitation (I) at 15-18° for one or several periods of 4-32 min. with intervals of 48 hrs. Temps. above 60° if they could be applied at all led to coagulations, **caramelization**, etc., and were undesirable. I in several periods with rest intervals gave better results than I in one period. The combination of several methods gave better results than each method alone. Best results (removal of 94% SO₂) were obtained by refluxing the must in a vacuum (40 mm.) at 55-60° and removal of SO₂ by suction. Aeration, vacuum, stirring, centrifugation, heat, absorption on charcoal, and repeated decantation gave decreasingly poorer results in this order. The partial oxidation of SO₂ leads frequently to sulfate values which exceed the legal limit of 0.1%. Its increase to 0.2% is recommended.

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603. Application of the phosphatase and turbidity tests to sterilized milk

By Clegg, L. F. L.; Lomax, K. L.

From *Journal of the Society of Dairy Technology* (1948), 1, 245-52. Language: Unavailable, Database: CAPLUS

Variations in 18 dairies as to homogenizing and sterilizing temps., pressure and time in producing sterilized milk are shown. Although conventional sterilizing temps. cause quick and complete inactivation of phosphatase, excessive heating such as to produce a cooked flavor induces phosphatase values above 2.3 Lovibond blue, the standard for pasteurized milk. This is not due to liberated phenolic compds., but to reducing groups produced by **caramelization**. Overheated milk is also detected by the Aschaffenburg turbidity test.

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604. Fructose anhydrides. XXV. Pyrosin

By Schlubach, Hans Heinrich; Huchting, Ilse

From *Justus Liebigs Annalen der Chemie* (1949), 561, 173-80. Language: Unavailable, Database: CAPLUS, DOI:10.1002/jlac.19495610303

cf. C.A. 35, 81.3. Wheat straw (49.1% dry) 36,500 was treated 20 min. with boiling 96% EtOH, then with 50% EtOH 20 min. at 100°, the ext. concd. in vacuo at 55-60°, and the proteins pptd. with Pb(OAc)₂ to give 850 g. (4.75%) crude pyrosin (I). Fractional pptn. from H₂O with EtOH and drying at 70-80° and 0.1 mm. 3-4 hrs. (caramelization occurred at 100°) gave after 30 pptns. a purified pyrosin (II) of const. $[\alpha]_D^{20}$ -30° (H₂O, c 1). The least sol.-fraction was accompanied by a persistent dark material. Partially purified I of $[\alpha]_D^{20}$ -17° (10 g.) was dissolved in 13 cc. H₂O, C₅H₅N added to initial turbidity, then 90 cc. freshly distd. Ac₂O added with stirring over 6 hrs.; after 16 hrs. the clear soln. was poured into 3 l. ice H₂O, and the ppt. washed with H₂O and dried over NaOH to give 15 g. (90%) product. Further treatment of this product with 90 cc. Ac₂O in 150 cc. dry C₅H₅N gave an ester of $[\alpha]_D^{20}$ 9.3° (CHCl₃, c 1). A final acetylation and fractionation by 40 pptns. of a 35% C₆H₆ soln. with ligroin (b. 35-55°) gave an acetylpyrosin (III), $[\alpha]_D^{20}$ 8.5° (CHCl₃). III on deacetylation with NaOMe gave a pyrosin (IV) similar to II, $[\alpha]_D^{20}$ -30°. The half-time for acid hydrolysis of 810 mg. II and of 810 mg. IV in 50 cc. 0.1 N H₂SO₄ at 20° was 237 and 234 min., resp. The aldose content of the hydrolyzates (detd. by the Auerbach-Bodlander method) and compared with a fructose soln. under the same conditions, was zero at 5 hrs. and 1.5% after 24 hrs. At 1840 min., the $[\alpha]_D^{20}$ -86.4° was calcd. as 78% hydrolysis. The mol. wts. in freezing H₂O were 311 for II and 336 for IV; osmotic values were 36, 603 and 33, 186, or 226 and 205 fructose units, resp.; cryoscopic detns. of III in C₆H₆ gave 1319, or between 4 and 5 fructose units. S. and H. consider the osmotic values too high in relation to the high soly. of II and IV in H₂O. III (10 g.) in 150 cc. Me₂CO was treated in a N atm. at 55° 2 hrs. with 50 cc. freshly distd. Me₂SO₄ and 135 cc. NaOH; the C₆H₆-sol. portion, obtained by extrn. until the aq. soln. showed no optical rotation, had $[\alpha]_D^{20}$ -29° (CHCl₃), 39.3% OMe (90% yield). Further methylation with Me₂SO₄ or with K and Mel in liquid NH₃ had no effect; methylation with Ag₂O and Mel and removal of the solvent at 56° and 1-2 min. in the presence of silica gel and paraffin gave a methylpyrosin (V), 45.9% OMe. V (17.5 g.) in 1 l. of 96% EtOH and 10 g. H₂C₂O₄ in 300 cc. H₂O were kept at 85° 26 hrs. (to const. rotation), then neutralized with NaHCO₃, concd. in vacuo, the residue hydrolyzed 2 hrs. at 85° with 200 cc. 0.25% aq. HCl, again neutralized and concd., then concd. twice with a 1:1 mixt. of EtOH-C₆H₆ to remove H₂O, and exhaustively extd. with Me₂CO and CHCl₃. The mixt. of hydrolytic products, after 20 hrs. in 50 parts abs. MeOH contg. 0.25% dry HCl, gave 15 g. mixed glycosides. Esterification with 13.2 g. BzCl in 8.1 g. abs. C₅H₅N and distn. of 23.5 g. of the benzoate mixt. at 0.003 mm. gave 3 fractions: (1) 3.1 g., b. 40-50° at 130-50° bath temp., n_D^{20} 1.465, 43.2% OMe; (2) 2.3 g., b. 55-63° at 165-80°, 1.447, and 57.7%; (3) 8.8 g., b. 122-38° at 190-220°, 1.484, and 36.2%; residue 3.6 g. with 23.2% OMe. Redistn. of (1) and (2) together gave 3.8 g. with 59.0% OMe and n_D 1.450, contg. (by calcn.) 2.6 g. Me tetramethylfructoside (VI) and a little Me trimethylfructoside formed from debenzoylation of VII. Redistn. of (3) gave 7.2 g. pure Me trimethylbenzoylfructoside (VII), $b_{0.004}$ 134°, n_D^{20} 1.499, 36.2% OMe. The residue contained almost pure Me dimethyldibenzoylfructoside (VIII). Acid hydrolysis of VI gave 1,3,4,6-tetramethylfructose (IX), n_D^{20} 1.4518, $[\alpha]_D^{20}$ 31.4° (H₂O, c 1.9), 21.4° → 17.5° (CHCl₃, c 1), 52.0% OMe. Similarly VII gave 1,3,4-trimethylfructose (X), m. 75°, n_D 1.4660, $[\alpha]_D^{20}$ -51° → -57.6° (H₂O, c 0.8), 3.4° → -26.0° (MeOH, c 0.6), 10.0° → 16.5° (CHCl₃, c 0.9). VIII gave a dimethylfructose (XI), $[\alpha]_D^{20}$ -10.7° → 19.0° (MeOH, c 0.6), -5.1° → 7.3° (CHCl₃, c 0.9); its possible 1,3-di-Me structure was not definitely established due to insufficient material. The ratios of IX, X, and XI were 1.4:3:1; the excess of IX was possibly due to partial hydrolysis of the pyrosin during methylation. According to the Schlubach and Ketu-Sinh rule (loc. cit.), pyrosin is a polyfructosan of the phlein type, with a d-rotatory acetate, and should give only X and no other tri-Me ether. As pyrosin does not reduce Fehling soln., it is considered either a 4-membered ring, with 1 fructose unit as a side chain, bound to C atom 4, or less probably a ring of fructose units, in which each member is joined to a 4-membered side chain. Pyrosin is very close to secalin (from rye straw) in structure but differs in optical rotation, as do III and V; conversely asphodelin and asparogodin show great similarity in rotation but the methylation products are different.

~0 Citings

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605. Caramelized honey in the diet of diabetic patients

By Lenzi, F.; Giordano, A.

From *Atti regia accad. fisiocritici Siena, Sez. med.-fis.* (1945), 13, 132-5. Language: Unavailable, Database: CAPLUS

After investigating the changes which honey undergoes during caramelization (sugars become glucosans, H₂O decreases 7.5%; Bang glucose detn. 0.07-0.064%) the blood-sugar curve was detd. for some normal and diabetic subjects, after administration of natural (I) or caramelized (II) honey (50 g. in 100 g. milk). Blood sugar, 4 hrs. after administration of II, was lower than after administration of I and lower than before the expt. In some cases this lowering occurred after the 1st hr.

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606. Bactericidal substance extracted from the caramelization products of glucose

By Mondolfo, H.; Hounie, E.

From *Farmaceuta* (1948), 3(No. 40), 35-9. Language: Unavailable, Database: CAPLUS

A bactericidal material (I) present in various com. carbohydrate products can be obtained in high concn. by treating glucose (20% soln.) at 120° for 40 min. in the presence of 0.6% NaOH. I is also produced by heating glucose at 60° in the presence of HCl (pH 3). I is sol. in Me₂CO, H₂O, and EtOH, slightly sol. in CHCl₃, and insol. in Et₂O. It dialyzes readily, is not pptd. from satd. (NH₄)₂SO₄ soln., and is not adsorbed by active C from aq. or Me₂CO solns. Partially purified I is obtained by extg. with Me₂CO the decompn. products of glucose (previously neutralized with NaOH), treatment of the ext. with active C, and evapn. to dryness. The residue is yellow, hygroscopic, and is bactericidal to *Escherichia coli* in diln. 1/10,000. A 2% soln. of I decreased the bacterial count (*E. coli*, 30°, 2 hrs.) from 15,600 to 370. I is harmless to tissues, and loses its activity in the presence of serum.

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607. Some aspects of chemotherapy

By Fourneau, E.

From [Annales Pharmaceutiques Francaises \(1948\), 6, 225-44,282-99](#). Language: Unavailable, Database: CAPLUS

A review of the development of antisyphilitic org. arsenicals, trypanocidal dyes, Sb compds. used against Leishmania, antimalarials, sulfones, sulfonamides, penicillin, and streptomycin. The modern enzyme theory of the mechanism of chemotherapeutic action is outlined. A bibliography is given of the more important books and articles of a general nature (monographs, lectures, etc.).

~0 Citings

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608. Methods of preparing zinc chloride in the pharmacy

By Winkler, Willibald

From [Osterr. Apoth.-Ztg. \(1948\), 2, 346](#). Language: Unavailable, Database: CAPLUS

Three methods are given for the prepn. of ZnCl₂ from Zn or ZnO.

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609. Detection of sulfonamides in pharmaceutical-chemical analyses

By Burgin, A.

From [Pharmaceutica Acta Helvetiae \(1948\), 23, 231-41](#). Language: Unavailable, Database: CAPLUS

A review with 40 references. By observation of the pH of the aq. phase, the Stas-Otto scheme is modified to provide a more satisfactory sepn. of medicaments into groups. The sulfonamides are extd. with CHCl₃ at pH 4. In general these compds. are in the aq. ammoniacal soln., which upon drying can be extd. with acetone. The recrystd. acetone residues are identified by melting and mixed m.ps. and qual. tests. Sepn. of mixts. should be accomplished by chromatographic procedures.

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610. Origin of the kraft color

By Pigman, W. W.; Csellak, W. R.

From [Technical Association Papers \(1948\), 31, 393-9](#). Language: Unavailable, Database: CAPLUS

The brightness (reflectance at 457 mμ) of an unbleached kraft pulp appears to be a direct function of the lignin content. The wood species from which the pulp was prepd. and the cooking conditions seem to affect the color only as they affect the quantity of residual lignin. The greater brightness of kraft hardwood pulps, as compared with softwood pulps, appears to be a result of the greater extent of removal of lignin from the hardwoods, rather than of the presence of specific color-precursors in softwoods. The amt. of hypochlorite bleach required to bring a series of slash pine kraft pulps to a brightness of 65 was a linear function of the lignin content of the unbleached pulp; a similar relationship for kraft pulp from jack pine seems to exist. Pulping of spruce and aspen holocellulose by the kraft process gives a much lighter pulp than when wood chips are used and the pulp is very easily bleached. Addn. of lignin to spruce holocellulose and to partially chlorited spruce chips before digestion produces a colored pulp which is more difficult to bleach than the same pulps produced without the addn. of lignin. A light color is produced on cotton linters by the addn. of lignin to the linters before digestion with kraft liquors. A composite cook of the various known components of sprucewood produced a pulp colored to about the same degree as when lignin alone was added to the linters. "Caramelization" of carbohydrates appears to be of minor importance in the formation of the kraft color. Color bodies are formed under the alk. conditions of the kraft process but they are much more easily bleached than the typical kraft color bodies. As evidence for this conclusion, it is shown that holocellulose does not yield a dark-colored pulp resistant to bleaching. Cotton linters when treated with kraft liquors contg. D-glucose in quantity as much as 50% of the wt. of the linters yield pulps which, although dark in color, are easily bleached.

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611. The refining of raw sugar from cane

By Hruska, Josef

From *Listy Cukrovarnicke* (1948), 64, 233-7. Language: Unavailable, Database: CAPLUS

Raw cane sugar called gur imported from India into Iran did not suit the people and had to be refined in one of the 8 state-owned Iranian refineries for beet sugar. A better brand of gur showed an apparent dry substance 94.5, polarization 74, ash 2.33, invert sugar 1.13%; the poor brands showed an apparent dry substance 93.8, polarization 68.8, ash 2.28, and invert sugar 1.30%. A specimen of gur having a polarization of 71.2% yielded 48% as refined white sugar and 47.2% as molasses with a polarization of 37% and a quotient of 45%. The steam consumption at 18 atm. was 1165 kg. of steam per 100 kg. of gur or 2430 kg. of steam per 100 kg. of refined sugar. Because of much caramelization of the gur the decolorization of the sugar was difficult. Slimy sediments required large amts. of filter-aids. A high consumption of chemicals, i.e., Ca led to the excessive formation of invert sugar. The high viscosity of the sugar solns. retarded the operation in the centrifuges. In general H. cannot expect a rendement greater than 50%.

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612. The action of fructose on indole derivatives

By Malowan, Lawrence S.

From *Biochimica et Biophysica Acta* (1948), 2, 95-6. Language: German, Database: CAPLUS

Fructose (I) can be distinguished from other hexoses by the color produced with 3-methylindole (II). Add approx. 10 mg. of II to 1 ml. of concd. HCl and stir well. Add an equal quantity of the unknown hexose. In the presence of I a blue color appears in a short time and is fully developed in 10 min. If no color appears, heat the mixt. to 45° on a water bath. If glucose is present, the color will now appear with an intensity comparable to the reaction of I. Mannose and galactose also react at 45° to give a less intense red-brown color (due to caramelization). Extn. with CHCl₃ sharpens the color.

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613. Measurement of alcohol losses in agricultural distilleries due to the caramelization of the mash while processing sugar beets

By Kopal, Stanislav

From *Sbornik Ceskoslovenske Akademie Zemedelske* (1947), 19, 39-45. Language: Unavailable, Database: CAPLUS

In processing sugar beets through scalding, it is necessary to choose a pressure between 2 and 3 atm. according to the quality of the beets. Scalding under high pressure causes not only caramelization of the mash but also decreases the fermentation of sugars.

~0 Citings

614. Caramelization of aqueous solutions of lactose

By Vas, Karoly

From [Magyar Chemiai Folyoirat \(1943\)](#), 49, 177-86. Language: Unavailable, Database: CAPLUS

Temp. and time of heating strongly affect the color produced in a lactose soln.; rapid darkening occurs with a rapid decrease of pH value. The concn. of the lactose soln. seems to have no effect on the intensity of color formed. Small amts. of CH₂O significantly increase formation of dark color; lower amts. impede coloration. Solns. of glucose and galactose give identical colorations; fructose gives colors stronger by 15%; maltose and lactose, lighter by 60% than glucose. Sucrose decomposes very slightly. Mixts. of components of disaccharides (artificial invert sugars) give colors identical with those of the monosaccharides.

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615. Preparation of caramel

By Jacobs, Morris B.

From [American Perfumer and Essential Oil Review \(1947\)](#), 49, 501,503,505. Language: Unavailable, Database: CAPLUS

The manuf. of caramel from sucrose, raw sugar or molasses, starch, dextrin, and glucose, malt, lactose, and soybean carbohydrate, and of caramel powder is described.

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616. Preparation of nonpyrogenic saline infusion fluids

By Todd, J. P.; Mearns, J. T.; Milne, G. R.

From [Pharmaceutical Journal \(1946\)](#), 156, 158-9. Language: Unavailable, Database: CAPLUS

A procedure previously reported is reviewed. Results indicate that the colors of 50 dextrose-saline solns. increase in intensity with the pH; caramelization is increased as the pH decreases (3.8-4.1), is absent when autoclaved for 45 min. at 110° and 15 min. at 125° and cooling rapidly. The pH of the soln. after slow Seitz filtration increases and after autoclaving decreases.

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617. Estimation of solids and water in fruit juices and concentrates

By Hadorn, H.

From [Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene \(1945\)](#), 36, 324-34. Language: Unavailable, Database: CAPLUS

Detn. of water by distn. with toluene or perchloroethylene gives high results owing to caramelization of the sugars. Fellenberg neutralizes the juices before distn. and applies a factor to compensate for decompn. of sugars. Detn. of solids by the d. of the juice gives erroneous results.

~0 Citings

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618. Caramelization of fructosans by heat

By Colin, Henri; Belval, Henri

From [Compt. rend. \(1941\)](#), 212, 521-4. Language: Unavailable, Database: CAPLUS

All the fructosans (from graminin, $[\alpha]_D -45^\circ$, formed exclusively of fructose, up to synanthrin, the least l-rotatory of all, $[\alpha] -17^\circ$, hydrolyzing to give a mixt. of levulose and 18% glucose, $[\alpha]_D -65^\circ$) behave like inulin on heating. The rotation of the heated product can reach 30° . With longer heating the changes are more extensive. An increase in reducing power, calcd. as glucose, accompanies the changes in rotation and can reach as much as 20% of the heated material, although the medium is scarcely fermentable and with PhNHNH_2 gives only a few crystals of glucosazone. The heated product is partially oxidizable with iodine. The fructosans do not saccharify so easily after heating. Of the fructosans, irisin is the most stable to dry heat.

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619. Obtaining a food concentrate by the heating of sugar beets

By Kartashov, A. K.; Kaganov, I. N.

From [Pishchevaya Promyshlennost SSSR \(1944\), \(No. 9\), 21-4](#). Language: Unavailable, Database: CAPLUS

A nutritious food concentrate of high caloric value can be made by the [caramelization](#) of air-dried sugar beets. It is recommended that the heating be carried out at $120-140^\circ$ for 20 min. The principal advantages claimed are more efficient utilization of the sugar in the beets and reduced cost and time of handling.

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620. Technical aspects of blood-transfusion work

By Allchin, John P.; Herbert, Dennis A.

From [Pharmaceutical Journal \(1945\), 154, 101-3](#). Language: Unavailable, Database: CAPLUS

General lab. hygiene is discussed. Control on and standards for raw materials are suggested. The metafilter is recommended for the clarification of intravenous fluids. Sterilization procedures and control are described, and the prepn. and dispensing of citrate solns. are discussed. Alk. reaction of citrate solns. consequent to autoclaving, gives rise to action on glass and to [caramelization](#) of the glucose. A "closed circuit" method of combining sterilized glucose and citrate solns. is described and a soln. of 2.5% disodium hydrogen citrate and 3% glucose is suggested for hospital use. Correct blood-storage conditions and common errors are enumerated. An account of plasma filtration is followed by details of optimum storage conditions and it is found that storage difficulties are overcome by the prepn. of dried plasma, which will keep indefinitely.

~0 Citings

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621. Citrus feed

By Lissauer, Arthur W.; Credo, Julius

From [No Corporate Source data available \(1944\), US 2862014 19441107](#), Language: Unavailable, Database: CAPLUS

The slimy acidic citrus waste not amenable to pressing is treated with an alk. substance to render it pressable. The waste is then sepd. into an aq. effluent and wet solids. The effluent is made distinctly alk. and then is concd. to a sirupy consistency at a temp. at which [caramelization](#) of the carbohydrates is avoided. The concentrate is acidified, the acidified bleached product is mixed with the solids and the mixt. is dried.

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622. Preparation of caramel by heating sugar masses containing water and an alkaline substance

No Inventor data available

From [No Corporate Source data available \(1942\), BE 447958 19421231](#), Language: Unavailable, Database: CAPLUS

The time and temp. of heating are selected in such a manner that [caramelization](#) and evapn. to dryness occur simultaneously; e.g., time 24 hrs., temp. 105° . The product is suitable for coloring beer.

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623. Solanum triflorum Nutt. I. Preliminary investigation

By Sciuchetti, Leo A.; McMurray, R. L.; Waller, Coy W.

From [Journal of the American Pharmaceutical Association \(1912-1977\) \(1944\)](#), 33, 300-3. Language: Unavailable, Database: CAPLUS, DOI:10.1002/jps.3030330903

A review of the literature and a description of Solanum triflorum are given. Analysis of the air-dried material gave the following results: H₂O, Leaves and flowering tops, Fruit, Stems, Roots; H₂O, 8.12%, 9.63%, 6.90%, 6.46%; Total ash, 18.06, 8.87, 12.92, 11.00; H₂O-insol. ash, 10.22, 2.79, 3.50, 4.93; H₂O-sol. ash, 7.84, 6.08, 9.42, 6.07; Acid-insol. ash, 2.44, 0.76, 0.48, 1.56; Acid-sol. ash, 15.62, 8.08, 12.44, 9.44; Alky. H₂O-sol. ash, 6.38, 5.43, 9.03, 5.96; Alky. H₂O-insol. ash, 11.20, 3.61, 5.92, 6.39; Successive extn. of leaves and tops, and of fruit, resp., gave: petr. ether 3.06, 8.34; anhyd. ether 1.06, 1.56; alc. 15.25, 19.73%. Analysis of the leaves and tops, and of the fruit, resp., gave: crude fiber 10.92, 20.29; volatile ether-sol. ext. 0.64, 0.82, nonvolatile ether-sol. ext. 3.88, 8.64%. Microchem. tests on sections of the fruit showed the presence of starch; **caramelization** during grinding of the fruit indicated the possible presence of sugars. Fixed oil obtained in 7.55% yield by petr. ether extn. of the air-dried fruit had the following consts.: d_{25}^4 0.9229, n_{25}^D 1.4761, α (CHCl₃ soln. of the oil decolorized by Norite) 0°, sapon. no. 176.7, acid value 20.1, ester value 156.6, I value 122.9, unsaponifiable matter 5.02%. The fruit gave a neg. test for alkaloids; the leaves and tops gave slightly pos. results corresponding to 0.0324% of total belladonna alkaloids.

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624. Effect of caramelized fructose on the stability of l-ascorbic acid

By Isaac, Wm. Edwyn

From [Nature \(London, United Kingdom\) \(1944\)](#), 154, 269-70. Language: Unavailable, Database: CAPLUS, DOI:10.1038/154269a0

Expts. show that there is a greater loss of ascorbic acid in solns. of caramelized fructose than in solns. of pure fructose, under aerobic conditions. Under anaerobic conditions the rate of destruction of ascorbic acid is much slower than under aerobic conditions.

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625. Citric acid-Na citrate-glucose mixtures for blood storage

By Loutit, J. F.; Mollison, P. L.; Young, I. Maureen

From [Quarterly Journal of Experimental Physiology \(1908-1938\) \(1943\)](#), 32, 183-202. Language: Unavailable, Database: CAPLUS

cf. C. A. 38, 5516.8. Certain citric acid-Na citrate-glucose mixts. are satisfactory as blood preservatives. The whole mixts. can be autoclaved with little or no **caramelization**. Red cells stored in these solns. survive better in the recipient's circulation after transfusion than when stored in any other soln. tested. The transfusion of blood stored in these solns. did not produce any untoward results. The quantity of Hb formed when blood is stored with these solns. is not significantly greater than the amt. formed when the usual trisodinm citrate-glucose soln. is used.

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626. Obtaining glycerol and glycols by hydrogenation of carbohydrates

By Natta, G.; Rigamonti, R.; Beati, E.

From [Chimica e l'Industria \(Milan, Italy\) \(1942\)](#), 24, 419-25. Language: Unavailable, Database: CAPLUS

In a study of the practicability of a process for obtaining glycerol (I) by catalytic hydrogenation of carbohydrates, several hundred carbohydrate preps. have been hydrogenated. Only the 1st hydrogenation stage, which leads to hexitols, can readily be effected quantitatively with various catalysts, especially Ni (R. & B., Rend. ist. Lombardo 73, No. 11(1939-40)). The present paper deals with the 2nd stage, leading to I and glycols. The expts. were carried out in a 2-l. steel shaking autoclave about 1/4 filled with the reaction soln. The 1st stage of hydrogenation (formation of sorbitol) generally takes place rapidly during the time required to attain the reaction temp. The most suitable catalysts are those of the 8th group and of the 2nd subgroup of the 1st group (Cu, etc.). They can be used with or without an activator or carrier. Cu catalysts are especially advantageous in alc., Ni catalysts in water soln.; in alc., the latter lead to too extensive hydrogenation to low-mol. alcs., whereas Cu catalysts give plurivalent alcs. in good yields. As Cu catalyst was employed chiefly Cu chromite prep. by decompn. of Cu NH₄ chromate in an autoclave and activated with BaCrO₄ (1/8 of the Cu); it gives neither (CH₂OH)₂ (II) nor methylglycerol (III), and below 300° no monovalent alcs. are formed either. Whether MeOH or EtOH solns. are used does not appreciably affect the yields. The losses which occur, especially with Ni catalysts, are due in part to decompn., in part to phys. changes, especially during the various operations (vacuum distns., etc.). Moreover, water is formed by reduction of HO groups to Me or CH₂ (formation of propylene glycol (IV), etc.). Better yields of I are obtained in water than in alc. solns. at low temps. and short contact times; in these expts. were employed Ni, Ni-Co and Ni-Cu catalysts on kieselguhr and Ni catalysts activated with Cr oxide (cf. C. A. 35, 5488.9, for general methods of prep. them). Some of the expts. with Ni and Ni-Cu catalysts gave greater yields of I than of IV; they were in general carried out below 250°, since at higher temps. excessive hydrogenation to low-boiling alcs. occurs. In water, intimate mixing of the H, soln. and catalyst is essential; otherwise, considerable acid is formed (apparently gluconic acid from the glucose by a Cannizzaro reaction), especially during the 1st stage of hydrogenation, and poisons the catalyst; 3% acid (calcd. as gluconic) completely destroys the activity of some catalysts. Especially active are Ni on kieselguhr and some Cu-Ni catalysts on kieselguhr, which yield up to 20-30% I (max., 33%) and 30-40 (max., 48%) IV. For good yields of I, the temp. must be kept below 230° and the reaction stopped before the H absorption exceeds the calcd. value. In general, at 220° the ratio of I to glycol is higher than at 230°. The ratio approaches 1 when sorbitol instead of glucose is hydrogenated or the hydrogenation is effected in 2 stages, first for some time at about 170°, so that all the glucose is hydrogenated to hexitol. The residues from these operations can then be successfully hydrogenated but should be dissolved in water and filtered to remove tarry impurities which might poison the catalyst. Unlike solid cryst. glucose, com. sugar sirup never gives good yields of hydrogenation products and they contain no or almost no I. This is also true of com. dextrose. In some expts. in the presence of CaCO₃ according to the du Pont patent (U. S. 2,004,135, C. A. 29, 4772.2) but with a Cu-Ni instead of the Ni catalyst, no I was found and the yield of glycol was very small (24%). In general, CaCO₃, unfavorably influences the yield of I; at best, it may increase that of IV. In the hydrogenation of polysaccharides (starch or dextrin) Ni is the most active catalyst; Cu-Ni is distinctly less active because of its greater sensitivity to the acidity of the partially hydrogenated soln. Noteworthy is the ready hydrogenation of white dextrin by Ni, which gives up to 25% of I. Other dextrins (light yellow), although they have a greater tendency to depolymerization, are less suitable, possibly because of **caramelization** products which poison the catalyst. With polysaccharides also, hydrogenation in 2 stages and further hydrogenation of the residues give higher yields of I and higher I/glycol ratios; in 1 expt. were obtained only traces of glycol along with 19.4% I, the rest consisting chiefly of hexitols which could be further hydrogenated to I. Ni-Cr catalysts act favorably even at 200° but they produce further hydrogenation and cause losses. However, they give high yields of I (as much as 47% in 1 expt.); at 220° the I/glycol ratio is 2:1. Co-Ni on kieselguhr is also quite active and gives at 230° good yields of I and IV (about 1:1). Expts. with Raney Ni, Cu aluminate, mixts. of Co-Fe, Fe-Ni, Co-Ag in varying amts. on kieselguhr were unsuccessful; Raney Ni, which is so extraordinarily reactive at low temps., is not suited to hydrogenation of carbohydrates at higher temps. (in 1 expt., 6% IV, 75% loss). The yields reported above are the values obtained by fractional distn. in a reflux app. corresponding to 6 theoretical plates; the sepn. of III is not quant. in this way and requires further distn. and extrn. with CHCl₃. The formation of considerable III along with glycol was observed only with Ni, never with Cu catalysts. In the yields given above, I includes III and glycol includes II and IV; I, II and III were detd. quantitatively in the combined products of various hydrogenations. About equal amts. of II and III were found, corresponding to cleavage of the hexitol at the 3,4-position; in a composite obtained with Ni catalysts the ratio I:II:III was 2:1:1. Fractionation of a completely dehydrated composite through a column corresponding to 10 theoretical plates gave the following percentages of monovalent alcs.: MeOH 14.2, EtOH 30.2, iso-PrOH 10.7, fraction b. 90-7° 14.9, b. 110-17° 6.9, b. up to 137° 9.9; the last 3 fractions contained, resp., sec-BuOH, Et₂CHOH and a sec-AmOH, identified as the 3,5-dinitrobenzoates, m. 66°, 59° and 51°. Xylose is readily hydrogenated to pentitol but the latter shows even greater resistance than the hexitols to cleavage of the chain, which occurs only at much higher temps. (250-300°); with Ni catalysts were obtained small amts. of I and larger amts. of IV. The mechanism of the hydrogenation reaction is discussed. The exptl. results confirm thermodynamic predictions; the hydrogenations which are accompanied by elimination of water are most favored, but with suitable catalysts (Cu) simple chain cleavage leading to formation of I can be made the chief reaction.

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627. Obtaining glycerol and glycols by hydrogenation of carbohydrates

By Natta, G.; Rigamonti, R.; Beati, E.

From [Berichte der Deutschen Chemischen Gesellschaft \[Abteilung\] B: Abhandlungen \(1943\), 76B, 641-56](#). Language: Unavailable, Database: CAPLUS

In a study of the practicability of a process for obtaining glycerol (I) by catalytic hydrogenation of carbohydrates, several hundred carbohydrate preps. have been hydrogenated. Only the 1st hydrogenation stage, which leads to hexitols, can readily be effected quantitatively with various catalysts, especially Ni (R. & B., Rend. ist. Lombardo 73, No. 11(1939-40)). The present paper deals with the 2nd stage, leading to I and glycols. The expts. were carried out in a 2-l. steel shaking autoclave about 1/4 filled with the reaction soln. The 1st stage of hydrogenation (formation of sorbitol) generally takes place rapidly during the time required to attain the reaction temp. The most suitable catalysts are those of the 8th group and of the 2nd subgroup of the 1st group (Cu, etc.). They can be used with or without an activator or carrier. Cu catalysts are especially advantageous in alc., Ni catalysts in water soln.; in alc., the latter lead to too extensive hydrogenation to low-mol. alcs., whereas Cu catalysts give plurivalent alcs. in good yields. As Cu catalyst was employed chiefly Cu chromite prep. by decompn. of Cu NH₄ chromate in an autoclave and activated with BaCrO₄ (1/8 of the Cu); it gives neither (CH₂OH)₂ (II) nor methylglycerol (III), and below 300° no monovalent alcs. are formed either. Whether MeOH or EtOH solns. are used does not appreciably affect the yields. The losses which occur, especially with Ni catalysts, are due in part to decompn., in part to phys. changes, especially during the various operations (vacuum distns., etc.). Moreover, water is formed by reduction of HO groups to Me or CH₂ (formation of propylene glycol (IV), etc.). Better yields of I are obtained in water than in alc. solns. at low temps. and short contact times; in these expts. were employed Ni, Ni-Co and Ni-Cu catalysts on kieselguhr and Ni catalysts activated with Cr oxide (cf. C. A. 35, 5488.9, for general methods of prep. them). Some of the expts. with Ni and Ni-Cu catalysts gave greater yields of I than of IV; they were in general carried out below 250°, since at higher temps. excessive hydrogenation to low-boiling alcs. occurs. In water, intimate mixing of the H, soln. and catalyst is essential; otherwise, considerable acid is formed (apparently gluconic acid from the glucose by a Cannizzaro reaction), especially during the 1st stage of hydrogenation, and poisons the catalyst; 3% acid (calcd. as gluconic) completely destroys the activity of some catalysts. Especially active are Ni on kieselguhr and some Cu-Ni catalysts on kieselguhr, which yield up to 20-30% I (max., 33%) and 30-40 (max., 48%) IV. For good yields of I, the temp. must be kept below 230° and the reaction stopped before the H absorption exceeds the calcd. value. In general, at 220° the ratio of I to glycol is higher than at 230°. The ratio approaches 1 when sorbitol instead of glucose is hydrogenated or the hydrogenation is effected in 2 stages, first for some time at about 170°, so that all the glucose is hydrogenated to hexitol. The residues from these operations can then be successfully hydrogenated but should be dissolved in water and filtered to remove tarry impurities which might poison the catalyst. Unlike solid cryst. glucose, com. sugar sirup never gives good yields of hydrogenation products and they contain no or almost no I. This is also true of com. dextrose. In some expts. in the presence of CaCO₃ according to the du Pont patent (U. S. 2,004,135, C. A. 29, 4772.2) but with a Cu-Ni instead of the Ni catalyst, no I was found and the yield of glycol was very small (24%). 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However, they give high yields of I (as much as 47% in 1 expt.); at 220° the I/glycol ratio is 2:1. Co-Ni on kieselguhr is also quite active and gives at 230° good yields of I and IV (about 1:1). Expts. with Raney Ni, Cu aluminate, mixts. of Co-Fe, Fe-Ni, Co-Ag in varying amts. on kieselguhr were unsuccessful; Raney Ni, which is so extraordinarily reactive at low temps., is not suited to hydrogenation of carbohydrates at higher temps. (in 1 expt., 6% IV, 75% loss). The yields reported above are the values obtained by fractional distn. in a reflux app. corresponding to 6 theoretical plates; the sepn. of III is not quant. in this way and requires further distn. and extrn. with CHCl₃. The formation of considerable III along with glycol was observed only with Ni, never with Cu catalysts. In the yields given above, I includes III and glycol includes II and IV; I, II and III were detd. quantitatively in the combined products of various hydrogenations. About equal amts. of II and III were found, corresponding to cleavage of the hexitol at the 3,4-position; in a composite obtained with Ni catalysts the ratio I:II:III was 2:1:1. Fractionation of a completely dehydrated composite through a column corresponding to 10 theoretical plates gave the following percentages of monovalent alcs.: MeOH 14.2, EtOH 30.2, iso-PrOH 10.7, fraction b. 90-7° 14.9, b. 110-17° 6.9, b. up to 137° 9.9; the last 3 fractions contained, resp., sec-BuOH, Et₂CHOH and a sec-AmOH, identified as the 3,5-dinitrobenzoates, m. 66°, 59° and 51°. Xylose is readily hydrogenated to pentitol but the latter shows even greater resistance than the hexitols to cleavage of the chain, which occurs only at much higher temps. (250-300°); with Ni catalysts were obtained small amts. of I and larger amts. of IV. The mechanism of the hydrogenation reaction is discussed. The exptl. results confirm thermodynamic predictions; the hydrogenations which are accompanied by elimination of water are most favored, but with suitable catalysts (Cu) simple chain cleavage leading to formation of I can be made the chief reaction.

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628. A method for determining sucrose, fructose, glucose, maltose and dextrin in their mixtures

By Aleksandrov, V. V.

From *Trudy Vsesoyuz. Nauch.-Issledovatel. Inst. Konditerskoi Prom.* (1941), (No. 3), 161-97. Language: Unavailable, Database: CAPLUS

Caramel products and starch sirups are analyzed in the following sequence: (1) iodometric detn. of fructose before inversion; (2) same, after mild inversion; (3) same, after strong inversion (reducing power detd. with Luff reagent after each of these detns.); (4) hexose after strong inversion (Luff reagent); (5) reducing power of initial sample (Luff reagent); (6) same (Barfoed reagent); (7) dextrin by difference. Since dextrin is thus assumed to be nonreducing, the actual reducing power of this component governs accuracy not only for dextrin but also for glucose and maltose. Hence the reliability of the method depends on the kinds of dextrin formed in **caramelization**. For the sucrose detn. accuracy depends on absence of easily hydrolyzable disaccharides such as anhydrofructose, which might be formed in **caramelization**. The fructose detn. is most dependable of all. The method does, however, serve to indicate the character of chem. changes occurring in **caramelization**. Some attention was also given to Schoorl's modification of the Schaffer-Hartmann method and to the Zerban-Sattler and Kruisheer methods.

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629. The isomeric conversion of glucose under the influence of alkalies

By Harlay, M. V.

From [Journal de Pharmacie et de Chimie \(1942\), 2, 257-63](#). Language: Unavailable, Database: CAPLUS

The heating of aldoses and ketoses with alkalies causes decompn. of the sugars (**caramelization**) whereby lactic acid is formed in addn. to other products. The action of alkalies of various concns. at low temps. converts glucose (I) in part into levulose (II) and mannose. With other sugars 3 isomers are formed. This conversion explains some of the abnormalities observed. A 10% I soln. in 1% NH_4OH shows a deviation of 51 saccharimeter degrees corresponding to 105 g. I/l., after 11 hrs. 47.3° , and after 72 hrs. 36° . Solns. of 5% I in 0.075, 0.15 and 0.3% Na_2CO_3 show deviations of 27, 29.5 and 25° , resp., while 5.57, 6.08 and 5.16% I solns. kept at 30° for 3 days show deviations of 25° , 24.2° and 14.8° , resp. They give a pos. Selivanoff reaction and have a reducing power of 5.52, 6.02 and 5.05% while their I content is 5.49, 5.82 and 4.45%, resp. A small amt. of alkali causes such a large conversion that the latter must be attributed mainly to the isomerizing action of the alkali. A soln. of 100.5 g. I/l. in a 1% Mg soln. (official) after 1 day shows a deviation of 48.5° , after 2 days 42° and after 3 days 40.6° . It gives a pos. S. reaction and has a reducing power corresponding to 10% I. Because of the higher temp. in summertime, a rapid fermentation of diabetic urine occurs and the NH_4OH formed suffices to cause a partial isomerization. At $30-2^\circ$, the urine rapidly becomes alk., the polarimetric test and the reducing power indicate 39.8 g. I/l., and the S. reaction is neg. After 2 days, the polarimetric test shows only 25 g. I/l., the reducing power 38 g. and the S. reaction is pos. In such a case, before levulosuria is diagnosed, it must be detd. whether or not an isomeric conversion has taken place. A I soln. sterilized by mistake at 120° became yellow and showed a deviation of 4° corresponding to 8.25 g. I, but the reducing power showed 40 g. I/l. A 1% soln. of I kept for several years under PhMe has a pH 8.2 and an unchanged reducing power but a slight pos. S. reaction, probably due to the alky. of the glass vessel. A ketose detn. gives 1.5% ketose. When a fresh 1% I soln. is kept in the same bottle for several weeks at $30-40^\circ$, only 0.75% glucose is found. The $\text{HCl-H}_3\text{PO}_4$ -vanillin reaction, which is based on a condensation of decompn. products of II with vanillin, gives a light pink to red coloration depending upon the concn. This reaction is neg. with I, galactose, ascorbic acid and dihydroxyacetone, but pos. with holosides or heterosides such as saccharose and inulin which on hydrolysis give II. The reagent is made up by dissolving 0.2 g. vanillin in 25 cc. HCl and 75 cc. 85% H_3PO_4 , and is stable when protected from light and air. A test soln. (1 cc.) with less than 1% sugar and 5 cc. reagent is mixed, heated for exactly 2 min. in a boiling water bath and immediately cooled. The coloration lasts for several hrs. The reaction is very sensitive and indicates 0.02 g. II/l. in the absence, and 0.05 g. in the presence of other sugars. The measurements are carried out colorimetrically with a standard soln. contg. 0.5-4.0 g. II/l.

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630. Continuous concentration [of beet juice]

By Willaime, G.

From [Journal des Fabricants de Sucre \(1941\), 82, 312-15](#). Language: Unavailable, Database: CAPLUS

cf. C. A. 37, 3964.5. W. presents graphically the possibility of stepwise continuous concn. of beet juice. Addnl. advantages of this process are a reduction of the total vol. of the concg. app., a decrease of **caramelization**, and a saving of as much as 6 kg. coal per ton of beets.

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631. Inactivation of the browning system in dried apples

By Denny, F. E.

From [Contributions from Boyce Thompson Institute \(1943\), 13, 57-63](#). Language: Unavailable, Database: CAPLUS

This is a continuation of C. A. 29, 6966.7. Slices of apple dipped in 0.01% thiourea soln., dried in a current of warm air and heated to 80° for 1.5 hrs. do not brown when later soaked in water. **Caramelization** occurred if the temp. reached 85° and the moisture was above 15°. The slices should be dried to between 10 and 15% moisture. The thiourea treatment destroyed the organic peroxides; the heat-treatment inactivated the peroxidase.

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632. Changes in starch in the process of breadbaking

By Chizhova, K. N.

From [Akad. Nauk S. S. S. R., Inst. Biokhim., Biokhimiya Khlebopecheniya, Sbornik \(1942\), 3, 131-9](#)(in English, 139-40). Language: Unavailable, Database: CAPLUS

C. showed that basic changes occur in carbohydrates during baking period. Apparently the intensive splitting of starch is due essentially to interaction of the amylase complex. In the crust essentially thermal changes occur with **caramelization** of sugars being the primary one.

~0 Citings

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633. Caramelized malt

By Rahn, Otto

From [No Corporate Source data available \(1942\), DE 722300 19420521](#), Language: Unavailable, Database: CAPLUS

Kiln-dried malt is mixed with water with continuous stirring. The temp. is gradually raised until the malt is saccharified and then it is roasted. The light-colored product is used for top-fermenting beer.

~0 Citings

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634. Malt extracts free of proteins

By Rohrer, Johannes

From [No Corporate Source data available \(1942\), DE 722257 19420521](#), Language: Unavailable, Database: CAPLUS

The usual malt wort is cooled under pressure, the pptd. proteinaceous substances are sepd. and the cooking repeated at a higher temp. and increased pressure. The newly pptd. proteinaceous material is sepd. and the malt evaporated in vacuo.

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635. Storage of synthetic citrus powders. **Caramelization by citric or tartaric acid and various sugars at high temperatures**

By Isaac, Wm. Edwyn

From [Industrial and Engineering Chemistry \(1943\), 35, 470-4](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50400a018

When artificial lemonade and orangeade powders contg. a high concn. of citric acid are stored at high temp., the citric acid evolves water of crystn. which, if not allowed to escape, hydrolyzes sucrose. The fructose formed then caramelizes. To prevent this, a higher concn. of sucrose should be used, or glucose may be used; or tartaric acid may be used in place of citric acid.

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636. The effect of boric acid on the **caramelization of the sugars**

By Niculescu, M.

From [Zeitschrift fuer Analytische Chemie \(1941\), 122, 335-44](#). Language: Unavailable, Database: CAPLUS

Boric acid inhibits the **caramelization** of the sugars by the formation of boron-sugar compds. The 3 sugars glucose, lactose and sucrose were studied. When a 10% soln. of glucose, to which 1-2 cc. of 10% NaOH soln. has been added, is heated to 126° it caramelizes. But if 0.2-0.3 g. boric acid is previously added there is less **caramelization**, and in the absence of NaOH none at all. Lactose is also more difficult to caramelize in the presence of boric acid; even in milk **caramelization** is inhibited. Sucrose is not caramelized at all, even in the presence of NaOH.

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637. **Caramelization of fructose and fructosana by the action of heat**

By Colin, H.; Belval, H.

From [Bulletin de l'Association des Chimistes \(1941\)](#), 58, 281-92. Language: Unavailable, Database: CAPLUS

Previous work on caramel and anhydro sugars is reviewed. When tritacin, graminin or the fructosans of Lycoris and Elymus are heated in a thin layer to 105-10° they neither lose nor gain wt., but they darken and finally become pasty, and upon cooling hard and vitreous. The initial levorotation continuously decreases, and then changes to dextrorotation which increases upon further heating. At the same time the reducing effect upon Fehling soln., very small at first, gradually increases. The hygroscopic fructosans change more rapidly in rotation and reducing power than the nonhygroscopic ones. Fructose, heated to 130° in the vacuum of a water jet pump for 5 hrs., gradually loses 10.3% H₂O, its levorotation decreases to 0, and the nonfermentable portion becomes dextrorotatory; this indicates the formation of levulosan. When the dextrorotatory products obtained by heating the above fructosans are hydrolyzed the levorotation after hydrolysis is greater, but the reducing power smaller, than that of fructose. An alc. ext. of the heated fructosan before hydrolysis has a greater dextrorotation, and after hydrolysis a smaller levorotation, than the heated fructosan itself. The original fructosans are not oxidized by NaIO, but after they have been heated they are; indicates the presence of aldoses. The observed facts must be due to a mol. rearrangement during the heating.

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638. **Preparing sirup for use in pineapple canning**

By Pearson, Cyril W.

From [No Corporate Source data available \(1941\)](#), GB 538769 19410815, Language: Unavailable, Database: CAPLUS

Comminuted paring waste of unripe pineapples is expressed to yield 50-70% of the total juice, undue acidity of the expressed juice is neutralized by the addn. of Ca(OH)₂ followed by CaCO₃, the juice is heated to ppt. albuminous coloring matter without **caramelization**, the flocculent solids are filtered off, and the sirup is fortified to the required saccharometer strength by the addn. of sugar.

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639. **Treating ice-cream mixes**

No Inventor data available

From [No Corporate Source data available \(1941\)](#), GB 538755 19410815, Language: Unavailable, Database: CAPLUS

A process for the treatment of ice-cream mixes preparatory to freezing comprises pasteurizing the mixt. at a temp. ranging from 180°F. to 205°F. by dividing the mix into fine streams or particles and commingling them with steam (so that pasteurization is completed in a period of a few seconds), and then deodorizing the mix by boiling it at a temp. ranging from 170° to approximately 180°F. under reduced pressure ridding thereby substantially all of the mix of aromatic and volatile flavoring oils and fatty acids without substantial **caramelization** of the sugar.

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640. **Factors influencing color of beer and ale**

By Laufer, Stephen

From [American Brewer \(1941\)](#), 74(No. 5), 20-4. Language: Unavailable, Database: CAPLUS

Melanoidins that are produced in malt during kilning through the interaction of reducing sugars and amino acids det. chiefly the intensity of color in wort and beer, while phlobaphenes which are formed because of oxidation of tannins and other coloring substances influence the tint, such as reddish or greenish. Particular precautions must be observed in producing a pale-colored malt intended for manuf. of pale beer or ale. The color contributed by the hops is due almost entirely to constituents other than hop resins (chiefly to tannins). Old hops impart more color than fresh hops. Alky. of the brewing water plays a very important part in developing color. A wort produced with a highly alk. water gave a color of 16.7°L. which dropped only to 15.6°L. after fermentation. In the course of brewing the color increases somewhat during mashing and more so during prolonged boiling in the kettle; this is due chiefly to oxidation of wort constituents and partly also to **caramelization** of sugars. The color increases with increase in pH during mashing and boiling. Little rise in color takes place in the course of cooling, but during fermentation, storage and finishing off (filtration) a reduction in color occurs owing to operations involving adsorption of pptd. substances and coloring matter. Yeast may occasionally cause a rise in color, while access of air during brewing operations and to the finished product generally brings about a color increase.

~0 Citings

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641. Problems in preparing color

By Khandros, Ya.; Gel'brud, R.

From [Spirto-Vodochnaya Promyshlennost \(1939\), 16\(No. 7\), 31-2](#). Language: Unavailable, Database: CAPLUS

In testing caramel for use as coloring matter neither 90% EtOH nor 20% H₂SO₄ is a satisfactory medium for soly. detns. A much better criterion is the soly. in 40% EtOH contg. 1% citric acid. Caramels made with accelerators, e. g., glycerol or NaOAc, are compared with caramels made by heat alone. Accelerators lower **caramelization** temp. to about 180° or even as low as 160° instead of 200-210°.

~0 Citings

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642. Quality color in corn

By Moyer, W. D.

From [Crown \(1941\), 29\(No. 11\), 16](#). Language: Unavailable, Database: CAPLUS

Darkening and subsequent loss of quality in canned corn are caused by the breakdown of sugar in the corn and brine due to heat of processing (**caramelization**) or by contamination by Cu. The first can be controlled by careful supervision of the process and prompt, effective cooling. The second can be taken care of by the elimination of equipment made of Cu or Cu alloys or by careful tinning of this equipment and frequent subsequent inspection to ensure complete coverage of Cu surfaces.

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643. Composition of the products of **caramelization** of unrefined sugar

By Cattaneo, Pedro

From [Anales de la Asociacion Quimica Argentina \(1921-2001\) \(1941\), 29, 33-47](#). Language: Unavailable, Database: CAPLUS

Like the products of the **caramelization** of pure sucrose, the products of **caramelization** of unrefined cane sugar comprise humic and isosucrose substances. The caramels of unrefined sugar contain a humic fraction insol. in water and when aq. solns. of such sugar caramels are acidified in the cold, sepn. of humins of the same compn. as the water-insol. fraction occurs. Caramels of pure sucrose, produced under the same conditions, are totally sol. in water and the solns. are not pptd. in the cold on acidification. The water-insol. humins from unrefined sugar caramels increase with the degree of dehydration. The sol. humins, pptd. by acid, increase with the degree of hydration, then decrease and disappear. The reducing power, after inversion, of unrefined sugar caramels, diminishes regularly with the degree of dehydration, and then disappears. Independently of the degree of dehydration, and for all samples of unrefined sugar caramels tested, the sum of the % insol. in water, pptd. by HCl, and the MeOH ext., is practically 100. Unrefined sugar caramelizes more rapidly than pure sucrose, giving degrees of dehydration much higher than those obtained with pure sucrose. This peculiar behavior is attributed to the presence of mineral compds. in the unrefined sugar and should be studied further. Four references.

~0 Citings

644. The determination of nitrates in water contaminated with organic material, with consideration of the treatment with activated carbon

By Tyuda, Keniti

From [Kyoto-furitsu Ika Daigaku Zasshi \(1940\)](#), 29, 866-78;in Japanese, 894. Language: German, Database: CAPLUS

The applicability of activated C in the detn. of the nitrate content of water was studied by use of the diphenylamine-sulfuric acid method of Tillmans (C. A. 5, 3211) (Method I), the brucine-sulfuric acid method of Noll (Z. angew. Chem. 1901, 1317) and Haase (C. A. 20, 2472) (Method II) and the phenoldisulfonic acid method of Chamot and Pratt (C. A. 3, 2922; 4, 1726) (Method III). Treatment with 1% activated C of distd. water to which had been added 10 mg. $\text{N}_2\text{O}_5/\text{l.}$ as NaNO_3 and which had been brought to pH 8.5 resulted in an av. adsorption of 12, 4 and 0% nitrate as estd. by Methods I, II and III, resp. If this expt. was repeated with the above soln. to which had also been added 0.1 or 0.5% peptone or with well water contg. 10 mg. $\text{N}_2\text{O}_5/\text{l.}$, some of the added nitrate was also adsorbed by the C; this loss was especially marked with Method II. The C treatment decolorized the NaNO_3 soln. with added peptone quite well. Method II was unsuitable for the estn. of nitrates in water which contained 0.1 or 0.5% glucose because the **caramelization** made the colorimetric estn. difficult. The C treatment clarified waste water more or less, but resulted in a loss of 15-46% of the added nitrate (10 mg. as above).

~0 Citings**645. Browning of autoclaved milk**

By Kass, J. P.; Palmer, L. S.

From [Industrial and Engineering Chemistry \(1940\)](#), 32, 1360-6. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50370a019

The characteristic color of autoclaved milk is ascribed to **caramelization** of the lactose by, and adsorption of the lactocaramel on, the caseinates, and not to the formation of definite lactose-protein compds. as proposed by Ramsey, et al. (C. A. 27, 1953) and others. Lactose solns. were heated for 15 min. at 120° in the presence of buffers over wide ranges of pH, concn. and time. **Caramelization** is characterized by a partial conversion of lactose to acids and to ketoses, the colored substance probably originating from the transformation products. The intensity of color is a logarithmic function of the amt. of sugar destroyed, i. e., the percentage of optically inactivated lactose, when any one of the following buffers was present: Clark & Lubs phosphate, Michaelis barbital or Palitzsch borate. The fact that the glycine buffer of Sorensen gave deeper colors for the same amt. of lactose destroyed indicates a special type of reaction. Solns. of highest purity lactose do not discolor on autoclaving whereas solns. of com. "pure milk sugar" discolor on mere boiling. Increase of the phosphate ion up to 0.05 M shows a logarithmic relation with color development on autoclaving, this relationship becoming linear as phosphate is further increased. Color development in the presence of phosphates or Na caseinate is directly proportional to the concn. of the lactose. A time study revealed the complexity of the change and indicated 3 simultaneous reactions, namely, production of acids, ketoses and caramel. The presence of CH_2O or trioxymethylene prevents color formation even under intense heating, ascribed to a blocking of polymerization of the lactose-split products to caramel. Milk salt combinations of S.ovrddot.oldner (Landwirt. Vers. Stat. 35, 351-436(1888)) and of Van Slyke and Bosworth (C. A. 9, 2406) or the addn. of whey powder or skim milk serum obtained by filtration had but little effect in the discoloration reaction but accounts for much of the acidity developed when milk is autoclaved. The important role played by casein in the browning of milk was shown by the increase in color as concn. of Na caseinate in the lactose soln. increased, destruction of the lactose remaining const. In the presence of Na caseinate, color increased with time of heating, destruction of lactose again remaining const. The adsorption of lactocaramel by casein follows the Freundlich isotherm, increasing with increasing pH of the caseinate sol. The color could not be eluted from the mixt. but was destroyed with Br. Dephosphorized casein had the same effect on lactose as normal casein.

~2 Citings**646. Crystallization of high-grade massecuites**

By Praeger, A. H.

From [International Sugar Journal \(1940\)](#), 42, 286-8. Language: Unavailable, Database: CAPLUS

The purpose of crystn. is to increase the speed of recovery of sugar. Tests show that massecuites of all grades when crystd. gave the same increased recovery. While it is true that sugar crystd. from high grades would otherwise be recovered in later boiling, such requires extra steam and capacity at the pan stage while opportunity is given for further **caramelization**. It also seems illogical to wait until the last stage of the process before striving for the max. recovery, especially as the ease of recovery is not increased. Several types of crystg. equipment are described.

~0 Citings

647. Dried starch-conversion product suitable for use in various foods

By Walsh, James F.

From [No Corporate Source data available \(1940\)](#), [US 2189824 19400213](#), Language: Unavailable, Database: CAPLUS

A process of producing a substantially dry, solidified, starch-conversion sirup product adapted to be packaged, shipped and stored without caking or lumping, involves dehydrating a starch-conversion liquor having a dextrose content of about 25-65% and a pH value of about 3.5 to 5.5, in the presence of about 0.01-0.03% of SO₂ to prevent **caramelization** of the dehydrated product until the moisture content of the product is between about 1% and 4%, quickly cooling the dehydrated product in the form of relatively thin sheets and in a humidity-controlled atm. to effect solidification without **caramelization**, and comminuting the solidified product in a humidity-controlled atm.

~0 Citings**648. Determination of the crude fiber in coffee substitutes and coffee supplements**

By Thaler, H.; Beitter, H.; v. Spiess, Th.

From [Zeitschrift fuer Untersuchung der Lebensmittel \(1939\)](#), [78](#), 387-92. Language: Unavailable, Database: CAPLUS

The **caramelization** of coffee supplements and substitutes, i. e., chicory, rye, barley, etc., during roasting causes an increase in the results obtained on analysis for crude fiber. The crude-fiber results on a chicory subjected to various degrees of roasting varied from 6.21 to 81.7% when detd. by the Weender method and from 6.64 to 9.71 by the Scharrer and K.ovrddot.urscher method (C. A. 25, 5718.7). The latter method is considered more suitable.

~0 Citings**649. Manufacture of high-test molasses**

By Mascaro, M. A.

From [Proc. 12th Ann. Conf., Asoc. tecnicos azucar., Cuba \(1938\)](#), 199-201. Language: Unavailable, Database: CAPLUS

The concd. cane juice (40-42 Brix) is mixed with dild. acid and heated to 215-20°F. by pumping through the 1st of 2 high-speed heaters; in the receiving tank the inversion is allowed to proceed until the temp. has fallen to 175°F., when the liquid is again passed through a similar heater to a 2nd tank where the purity is allowed to drop to the desired figure. This system advantageously replaces the ordinary "stationary" heating in a single tank, as there is less **caramelization** and decompn.

~0 Citings**650. Synthetic resins**

By Bremer, Clarence

From [No Corporate Source data available \(1939\)](#), [US 2176415 19391017](#), Language: Unavailable, Database: CAPLUS

A process of making an odorless, tasteless resinous material suitable for coating food wrappers, etc., involves heating a mixt. consisting essentially of an inner ether derivable from a straight chain hexahydric alc., such as sorbitol or mannitol with abietic acid or a rosin from grades WG to X, and a hydroxyl-free, aliphatic dibasic acid in which the carboxyl groups are sepd. by at least 2 C atoms, such as maleic, adipic or succinic acid at temps. (suitably to 295°) to effect desired reaction with **caramelization** of the product while substantially excluding air and removing volatile odor- and taste-producing reaction products from the reaction mixt., the total no. of acid equivs. in the reaction mixt. being about 2.8 to 4.5 per mol. of inner ether, and the dibasic acid mol. fraction of the total acid present being substantially from 0.05 to 0.35.

~0 Citings

651. Oxidations in the sugar group and their significance in sugar manufacture

By Spengler, O.; Pfannenstiel, A.; Nordstrom, L.

From [Zeitschrift der Wirtschaftsgruppe Zuckerindustrie \(1939\), 89, 171-205](#). Language: Unavailable, Database: CAPLUS

In the presence of KOH, Ca(OH)_2 , Ba(OH)_2 , or Sr(OH)_2 and catalysts such as Ag or Cu, sucrose (I) is rapidly and very extensively oxidized. In contrast to previous expts. in which more or less brown solns. result owing to **caramelization**, the present solns. are colorless. An exception is met in solns. obtained from 1 mol. of I and 2 O, which are intensely yellow; the color must be caused constitutionally since it disappears in the presence of more O. The change takes place rapidly at room temp. In hot, satd. aq. Sr(OH)_2 the reaction can be so conducted that 18 O per mol. of I are absorbed in 4 hrs. (75% of the amt. required for the complete conversion of I into CO_2). Under these conditions 100 g. of I give 62 g. of $\text{H}_2\text{C}_2\text{O}_4$ and other products. Under mild conditions I is not hydrolyzed in alk. soln. Fission of the glucosidic linking is only possible therefore after oxidation of the intact mol. of I. This fission necessitates the formation of oxidation products of the hexose components of I. The isolation of K d-arabonate is recorded but high yields are not to be expected since the salt rapidly undergoes further oxidation under the exptl. conditions. In 2 N KOH at 50-60° I absorbs O rapidly. At 70-80° the change is still faster; HCO_2H and CO_2 appear immediately but $\text{H}_2\text{C}_2\text{O}_4$ cannot be detected until 3-4 atoms of O per mol. of I have been absorbed. A mechanism of the reaction is proposed. The oxidation of glucose (II) and fructose (III) with mol. O in aq. Ca(OH)_2 without catalyst proceeds differently from the change in aq. KOH under similar conditions whereby d-arabonic acid is obtained in 75% yield. In aq. Ca(OH)_2 II and III absorb resp. 3 O and 4 O whereas in 2 N KOH only 2.2 O are absorbed. Under like conditions III is much more rapidly and completely oxidized than is II. The appearance of large amts. of $\text{H}_2\text{C}_2\text{O}_4$ in the evapg. plant of sugar refineries is explained by oxidative degradation of invert sugar or I.

~0 Citings

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652. A colorimetric sugar determination

By Schmidt, Ernst A.

From [Muehlenlaboratorium \(1938\), 8, 121-32](#). Language: Unavailable, Database: CAPLUS

In dil. solns. (up to 1%) maltose, glucose, fructose, mannose and arabinose were equally caramelized and glycerol was only slightly affected. The color developed was proportional to the concn. of sugar present. Sucrose, raffinose, starch, dextrin, mannitol and sorbitol were not caramelized. The reaction was considered applicable to the detn. of sugars in rye and wheat meals and flours. Preliminary expts. to det. the details of the procedure are reported and the method as developed is outlined (cf. C. A. 32, 5942.5).

~0 Citings

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653. The **caramelization of sucrose by sulfuric acid**

By Milbauer, Jaroslav

From [Chemické Listy pro Vedu a Prumysl \(1939\), 33, 132-3](#). Language: Unavailable, Database: CAPLUS

Equal vols. of 1.169 M sucrose and 12.235 M H_2SO_4 mixed by a stream of bubbles of CO_2 , maintained at a const. lab. temp., and kept in a special glass reaction chamber caramelized so slowly that it was possible to follow the color changes with a photoelec. cell. After 24-60 hrs. the transmission of light fell to a tenth of the original and followed approx. a hyperbolic curve. The addn. of HgSO_4 to give a concn. of 8.6 mg. HgSO_4 per l. slowed the **caramelization** of the sucrose: with HgSO_4 the light transmission fell to a tenth of the original value in 53 hrs.; without HgSO_4 the light transmission fell to a tenth of the original value in 32 hrs.

~0 Citings

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654. Iodometric characteristic of the degree of carmelization of mash

By Sotonin, K.

From [Spirto-Vodochnaya Promyshlennost \(1937\), 14\(No. 2\), 37-8](#). Language: Unavailable, Database: CAPLUS

To 10 cc. of mash 15 cc. of 0.02 N I soln. is added. After 30 min. 100 cc. water and a small amt. of starch are added and the sample is titrated with 0.02 N $\text{Na}_2\text{S}_2\text{O}_3$.

~0 Citings

655. The industrial crystallization of sucrose

By Bieselaar

From [Bulletin de l'Association des Chimistes \(1939\)](#), 56, 3-38,85-152,193-227. Language: Unavailable, Database: CAPLUS

The history of sugar manuf. is reviewed, with the emphasis on the crystn. process. The crystallography of sucrose, and the chem. and phys. constitution of the sucrose mol. are discussed and it is shown that the present knowledge of these properties is of little use in industrial crystn. While the cost of extn. and purification of the juices is nowadays about the same in different countries, that of crystn. varies widely, and is generally too high. The most important factors in crystn. are the soly. of sucrose, thviscosity of its solns., the velocity of soln. and the decompn. of sucrose by heat, especially at high alky. The various theories on these subjects and on the mechanism of crystn. cannot as yet be applied to industrial practice, but the fact that colloids slow up crystn. is important. Expts. in the lab. and factory have shown that the coeff. of satn. does not have the importance that is generally ascribed to it. If the satn. coeff. is corrected for fine grain by the refractometric method it is usually found to be only slightly above 1. In impure solns. crystn. is regulated principally by the proportions of water, sucrose and nonsugar. Crystn. stops when these 3 factors are in equil. at a given temp. This point is reached at a molasses purity of about 55. Further evapn. merely increases the viscosity and the coeff. of satn., but does not induce further crystn. of sucrose, and is therefore a waste of time and money. A P_H above 8, and destruction of sucrose by heat have a decided effect on crystn. A normal, grain-free beet molasses at 30° has the following compn.: H_2O 20.1-21.5%, sucrose 49.3-47.1%, purity 55-60, depending on the nature of the nonsugars. Calcn. and practical tests have shown that such a molasses can be obtained best by crystn. in 2 stages. It is a mistake to boil back the run-offs from the 1st boiling; only the washings should be returned to the 1st massecuite. The 1st massecuite is purged at 60° and yields com. sugar. The run-offs are purified, filtered and boiled to 2nd massecuite which is purged at 25 to 30°, giving final molasses. The 2nd sugar is remelted, the melt purified, filtered and returned to the sirup. This system avoids excessive **caramelization** and reduces the quantity of massecuites per ton of beets to a min., with an increase in pan capacity of about 25%. Molasses of min. purity is obtained at the least expense; the purity to be expected can be readily calcd. from the compn. of the 2nd massecuite by given formulas. This principle has not yet been applied to cane-sugar manuf., but it should give about the same results, because apart from the presence of large quantities of reducing sugars there is no essential difference between beet and cane juices. Instead of the usual stationary types of pans and crystallizers which give poor circulation, rotary app., such as those of Lafeuille (C. A. 20, 121.2, 2088.1,2088.3,2088.5, 3585.6), should be used. The brasmoscope is not a proper guide for boiling operations because the b.-p. elevation is affected by the pressure. The best method for starting grain is seeding with powd. sugar.

~0 Citings

656. Improvement of the baking power of cereal flours

By Vuk, Mihaly; Gomory, Sandor

From [No Corporate Source data available \(1938\)](#), HU 119524 19381201, Language: Unavailable, Database: CAPLUS

Flour is made up to dough by adding twice as much water, then a part of the dough is decomposed by natural lactic acid fermentation and heated to a temp. below the coagulation temp. of proteins until the contours of the starch particles begin to disappear under the microscope. The mass is dried at a temp. not exceeding **caramelization** temp. and ground to flour. Such flour can be added to ordinary flours in amounts varying from 4 to 6% or the prepn. is allowed to swell in water and added in this state to the dough.

~0 Citings

657. Maple food flavor

By Morison, Frederick S.

From [Food Industries \(1938\)](#), 10, 143-4. Language: Unavailable, Database: CAPLUS

Quebec sirup and sugar are considered to have the most pronounced flavor. The maple sirups are graded only according to a color scale, the lightest color being of the highest grade. The flavor in maple products is readily removed by activated C from which it is not recoverable. Prolonged cooking under vacuum likewise removes much of the flavor. **Caramelization** is likewise harmful to the retention of the true maple flavor. No form of processing will remove the moldy flavor from maple products. A cool, dry storage below 50°F. is best for either sugar or sirup. For com. bottling of sirup, the crude product is passed through a filter press to secure transparency and brilliancy.

~0 Citings

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658. What is known about nonsugars?

By Schweizer, A.

From [Listy Cukrovarnicke \(1938\)](#), 56(No. 12), Rozhledy 6. Language: Unavailable, Database: CAPLUS

In a compact bibliography of recent investigations S. reviews the formation of allantoin and glyoxal and their relation to oxalate sediments, the formation of decompn. products from invert sugar in the presence of amino acids, the presence of pentoses and the mechanics of [caramelization](#).

~0 Citings

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659. What is known about nonsugars?

By Schweizer, A.

From [Riet en Biet \(1937\)](#), 10, 126-7. Language: Unavailable, Database: CAPLUS

In a compact bibliography of recent investigations S. reviews the formation of allantoin and glyoxal and their relation to oxalate sediments, the formation of decompn. products from invert sugar in the presence of amino acids, the presence of pentoses and the mechanics of [caramelization](#).

~0 Citings

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660. The colorimetric maltose determination as an operating control in the bakery

By Schmidt, E. A.

From [Mehl u. Brot \(1938\)](#), 38(No. 20), 1-3. Language: Unavailable, Database: CAPLUS

The method is based on the [caramelization](#) of maltose under the action of dil. alkali. The depth of the brown color developed is proportional to the concn. of the maltose. The method is as follows: Mix 10 g. of flour into a thin paste with 50 cc. of distd. water at 29° and allow to stand 1 hr. with frequent shaking, in a fermentation cabinet or water bath held at 29° to 30°. Pour half the mixt. onto a folded filter and collect 5-10 cc. of the turbid filtrate, using a graduated cylinder for the receiver. Return this filtrate to the filter, let it run through again, then transfer the other half of the mixt. to the filter. Keep the time for complete filtration const. at 30 min. Shake the filtrate, measure out 15 cc. and to this add 5 cc. of N alkali. Hold in a boiling water bath for 5 min., cool 5 min., and transfer an appropriate quantity to the cell of the special sugar colorimeter newly developed by E. A. Schmidt and Armin K. ovrddot.uhn (illus.). Match the color with that of one of the standard colored glasses mounted in the color disk of the colorimeter and take the reading. The scale reads directly as percentage of maltose.

~0 Citings

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661. Caramel and humin. The decomposition products of sugar

By Schweizer, A.

From [Recueil des Travaux Chimiques des Pays-Bas et de la Belgique \(1938\)](#), 57, 345-82. Language: English, Database: CAPLUS

Sugar humin (I), obtained as a by-product in the prepn. of levulinic acid by Tollens' method, was washed with H₂O until free from HCl and then with EtOH and Et₂O; no CO₂ was evolved when heated at 120-30°; analysis indicated the formula C₂₄H₂₀O₉. I in NaOH (up to 50%) swells to a gelatinous mass with no coloring of the alkali; if air, O₂ or O₃ is bubbled through the suspension, the liquid eventually becomes brown. When I is treated with an alk. soln. of H₂O₂, a vigorous reaction takes place with the evolution of gas and much heat. On acidification with AcOH, CO₂ is evolved in large amts.; mineral acids also give CO₂ and after a short time a pale brown substance ppts.; on continued washing with H₂O this ppt. passes into colloidal soln. Admixed KCl is sep'd. by drying the ppt. and then dissolving in EtOH; analysis indicates the formula C₁₂H₁₀O₅ (C₆H₁₀O₅ given in text), which is that of hyalomelanic acid (II). Oxidation of I with H₂O₂ in NH₄OH gives a compd. with 4.3% N; after boiling with 10% KOH, the product still contains 2.4% N. I (10 g.) on oxidation gives about 2.37 g. of CO₂ or 10% of the C present in I. II gives a Pb salt, C₁₂H₁₀O₅.PbO, and a K salt, C₁₂H₉O₅K. PhNHNH₂ yields 2 compds.; in AcOH a dark red compd., 2II.-PhNHNH₂; in EtOH, a brown compd., which may be II.PhNHNH₂ or C₁₂H₁₀O₄:N.NHPh. II yields a di-Ac deriv., brown, with no m. p. Definite products could not be isolated from the mother liquors of II. II and Br in N gas give the compd. C₁₂H₈O₅Br₂ (III); the Br is removed by boiling 0.5 hr. with 50 cc. 10% KOH. I gives the compd. C₂₄H₁₅Br₄O₉; all the Br is removed with alkali. I and liquid Br appear to give a mixt. of 2 compds. with 41 and 51% Br. I and dry Cl at 70-80° give a compd. with 24% Cl. II (2 g.) with HNO₃ (d. 1.52) at -5° gives 0.7 g. of the yellow compd. C₁₂H₁₁O₅NO₃ (IV), 0.23 g. (CO₂H)₂ and 0.5 g. saccharic acid monolactone; dil. HNO₃ also gives IV but a higher reaction temp. is necessary. Although I is not sol. in HNO₃, it gradually gives 70% of IV at temps. below 70°. At 100° IV and HNO₃ give (CO₂H)₂ and saccharic acid (V); these acids are also produced by alk. H₂O₂. Refluxing IV with 25% KOH splits off 1.8 to 2.4% N, regenerating a part of the I. HNO₃ splits off 10% of the C of I as CO₂ at low temps. (until the I is converted into IV), and about 30% more of CO₂ is formed by the further decompn. of the sol. products by the HNO₃ at the b. p.; about 50% of the CO₂ is split off at 95°. Oxidation of 50 g. I with 150 cc. HNO₃ (d. 1.52) at a temp. below 60° gives 10 g. (CO₂H)₂ and 6 g. of the dilactone of V. With HNO₃ (d. 1.26) at 60-70° a compd. is obtained which is probably a lactone of gluconic acid. HNO₃ reacts slowly with III, giving a yellow compd. C₂₄H₁₈O₁₅Br₄N₂ and a little (CO₂H)₂Br does not attack IV. In the **caramelization** process, a definite degree of dehydration does not lead to a definite product. The coloring matter in caramel (VI) is a highly dehydrated carbohydrate, having the characteristic properties of I; this coloring matter is found in slightly dehydrated sugar, isosaccharosan (VII). When VI is dissolved in H₂O, the presence of VII prevents the flocculation of I. VII may be extd. from VI with cold 84% EtOH. Heating 40 g. sucrose at 185-90° for 4 hrs. gives 27 g. of a black powder; MeOH in 10 hrs. exts. 7 g. VII; of the residue (10 g.), 3 g. are sol. in boiling H₂O (4 hrs.); the residue and alk. H₂O₂ give II; in another expt., 40 g. fructose, heated for 6 hrs. at 165-80°, give 7 g. fructosan and 14 g. I. VII (10 g.) with 10% HCl (16 hrs.) gives 2 g. I. Thus, VI is a mixt. of I and VII. I is a highly dehydrated carbohydrate in a highly polymerized form. Caramelan, carameline and caramelin, which thus far have been considered as chem. individuals, are also mixts. of I and VII. Since I is produced by condensing the alc. HO groups in II with the loss of H₂O, S. considers the formula of I to be (C₁₂H₈O₃)_nO_{n-1}(OH)₃ or, when n is very large, (C₁₂H₈O₄)_n.

~0 Citings

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662. The carbonization of fabrics and the material used

By Gagnaire, Andre

From [Ind. textile \(1936\)](#), 53, 251-3. Language: Unavailable, Database: CAPLUS

Thorough removal of size prior to carbonization is necessary. Starch remaining in the material is converted by the acid into dextrin and glucose, which undergoes **caramelization** and leads to failure. Further data are given on the impregnation with acid.

~0 Citings

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663. Causes for the darkening of sweetened condensed milk on storage at high temperatures

By Kozin, N. I.; Novikova, E. I.

From [Voprosy Pitaniya \(1937\)](#), 6(No. 4), 3-20(in German 19-20). Language: Unavailable, Database: CAPLUS

The change in flavor and darkening of sweetened condensed milk on storing at 55° are due to the **caramelization** of sucrose and lactose, the intensity of darkening being dependent upon the extent of splitting of the sugars, which in turn is a function of the temp., duration of storage, and acidity. The fat isolated from the stored milk showed no change, so it takes no part in the process and also indicates the absence of lipolytic enzymes. The darkening is not a function of the container since both metallic and glass containers gave identical results. Decompn. of the sugars results in an increase in acidity which leads to a coagulation of the proteins present. It was observed that casein has a catalytic effect on the **caramelization** of sucrose, lactose and glucose. Milk stored at 55° begins to darken in 5 days. Storing at temps. no higher than 5° is recommended.

~0 Citings

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664. A spectral investigation of glucose glass

By Cohn, Willi M.

From [Journal of Chemical Physics \(1938\)](#), 6, 65-7. Language: Unavailable, Database: CAPLUS, DOI:10.1063/1.1750203

The spectral transmission of glucose glasses of different thermal histories, from white to dark brown in color, was investigated from 3600 to 8000 Å. There are no narrow absorption bands in this region. The spectral energy distribution shows flat max. from 5800 to 6400 Å. for all glasses. Transmission max. shift toward greater wave lengths with increasing **caramelization**. The absorption limits at small wave lengths shift toward the red with increasing **caramelization**.

~0 Citings

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665. Sugar-boiling apparatus, history and future

By Szego, E.

From [Bulletin de l'Association des Chimistes \(1937\)](#), 54, 817-23. Language: Unavailable, Database: CAPLUS

The history of the vacuum pan is briefly traced, and 3 types of modern pans are described and illustrated. The Gr. overddot. antzd. overddot. offer pan is considered superior to the other types, because of better circulation, less **caramelization**, and greater recovery of sugar contg. less ash and fine grain.

~0 Citings

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666. Caramel

By Sweizer, A.

From [Tijdschrift der Algemene Technische Vereniging van Beetwortelsuikerfabrikanten en Raffinadeurs \(1937\)](#), 33, 17-20. Language: Unavailable, Database: CAPLUS

The coloring matter of caramel is quantitatively pptd. by Pb acetate. When Pb is removed from the ppt. by dil. HNO_3 the residue is humin, which consists of complexes built up from pyran nuclei; two definite forms of these complexes, $(\text{C}_{12}\text{H}_{10}\text{O}_5)_x$ and $(\text{C}_{12}\text{H}_8\text{O}_4)_y$, were obtained. Extn. of caramel with alc. showed it to be composed of isosucrosan and humin in varying proportions, depending on the time and temp. of **caramelization**; considerable quantities of isosucrosan were found even in caramel prepd. from sucrose with a loss of as much as 25% of H_2O . The substances caramelan and caramelen of the older literature therefore do not exist; the caramelin of Peligot is impure humin. Isosucrosan forms a hexaacetate which prior investigators have mistaken for the tetraacetate of the hypothetical caramelan. No exptl. details are given.

~0 Citings

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667. Influence of evaporation under pressure on yield of molasses

By Lyasko, B. A.; Shtepan, G. V.

From [Sovetskii Sakhar \(1936\)](#), 3, 30. Language: Unavailable, Database: CAPLUS

It is concluded from factory expts. that the Geischtoft system of evapn. under pressure favors **caramelization** of the juice, diminishes the effect of clarification and increases loss of sugar in the molasses. Molasses of acid reaction, in spite of the alky. of the thick juice having been normal, was obtained.

~0 Citings

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668. The present position of dried grass and its use as a fodder

By Watson, S. J.

From [Agr. Progress \(1937\)](#), 14, 147-55. Language: Unavailable, Database: CAPLUS

In 69 samples of dried grass the crude protein content varied from 9 to 20% (av. 15.1) and the carotene content varied from 10.4 to 48.8 mg./100 g. (av. 25.8). There was a close correlation between the carotene and crude protein. Direct exposure of dried grass to hot gases resulted in a depression in the carotene content and the digestibility of the protein, the higher the temp. the more rapid the deterioration. Retention of the carotene was of a high order in properly dried grass. The dried grass usually showed no evidence of **caramelization** other than a certain pleasant odor in the material as it left the dryer. Feeding expts. showed that dried grass is equal in value to the original undried material.

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669. The preservation of dairy products by the procedure of Hofius

By Genin, G.

From [Lait \(1937\)](#), 17, 727-9. Language: Unavailable, Database: CAPLUS

cf. C. A. 29, 8743.3. Unpasteurized milk at about 8° is placed in a steel cylinder so that it is 3/4 full. Oxygen under 8 atm. pressure is then introduced into the cylinder and the milk shaken. The valve on the cylinder is then opened and the O pressure relieved. The outgoing O carries with it any gases dissolved in the milk. Oxygen is again introduced into the cylinder until a pressure of 8 atm. is attained. The cylinder contg. the milk is then placed at a temp. of 8° and shaken for 2 hrs. If the pressure in the cylinder is still above 7 atm., the cylinder of milk is placed in storage at 3° to 6°, otherwise the O pressure is raised to 8 atm. before the milk is stored. The milk will keep well and there will be no increase in acidity during a storage period of 14 days. If the milk is heated rapidly but not pasteurized before being subjected to the O treatment, it will keep for 4 weeks. When such milk is held for 42 days, there will be a considerable development of off-flavor in the milk. If the storage temp. of milk by the Hofius process attains 18° to 22°, the acidity will show an increase at the end of 3 days. Milk serum keeps less well by the Hofius process than whole milk. The off-flavor which develops in whole milk treated by the Hofius process is that of **caramelization**; in milk serum, a malt-like flavor. Peroxides have not been detected in milks treated by this process.

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670. Dependence of **caramelization of distillery mashes on steam pressure and duration of steaming**

By Frey, A.; Miller, M.

From [Zeitschrift fuer Spiritusindustrie \(1936\)](#), 59, 306,308-9. Language: Unavailable, Database: CAPLUS

The colors of filtrates from rye mashes made under two described sets of pressure-cooking conditions for varying times have been measured (Duboscq) by comparison with standard caramel soln., the results being considered mathematically, thus yielding equations which are of value for process control.

~0 Citings

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671. The **caramelization of sugars**

By Dedek, J.; Svencon, K.

From [Sucrierie Belge \(1936\)](#), 55, 461-7,477-88. Language: Unavailable, Database: CAPLUS

Heating to 170° has a marked effect upon the color of sirup and wash sirup sugars, even when the sirups are treated with C. The app. is an electrically heated cylinder, of the block type, with holes to accommodate 16 X 220 mm. test tubes with 10 g. of sugar, dried at 95°.

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672. Impurities in white sugars. IX. Loss of anions from certain salts during evaporation of concentrated sugar solutions

By Ambler, J. A.

From [Industrial and Engineering Chemistry \(1936\)](#), 28, 1266-8. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50323a007

cf. C. A. 29, 4615.1. Sucrose and dextrose solns. were boiled to hard candy (176°) after addn. of known amts. of NaCl, CaCl₂, KI, Na₂SO₄, Na₂SO₃ or NaF. No Cl⁻, I⁻ or SO₄²⁻ was lost up to 176°, but SO₃²⁻ was lost above 130-5°. NaF increased **caramelization** and decreased inversion. F⁻ losses occurred below the b. p. of the soln., and were appreciable below 135°. The rate of F-loss decreased between 135° and 176°. No differences due to the kind of sugar were noted.

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673. Process of aging or maturing wines

By Joslyn, M. A.

From [Food Industries \(1936\)](#), 8, 444-5,449. Language: Unavailable, Database: CAPLUS

cf. C. A. 29, 8222.2. The essential changes in wine during aging are: increase in ester content, slight increase in AcH and acetal contents; decrease in tannin, coloring matter and total acidity; slight increase in volatile acid content; and lightening in color of red wines and slight yellowing of white wines. The slow oxidation of wine and low rate of esterification under ordinary storage conditions result in slow natural aging. Oak barrels are best for aging wines. The optimum temp. is 15-16°. A const. storage temp. is important, especially for bottled wines stoppered with corks. The prompt remove of yeasts and other sediments from freshly fermented wines is useful in avoiding the liberation of undesirable constituents such as enzymes and cysteine. Argols are removed by refrigeration which accelerates pptn. Pasteurization in continuous-flash pasteurizers at 85° coagulates certain colloids and aids the blending in fortified wines. Sauterne-type wines are heated in oak barrels at 60° for several months to develop the flavor. The process consists of a combination of **caramelization** and oxidation to develop the so-called "rancio" or AcH flavor of the wine. All of the present quick aging processes are defective in that they merely increase the rate of the oxidative changes and do not materially increase the rate of the esterification processes which give the beverage its delicate bouquet and aroma. Too much stress has been placed on oxidation. The chemistry of the aging of wine is still very imperfectly understood.

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674. Comparative studies of caramel and molasses colloids

By Joszt, A.; Molinski, S.

From [Kolloid-Beihefte \(1935\)](#), 42, 367-83. Language: Unavailable, Database: CAPLUS

Three colloids were prepd. from **caramelization** products derived from sucrose by vacuum distn. They were examd. and their solubilities, empirical formulas, pentosan contents, reducing powers, p_H values, buffer capacities, surface tensions, viscosities, extn. coeffs., colors and coagulabilities were detd. The colloids corresponded to v. Brodowski's fraction C₄.

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675. Hypo-allergic milk

By Frohring, Wm. O.

From [No Corporate Source data available \(1936\)](#), US 2036404 19360407, Language: Unavailable, Database: CAPLUS

Whole or skim milk or cream is heated to about 116° for about 2 hrs. to destroy spores and bacteria without producing destructive chem. change in the protein and with a min. of **caramelization** and to obtain a product of reduced allergic properties with respect to individuals normally sensitive to proteins.

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676. Drying of sugar beets with superheated steam

By Benin, G. S.; Plakhotnik, M. S.

From [Nauch. Zapiski Sakharnoi Prom. \(1934\)](#), 11(Book 49;No. 11), 12-25. Language: Unavailable, Database: CAPLUS

Drying with superheated steam gave poor results. Increasing the temp. of its steam produces **caramelization**. Combined drying with steam and dry air gave but little better results.

~0 Citings

677. Methods for the identification of caramel

By Joszt, A.; Molinski, S.

From [Zeitschrift fuer Untersuchung der Lebensmittel \(1936\)](#), 71, 19-32. Language: Unavailable, Database: CAPLUS

A study has been made of the following methods for identifying caramel: J. ovrddot.agerschmidt (C. A. 3, 1436); C. Amthor (Z. anal. Chem. 24, 30(1885)); V. Griessmayer (Pharm. Zentralhalle 21, 368(1880)); L. Aubry (cf. J. K. ovrddot.onig: Untersuchung landwirt. u. gewerb. wich-tiger Stoffe 5th Ed. II, 176(1926)); Lichthardt (C. A. 5, 749); M. N. Fradiss (Bull. assoc. chim. sucr. dist. 16, 280(1898-9)); C. A. Crampton and F. D. Simons (J. Am. Chem. Soc. 21, 355(1899); 22, 810(1900)); Straub (C. A. 6, 412); J. Nessler (Weinlaube 2, 119(1870)) and M. P. Carles (J. Pharm. chim. 22, 127(1875)). The caramel reactions of A. Ihl (Chem.-Ztg. 9, 485(1885)) and of A. J. Magalha'es (Compt. rend. 123, 896(1896)) have also been studied. As a substance for comparison in these expts. J. and M. used a product obtained by the vacuum method for sucrose **caramelization** (Pictet and Andrianoff, C. A. 18, 3045), which method J. and M. modified somewhat. The colors of the caramel products corresponding to "caramelan" (I) and "caramalen" (II) of Pictet and Andrianoff, and of "caramelin" (III) of A. G'elis (Ann. de chim. [3], 52, 356(1858)), as well as the color of com. sugar color, were detd. by means of their extinction coeffs. The method of J. ovrddot.agerschmidt with use of Et₂O extn. and resorcinol was found to be the most sensitive means of identifying caramel, but less sensitive with acetone. The reacting substance in both cases is probably ω-hydroxymethylfurfurol, a by-product of **caramelization**. The reaction was strongest in a distn. product (IV) obtained in the vacuum method employed by J. and M. in the prepn. of caramel. The reacting substances in the case of the less sensitive Amthor method are the colored caramel products, but not the volatile decompn. ones. The sensitivity of this method is greatest with II ("caramelen" 0.1%) and with com. color (0.1%). Quant. colorimetric studies were made of the method of Griessmayer and Aubry. The results were satisfactory with caramel malt and com. color. The Lichthardt method was much more sensitive for com. color than for the products made by J. and M. and for IV. The method of Fradiss gave unsatisfactory results. The Crampton and Simons method of decolorizing caramel solns. gave complete decolorizing of I, II and III and of com. color with certain amts. of absorption earths, such as "tonsel," "floridin" and fullers earth. Crampton and Simons Et₂O extn. method showed no extractable matter with any of the J. and M. **caramelization** products. Straub's method gave colored ppts. with all caramel prepn. In Carles method, treatment of caramel products with egg white produced no decolorization. J. ovrddot.agerschmidt's reaction with resorcinol is much more sensitive than that of Ihl with pyrogallol. The Magalha'es reactions are developed by the volatile **caramelization** products and can show the presence of only these products in a soln. Thirty-one references.

~0 Citings**678. The **caramelization** of sucrose**

By Joszt, A.; Molinski, S.

From [Biochemische Zeitschrift \(1935\)](#), 282, 269-76. Language: Unavailable, Database: CAPLUS

On heating sucrose in vacuo there is no gas formation but about 10% is lost in the form of a liquid distillate which has about 20% solid residue. The latter consists almost entirely of furfural compds., but probably no furfural.

~0 Citings**679. Cane sirup**

By Carrero, J. O.

From [Puerto Rico Agr. Expt. Sta., Rept. \(1935\)](#), 9-12. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 7576.3. The juices from 10 cane varieties were studied with respect to their value for sirup manuf. Grinding began when the canes were 6 months old and continued at 15-day intervals. Analyses were made for sucrose, reducing sugars, P, K and coloring matter. S. C. 12/4, P. R. 803 and M. 42 yielded juices of lightest color. Filtration was slightly faster when lime was supplemented with H₃PO₄ than with lime alone. The lime darkened the juices but the color was restored by the addn. of acid. Juices filtered with Filter-cel only yielded sirups of the best flavor. The care exercised in the boiling and concn. of the juice affected the color and quality. The longer the concn. period, the darker became the final sirup. If the temp. was raised unduly in the last stages of concn. **caramelization** with resultant darkening occurred. When sirups from different varieties were compared, those from Mayaguez 42 ranked 1st, with those from F. C. 998 and B. H. 10 as very close seconds. Sirups which had been fermented were lightest in color and were very attractive. Decided reductions in color were obtained by the use of activated C or by slightly increasing the acidity of the juice with H₂C₄H₄O₆. The use of activated C resulted in a loss of flavor. By means of controlled fermentation, the sugar was partly inverted which prevented crystn. of sucrose in the sirup. Natural fermentations were objectionable.

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680. The determination of moisture in barley malt. A comparison of methods and apparatus for this purpose

By Coleman, D. A.; Snider, S. R.

From [Cereal Chemistry \(1935\), 12, 621-45](#). Language: Unavailable, Database: CAPLUS

The vacuum-desiccator method, i. e., drying of the sample over anhyd. P_2O_5 in a desiccator maintained at a pressure of 10 mm. of Hg or less until a const. loss in wt. has been reached, has been selected as the standard or referee method for making moisture detns. on malt because of the absence of [caramelization](#) or decompn. phenomena which commonly accompany the oven methods used for moisture-detn. purposes. The 130° air-oven method gave results 0.63% higher than the standard method. A vacuum oven operated at 25 mm. pressure at 100° for 5 hrs. gave results 0.25% higher than those of the standard method. The Carter-Simon method results were 0.5% higher than those of the standard method. The vacuum oven operated at 25 mm. pressure but at 70° for 18 hrs. produced results that were 0.1% lower than those of the standard method. Malt Analysis Standardization Committee method, i. e., heating for 3 hrs. at a temp. between 103° and 104° gave results practically equiv. to those by the standard method, being only 0.04% lower. Results by the water-oven method were 0.25% lower than those by the standard method.

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681. The thermal decomposition of sugar and its catalytic acceleration

By Riesenfeld, E. H.; Muller, Fr.

From [Berichte der Deutschen Chemischen Gesellschaft \[Abteilung\] B: Abhandlungen \(1935\), 68B, 2052-4](#). Language: Unavailable, Database: CAPLUS

The thermal decompn. of sucrose during 3.5 hrs.' heating at 150° was detd. by dissolving the product in water and observing the intensity of color of the soln. ([caramelization](#)) and the amt. of carbonaceous residue. Pure sugar showed little [caramelization](#) and no residue. When 5% NaCl was mixed with the sugar [caramelization](#) increased and there was a moderate amt. of residue. Addn. of $FeCl_3$ along with the NaCl failed to increase the decompn. until it amounted to 0.005% of the mixt. (sugar + NaCl + $FeCl_3$). Greater quantities of Fe decreased [caramelization](#) but greatly increased the carbonaceous residue. In the well-known expt. of making a lump of sugar burn by spreading cigar ashes over it, the Fe in the ash probably is less important as a catalyst than the alk. salts in the ash.

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682. The corrosion of tin

By Bryan, J. M.

From [Dept. Sci. Ind. Research, Rept. Food Investigation Board \(1935\), 177-9](#). Language: Unavailable, Database: CAPLUS

Expts. were carried out to ascertain the effects of NaCl and sucrose, resp., on the rates of corrosion of Sn by solns. of citric acid at 25° and 75° in presence of a limited amt. of air. Addn. of 2% NaCl had a slight inhibiting effect in corrosion, which was more pronounced on untreated specimens than on those in which the surfaces of the metal had been abraded with fine emery. Addn. of 1% NaCl to a 0.5% citric acid soln. of p_H 2.4 at 25° had no effect; but as the p_H increased to 5.5 (by addn. of Na citrate buffer) there was a slightly increasing inhibiting effect. Addn. of 25% sucrose at 25° produced an appreciable inhibition over the whole p_H range studied, the rate of corrosion being reduced to 1/3 at p_H 2.4 and to 1/2 at p_H 5.5. At 25°, addn. of varying amts. of sucrose to 0.5% citric acid soln. progressively retarded the rate of corrosion as the concn. increased. This inhibition seems to be due mainly to the effect of sugar in reducing the soly. of air in the solns., since the corrosion (like that in plain citric acid solns.) was entirely of the oxidative type. At 75°, concns. of less than 15% sucrose inhibited corrosion, while greater concns. stimulated it; the latter effect, however, may have been due to the action of one or more of the decompn. products formed by [caramelization](#). Addn. of Sb to the Sn produced a small reduction in corrosion, amounting to 8% with 0.25% Sb and to 11% with 0.5%; larger addns. did not give further reduction.

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683. Action of some commercial practices on the nutritive value of foods

By Lecoq, Raoul

From [14me Congr. chim. ind., Paris \(1934\)](#), 5 pp.. Language: Unavailable, Database: CAPLUS

More or less prolonged action of a dry heat of 180° can change very considerably the nutritive value of foods; when, however, it is confined to the sugar portion of a mixt. (e. g., [caramelization](#)), the change in nutritive value is less marked. As practiced in the canning industry, a wet heat of 112° produces only a slight decrease in the vitamin B and C contents. An alk. reaction (obtained, e. g., by addn. of baking powder) tends to increase the destruction of vitamins, while an acid reaction exerts a protective action.

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684. Impurities in white sugars. VIII. Effects of some impurities on decomposition of sucrose during the barley candy test

By Ambler, J. A.; Byall, S.

From [Industrial and Engineering Chemistry, Analytical Edition \(1935\)](#), 7, 168-73. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ac50095a014

cf. C. A. 29, 1275.4. To obtain comparable results, the candy test must be carried out under strictly standardized conditions, which are described in detail. Sucrose itself liberates increasing quantities of H ions with rising temp., and the inversion becomes greater. Small amts. of impurities acidic in nature cause greater inversion but less [caramelization](#); among these are the chlorides of Na, K, Ca and Ba, the sulfates of Na, K, Ca and Mg and also KNO₃, KH₂PO₄, CaCO₃ and K acid tartrate. Impurities which are alk. or give rise to alky., such as the carbonates, bicarbonates, nitrites and sulfites of Na or K, Na₂HPO₄ and alk. salts of org. acids produce more [caramelization](#) and less inversion. NH₄ salts, amino acids and their amides and ferrous salts increase both inversion and [caramelization](#).

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685. Some properties and reactions of carbohydrates in liquid ammonia

By Miller, Clemmy O.; Siehrs, Arthur E.

From [Proceedings of the Society for Experimental Biology and Medicine \(1932\)](#), 29, 535-8. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 3055.2. Arabinose, glucose, levulose, galactose, sucrose, maltose, lactose and α -Me glucoside (I) are readily sol. in liquid NH₃ at -33.5° and 25°. Glycogen (II) is dispersed to give an opalescent soln. Sugars are stable in NH₃ in the absence of H₂O, but a small amt. of moisture causes [caramelization](#). Monosaccharides do not crystallize from NH₃, even a trace of residual solvent preventing crystn. The disaccharides and I crystallize from NH₃. When solns. of KNH₂ are combined with concd. solns. of the above sugars at -33.5° the white K salts ppt., the mono-K salts of the monosaccharides, the di-K salts of the disaccharides and either of I, depending on the proportions of reagents, being obtained. The salts are stable to air when dry from NH₃. II gives a K salt which chars on exposure to air. Reducing sugars when sealed with KNH₂ at 20° caramelize within 24 hrs. Sucrose is stable.

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686. The melting point of sugar: the influence of the procedure upon the results

By Sandera, K.; Mircev, A.

From [Listy Cukrovarnicke \(1934\)](#), 53, 25-8. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 5699.6. The m. p. of sugar depends more on the temp., rate and duration of heating than on the grade of the sugar. Temp.-time graphs were made for sugar specimens immersed in baths at 150°, 160°, 170° and 180° and then heated at const. rates over the range of 0.25-10.0° per min. A difference of 15° was found for the same sugar; the m. p. rose with the faster rates of heating, and also with the higher initial temp. Empirically, the m. p. could be expressed as $t = t_0 + k \times [v/(1 + k'v)]$, where t_0 is the initial temp. at which the heating begins, v is the temp. rise in degrees per min., k is the time required for heating the sugar at t_0 in order to melt it, and $k' = k/t_{\text{max}}$, or the temp. at which the sugar melts under very rapid heating without superheating. For each group of expts. several samples are used at a const. t_0 but with a range of v from 0.25° to 10.0° per min. From the graphs, k and k' are extrapolated. For detg. m. p. in routine work the bath should be 5° below the anticipated temp., and the heat applied so that the temp. rises exactly 0.5° per min. The results are reproducible, but slight deviations from the procedure gave large variations. Sugars kept at 170° for 15 min. underwent chem. changes (caramelization) and the presence of 0.01-0.2% nonsugars hastened these decompns. Addns. of NH_4Cl or $\text{NH}_4\text{Fe}(\text{SO}_4)_2$ in 0.002% concns. were effective catalytically. Salts of strong bases stabilized the sugar and decreased the quantity of caramel. The same changes occur during m.-p. detns. and explain the variable results obtained by following the ordinary method.

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687. The gelatinization of nitrocellulose by binary mixtures of the alcohol-ether type

By Medard, L.

From [Memorial des Poudres \(1935\), 26\(No. 1\), 69-85](#). Language: Unavailable, Database: CAPLUS

A study of the gelatinization of nitrocellulose by binary combinations of dioxane, cineole, methylfuran and methylal with anhyd. EtOH was made by viscosity tests on 12% N nitrocellulose and soly. and swelling tests on guncotton contg. 5.5% sol. in ether-alc. Approx. agreement was shown by the 3 methods, the viscosity tests being the most exact. Variation in compn. caused a variation in gelatinization, the following maxima being found: ether 65, dioxane 50, cineole 16, methylfuran 55 and methylal 80%. Soly. tests showed methylfuran had a chem. action on the nitrocellulose leading to caramelization. The mechanism of gelatinization is attributed to the dielec. polarization of the binary liquid.

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688. Activated carbons

By Zert, K.

From [Zeitschrift fuer die Zuckerindustrie der Cechoslovakischen Republik \(1933\), 58, 77-9](#). Language: Unavailable, Database: CAPLUS

cf. C. A. 27, 5571. In general, the best decolorizing effect of activated vegetable carbons on sugar-factory juices is obtained when the previously boiled and filtered thin juice is treated by the "compd." process; that is, filtration through a previously used but not exhausted C, followed by filtration through fresh C. The decolorizing effect is always the greater, the lower the concn. of the sugar soln. The thick juice will need to be treated with C only when caramelization has occurred during evapn. Z. also recommends the method proposed by Stanek, in which the C is added to the juice in the evaporators. Where the middle juice or thick juice is efficiently filtered no other appliances for using the C are needed. Where the mingling method is employed the mixt. of C and sirup may be filtered in either a bag filter or a plate and frame press; a layer of fresh carbon is first built up on the filtering surfaces. Where finished sugars are made with the help of bone-char filters an excellent and economical method is to combine the use of active C and bone char. The affined raw sugar is melted and is first treated with active C, and the char filters are then used as secondary mech. filters. In this way the char needs to be regenerated only at long intervals (4 to 6 weeks) and there is no sweet water to be evapd. When active C is used it is unnecessary to lime the thick juices, and thus the sirup contains less lime in the first place.

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689. Changes which solutions of monosaccharides undergo when heated in the autoclave

By Cianci, V.; Pannain, L.

From [Bollettino - Societa Italiana di Biologia Sperimentale \(1933\), 8, 1684-7](#). Language: Unavailable, Database: CAPLUS

In a previous communication (cf. C. A. 27, 2170) the results obtained by heating glucose solns. in the autoclave were reported. The same procedure has been used in studying solns. of fructose and galactose. In general, under the same exptl. conditions, the 3 sugars behave alike; the changes are slightly more marked in fructose than in glucose, and the least in galactose solns. In unbuffered solns. the caramelization of fructose is more intense.

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690. Physicochemical changes produced by the cooking of potatoes

By Sweetman, Marion D.

From [American Potato Journal](#) (1933), 10, 169-73. Language: Unavailable, Database: CAPLUS, DOI:10.1007/BF02881434

cf. C. A. 27, 1684. Cooking of potatoes does not cause the bursting of cell walls but permits ready mech. disintegration of the tuber tissue by sepn. of cells. The process is characterized by partial gelatinization of the starch, soln. of some of the pectic substances, increased digestibility of the cellulose, coagulation of most of the protein, and more or less **caramelization** of the sugar. Probably constituents present in smaller proportions are also important in their effects on culinary quality. Fourteen references.

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691. Color in tomato products

By Matlack, M. B.; Sando, Charles E.

From [Fruit Products Journal and American Vinegar Industry](#) (1933), 13, 81-2,90. Language: Unavailable, Database: CAPLUS

Lycopene, the red pigment of tomato, forms a yellow oxidation product, but this alone cannot explain all the browning that occurs in tomato products. Washing the solids, including lycopene, with 50-85% alc. prevents browning. Possible causes of browning are: coagulation of protein or other colloidal matter, adsorption of chlorophyll or its decompn. products on the colloids, soln. of lycopene in the fatty matter, **caramelization**, polymerization of furfural derivs., reaction between amino acids and sugars, oxidation of lecithin or changes in phenolic bodies. Methods used to prevent browning will also protect the carotene present. Also in *Canning Age* 14, 481-2(1933).

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692. Hydrolysis of cellulose with gaseous hydrochloric acid

By Sharkov, V. I.; Kamaldin, O. D.

From [Lesokhimicheskaya Promyshlennost](#) (1932), 1(No. 3-4), 7-12. Language: Unavailable, Database: CAPLUS

Bleached cotton cellulose was dried at 150° to const. wt. and a weighed amt. placed in a 150 cc. ampoule, which was then evacuated, charged with gaseous HCl and brought up to the desired temp. by immersion in an oil bath. The treated cellulose was transferred to a one-l. flask with distd. H₂O and stirred with a glass rod. It was then placed in a Gooch crucible, washed to neutral reaction and dried to const. wt. The loss of wt. was calcd. on the original cellulose while the filtrate was transferred to a measuring flask and brought to a predetd. vol. A detn. of the aldehyde groups was made in the filtrate by the I method. The dry residue from the crucible was transferred into 100 cc. of a 10% NaOH soln. and agitated. The insol. part was filtered off after 30 min. through glass wool, washed with H₂O and 1% AcOH, washed again with H₂O to neutral reaction and dried to const. wt. at 105°. The amt. of cellulose which was dissolved in the alkali was recalcd. on the original sample. The expts. showed that the action of HCl gas on absolutely dry cellulose in H₂O and in 10% soln. of NaOH increases gradually with increase in pressure. **Caramelization** of cellulose occurs at 60° and higher. The best temp. for the destruction of cellulose for the purpose of its further hydrolysis lies between 30° and 60°. The destruction of absolutely dry cellulose by gaseous HCl takes place mainly in the first 5 min. of its action, while prolonged action of HCl (up to 5 hrs.) increases the soly. in H₂O and 10% NaOH only to a slight extent. The soly. in water remains almost unchanged with increasing pressure while that in 10% NaOH increases steadily, an indication that addnl. quantities of hydrocellulose are formed. The soly. in 10% NaOH decreases if the cellulose contained up to 25% H₂O when it was treated with HCl, while cellulose that contained more than 25% of H₂O is completely dissolved in 10% NaOH. Thus the best conditions for the conversion of cellulose into hydrocellulose are: temp. 40-60°, moisture content not over 5%, duration of action with HCl not over 15 min., and a pressure as high as possible.

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693. Can solubility experiments with sugar and non-sugars explain molasses formation?

By Claassen, H.

From [Deutsche Zuckerindustrie \(1932\)](#), 57, 569-70. Language: Unavailable, Database: CAPLUS

cf. preceding abstract. Complex compds. of sugar and org. non-sugars are more readily formed in concd. solns.; this is held to explain why there is a greater increase of color in the vacuum pan, where the temp. is low, than in the juice boiler. This increase of color is due, not to **caramelization**, but to the formation of complex compds. between sugar and amino acids.

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694. The vitreousness of malt

By Biernaux, Ch.

From [Bulletin de l'Association des Anciens Eleves de l'Institut Superieur des Fermentations de Gand \(1933\)](#), 34, 60-70, 152-7. Language: Unavailable, Database: CAPLUS

It is shown experimentally that the main factor in producing a high percentage of vitreous grains is incomplete disintegration by soaking and germination; semi-vitreousness is produced because of a quick and intense disintegration of the grains, which affects chiefly the heart of the grain but leaves the external portion practically undisintegrated; **caramelization** is due to rapid heating to high temp. of well-disintegrated grains contg. an appreciable amt. of preformed sugars. The vitreous constituents are unaffected by C_6H_6 , alc. Et_2O , CS_2 and CCl_4 ; they are apparently completely dissolved or broken down by aq. NH_3 .

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695. Determination of inulin and levulosin, used in the analysis of coffee substitutes and in **caramelization**

By Kruisheer, C. I.

From [Zeitschrift fuer Untersuchung der Lebensmittel \(1933\)](#), 65, 275-97. Language: Unavailable, Database: CAPLUS

See C. A. 27, 1958.

~0 Citings

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696. Detection of coffee substitutes

By Heiduschka, A.; Thomas, H.

From [Zeitschrift fuer Untersuchung der Lebensmittel \(1933\)](#), 65, 95-7. Language: Unavailable, Database: CAPLUS

Normal malt coffees were found by Merl's method (C. A. 25, 1007) to contain 5.2-5.7 mg. of maltol/10 g., normally roasted barley 5.5, wheat 5.6 (3.5 if steeped, roasted and glazed), rye 6.1, dried, roasted and glazed malt 1.3 (5.7 if first steeped), and rye (treated similarly) 3.9-5.2.

~0 Citings

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697. Packing of ground coffee

By Carrasco, Oreste

From [Food \(1933\)](#), 2, 312-14. Language: Unavailable, Database: CAPLUS

Roasted ground coffee gives off gases over long periods of time, the amt. given off being greater in evacuated tins than in tins filled with air or inert gases, and the amt. is sufficient to raise the pressure in the tins to as much as 15 lb. per sq. in. The amt. and compn. of the gases (which consist of CO₂, CO, O₂ and N₂) vary with the conditions of the roasting treatment. The formation of the gases must be due to chem. changes brought about by the action of heat during roasting in substances contained in the coffee bean, such as dextrins, sugar, tannins, fats and nitrogenous compds., and it is thought that they are imprisoned under pressure in a very large no. of tiny cavities, the walls of which are formed by caramelized material held together by the cellular structure of the coffee bean. This assumption is supported by the fact that, on treating ground roasted coffee with distd. water, in 12 hrs. it gave off almost twice as much gas (of the same qual. but not quant. compn.) as would have been given off in 1 month when packed dry and under vacuum; but when treated with liquids (e. g., abs. alc. or oil) which do not dissolve or soften the walls of the cavities which retain the gas, gas is not released any more rapidly than from dry-packed coffee. To explain the slow liberation of the gas without the action of outside agents, it is suggested that the caramelized substances form a kind of emulsion with the gas under pressure and must be regarded as false solids having still in soln. substances like sugar and caffeine which are crystallizable; the slow crystn. and orientation of the crystals of these false solids render them less homogeneous, weakens the walls of the cavities and causes them to disintegrate.

~0 Citings

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698. The determination of inulin and levulosin applied to the analysis of coffee substitutes and to the problem of caramelization

By Kruisheer, C. I.

From [Chemisch Weekblad \(1933\)](#), 30, 154-66. Language: Unavailable, Database: CAPLUS

cf. C. A. 25, 1596. Inulin breaks down in 10 min. when subjected to a Clerget inversion at 68-70°. Thus the fructose content after such treatment is a measure of the inulin content provided other sources of fructose are absent. From a comparative investigation of various materials contg. inulin it has been confirmed that it is always accompanied by 5-10% combined glucose. Pure inulin could not be obtained, but this problem will be further investigated. Inulin begins to break down in the tech. drying of chicory root. In tech. roasting levulosin is formed. At the same time part of the fructose breaks down. After hydrolysis there is still an excess of fructose over glucose. The ratio 4 to 1 is characteristic of roasted inulin products. The formation of hydroxymethylfurfuraldehyde (about 2%) was noticed, but very little furfuraldehyde is formed. The detection of inulin products (chicory) in coffee and coffee essence is possible, since fructose compds. are practically absent. The presence of burnt sugar in coffee products is detectable by the presence of levulosin, without the amt. of fructose exceeding that of glucose in this case. An investigation of burnt sugar and other tech. baked products led to a closer study of [caramelization](#). The ideas of Pictet (cf. C. A. 18, 3045) appear to be untenable. "Isosaccharosan" appears to be a mixt. of different substances including probably levulosin and glucosin. The occurrence of "caramelan" and "caramelen" is also fictitious. Addn. of alkali on [caramelization](#) is characterized by very considerable decompn. of monosaccharides, absence of levulosin and glucosin and a partial decompn. similar to heating of alk. solns. of monosaccharides.

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699. Relation of storage temperature of potatoes to their culinary quality

By Sweetman, Marion D.

From [Bull. \(1931\)](#), 360, 218. Language: Unavailable, Database: CAPLUS

cf. C. A. 25, 5717. Frying quality of potatoes stored at temps. below 5° is greatly injured because of the development of a bitter flavor and dark color. These deleterious changes are due to [caramelization](#) of the sugars. Storage at warm temp. for several weeks will usually remove the sugar.

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700. Relation of storage temperature of potatoes to their culinary quality

By Sweetman, Marion D.

From [American Potato Journal \(1931\)](#), 8, 174-6. Language: Unavailable, Database: CAPLUS, DOI:10.1007/BF02878611

cf. C. A. 25, 5717. Frying quality of potatoes stored at temps. below 5° is greatly injured because of the development of a bitter flavor and dark color. These deleterious changes are due to [caramelization](#) of the sugars. Storage at warm temp. for several weeks will usually remove the sugar.

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701. Report on [the determination of] formic acid in sugar products

By Zerban, F. W.

From [Journal of the Association of Official Agricultural Chemists \(1932\)](#), 15, 355-60. Language: Unavailable, Database: CAPLUS

The official A.O.A.C. method for formic acid (Finckc method modified in certain details) if carefully followed can be safely used for sugar products. The Morton and Spencer xylene distn. method (C. A. 20, 2211) is not applicable to sugar products, because it leads to **caramelization** and formation of formic acid. Pure dextrose and levulose contain no formic acid; refined cane sugar contains a trace; raw cane sugar (6 samples), 0.004-0.027%, av. 0.010%; cane molasses sugar (1 sample), 0.004%; raw beet sugar (1 sample), 0.040%; sugar cane sirup (7 samples), 0.007-0.015%, av. 0.011%; final cane molasses (2 samples), 0.139, 0.154%; soft refinery sugar (15 samples), 0.014-0.155, av. 0.080%; filtered refinery sirup (2 samples), 0.791, 0.678%; final refinery molasses (2 samples), 0.586, 0.416%. The sources of formic acid in sugar products in general, and the comparatively large quantities in refinery products are discussed, particularly as regards the influence of activated charcoals.

~0 Citings

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702. Determination of water in jams

By Berg, P.; Schmechel, S.

From [Zeitschrift fuer Untersuchung der Lebensmittel \(1931\)](#), 62, 575-80. Language: Unavailable, Database: CAPLUS

The detn. may be carried out either by distn. with $C_2H_2Cl_4$ with addn. of 10 g. $CaCO_3$ to 20 g. of sample to prevent **caramelization** of sugars, or by detn. of d_{15}^{15} of a 10% filtered soln. in hot water. Either method yields readily reproducible and satisfactorily consistent results (0-1.80%).

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703. The influence of the presence of reducing sugars upon the results of the **caramelization test with refined sugar**

By Pucherna, J.

From [Zeitschrift fuer die Zuckerindustrie der Cechoslovakischen Republik \(1931\)](#), 55, 663-9. Language: Unavailable, Database: CAPLUS

cf. C. A. 25, 1697. The effect of reducing sugars upon the **caramelization** test with refined sugar was studied. Reducing sugars were found to decomp. at the same rate as sucrose in the test. In the presence of 0.2% soln. of KCl, Na_2CO_3 , aspartic acid, Na aspartate, betaine, glutamic acid hydrochloride, $KHSO_4$, $Fe_2(SO_4)_3$ and NH_4Cl and $Fe(NH_4)_2(SO_4)_2$, colored decompn. products form from reducing sugars (glucose and invert sugar) much more easily and more rapidly than from sucrose. The colored decompn. products from glucose are more intensely colored than those originating from sucrose under identical conditions. Their appearance is indicated by a sudden measurable increase in the coloration of the **caramelization** test, but the presence of reducing sugars does not increase the primary coloration of the test if substances inverting sucrose are present. Hence the primary coloration cannot be used as an index of the presence of invert sugar in sugar mixts.

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704. The influence of the presence of reducing sugars upon the results of the **caramelization test with refined sugar**

By Pucherna, J.

From [Listy Cukrovarnicke \(1931\)](#), 49, 565-70. Language: Unavailable, Database: CAPLUS

cf. C. A. 25, 1697. The effect of reducing sugars upon the **caramelization** test with refined sugar was studied. Reducing sugars were found to decomp. at the same rate as sucrose in the test. In the presence of 0.2% soln. of KCl, Na_2CO_3 , aspartic acid, Na aspartate, betaine, glutamic acid hydrochloride, KHSO_4 , $\text{Fe}_2(\text{SO}_4)_3$ and NH_4Cl and $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$, colored decompn. products form from reducing sugars (glucose and invert sugar) much more easily and more rapidly than from sucrose. The colored decompn. products from glucose are more intensely colored than those originating from sucrose under identical conditions. Their appearance is indicated by a sudden measurable increase in the coloration of the **caramelization** test, but the presence of reducing sugars does not increase the primary coloration of the test if substances inverting sucrose are present. Hence the primary coloration cannot be used as an index of the presence of invert sugar in sugar mixts.

~0 Citings

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705. More about sirup of ferrous iodide

By Arny, H. V.; Steinburg, A.

From [American Journal of Pharmacy \(1835-1936\) \(1931\), 103, 504-8](#). Language: Unavailable, Database: CAPLUS

The color of the glass container has apparently no effect in the preservation of sirup of FeI_2 , U. S. P. Sirup contg. H_3PO_2 is for a time more stable than that prepd. without the acid. However, when the strictly official sirup turns brown its green color can be restored only by addn. of stabilizers. Sirups of FeI_2 made without H_3PO_2 can be preserved perfectly incompletely filled bottles. Samples in partly filled containers will turn brown rapidly when kept in the dark, but the green color is quickly restored by bringing into sunlight. On the other hand sirup of FeI_2 contg. H_3PO_2 becomes permanently darker when exposed to sunlight. The darkening of the sirup made with H_3PO_2 because of the **caramelization** of the sugar and such samples fail to indicate the presence of free I. On the other hand, the darkening of the sirup made without H_3PO_2 is due to the liberation of free I as shown by the starch-paste test. The darkened sirup made without H_3PO_2 responds to the starch-paste test for free I but not to the CHCl_3 test for the same element. This suggests the possibility that the I may form some loose combination with sugar, not decompd. by CHCl_3 but changed by the other carbohydrate, starch. The sirup made without H_3PO_2 is a product superior to that contg. the acid. The acid serves as a preservative during a few months of contact with the air but when the sample turns brown there is no way (other than chem.) to restore its original color. On the other hand, the dark color of a sirup made without H_3PO_2 can be restored to its original green by action of sunlight or by warming on a water bath. Sirup of FeI_2 (without H_3PO_2) can be kept perfectly by storing in completely filled bottles of suitable dispensing size, kept preferably in direct sunlight. The darkening is due to oxidation and apparently the sun's rays prevent this oxidation. As pointed out previously (cf. C. A. 23, 5545) invert sugar is a better stabilizer for this group than sucrose. A short bibliography is appended.

~0 Citings

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706. Concentrated milk food

By Parsons, Clinton H.

From [No Corporate Source data available \(1931\), US 1824496 19310922](#), Language: Unavailable, Database: CAPLUS

Concd. milk is subjected to a caramelizing and hydrolyzing treatment in the presence of a stabilizing agent such as K acid tartrate. The product may be used in various food mixts. such as salad dressings or sandwich fillings.

~0 Citings

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707. A cause of error in the detection of benzoic acid in wine

By Vilar, Juan

From [Revista Farmaceutica \(Buenos Aires\) \(1931\), 73, 225-8](#). Language: Unavailable, Database: CAPLUS

The evapn. of fresh grape juice to a concn. which permits a slight **caramelization** leads to the formation of substances giving a violet color with ferric salts. The concd. must is often added to wine in its manuf.

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708. The baking temperature of bread

By Read, O. B.

From [Proceedings of the Iowa Academy of Science \(1930\), 37, 231-3](#). Language: Unavailable, Database: CAPLUS

The av. oven temp. was 173°. In only one trial was the temp. of the loaf found to be above 100°. Usually it was from 1° to 3° below the 100° mark at the end of the bake. When the oven temp. had had time to penetrate to the thermometer whether near the surface or at the center, the temp. rose rapidly with an increasing rate until it reached about the b. p. of alc., when the rate rapidly decreased to about one-fourth the max. rate. From there on the rate of rise slowly and steadily decreased until the end of the bake period. Moist starch grains begin to disintegrate at about 75° and nearly all are broken up by the time the temp. reaches 90°. As this noticeable temp. change occurs at about the temp. of the max. rate of starch disintegration, it is more likely that the change is due in some way to the cooking of the starch rather than to the alc. vaporization. The rigidity of the crust does not develop until near the end of the bake when the outer surface of the bread is approaching the **caramelization** temp. of starch, which is about 200°. This apparently has no effect on the interior temp. of the bread.

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709. The effect of sterilization of media upon their growth-promoting properties toward bacteria

By Fulmer, Ellis I.; Williams, Arthur L.; Werkman, C. H.

From [Journal of Bacteriology \(1931\), 21, 299-303](#). Language: Unavailable, Database: CAPLUS

Caramelization produced by sterilization of media under pressure may lead to the production of growth stimulants for bacteria and yeast. Decolorization of the caramelized media with charcoal (Norite A) does not remove the bacteria stimulant.

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710. Improvement of the baking capacity of cereal flours

By Vuk, M.; Gomory, S.

From [No Corporate Source data available \(1929\), HU 101845 19291112](#), Language: Unavailable, Database: CAPLUS

A paste-like pulp is formed of the flour with water. This pulp is kept at a temp. higher than that at which albumins coagulate (drying, however, is avoided) until the outlines of starch particles begin to fade under the microscope. Then it is dried at a temp. lower than that of **caramelization** and is ground to dust. Of this product 4-6% is added to flours to improve them.

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711. The action of nonsugars in sugars upon the **caramelization** test

By Pucherna, J.

From [Listy Cukrovarnicke \(1930\), 49, 13-20](#). Language: Unavailable, Database: CAPLUS

Thin-walled containers contg. 6.5 g. of a sugar mixt. were dried at 100° for 2 hrs. The containers were then submerged in an oil bath at 170° for 15 min., withdrawn and cooled in the air. The residue was dissolved in 50 cc. water, filtered and compared in an objective photometer. The remaining soln. was treated with 0.5 cc. 2 N NaOH, digested over a water bath for 10 min., cooled and compared in the photometer for additional coloration. The action of salts falls into 3 classes: (1) large primary and small secondary coloration, (2) small primary and large secondary coloration, (3) very little coloration. Salts failing into class (3) are NaCl, KCl, BaCl₂, K₂SO₄, Na₂CO₃, AcONa, AcONH₄, Na oxalate. All salts in this class except AcONH₄ are strongly electropositive and their solns. are neutral or alk. The small coloration in alkali formed by the chlorides and acetates indicates a decompn. of sucrose into glucose and fructose which readily give rise to colorations. Acetates form more primary coloration than chlorides. Sucrose in soln. and at high temps. behaves as an acid. At 170° AcOH is volatilized from AcONa by sucrose. The sucrose liberates an equiv. quantity of an acid from the salt of the acid. The action is most pronounced for weak acids; the resulting soln. is alk., which favors a decompn. of sucrose. For NaCl, KCl and BaCl₂, the liberated HCl is small, the medium is neutral and no decompn. due to increased alky. occurs. AcONH₄, as the salt of a weak acid and base, remains neutral in action. Na₂CO₃ leaves an alk. medium, and some coloration results. K₂SO₄ decomposes at 1050°; it cannot be attacked by the sucrose and remains neutral during the decompn. Na oxalate behaves more like NaCl than AcONa. (COOH)₂ is a stronger acid than AcOH and the decrease in coloration agrees with their disson. const. Class (1) consists of salts or amides of amino acids. Metallic salts of amino acids have a greater effect than the corresponding amides because of the action of the alkali. Class (2) forms products which become colored in alkali. NH₄Cl, Fe(NH₄)₂(SO₄)₂. NH₄ oxalate and (NH₄)₂SO₄ cause a large primary coloration in addn. to the secondary; CaCl₂, betaine-HCl and glutamic acid-HCl give very little primary coloration; Fe₂(SO₄)₆ and KHSO₄ lie between these groupings. Betaine-HCl decomposes at 228°; glutamic acid-HCl, at 208°; in the presence of sucrose the decompn. begins at a lower temp. The effect of sucrose upon salt is marked: HCl is liberated and attacks the sucrose, forming invert sugar. The additional coloration in an alk. medium is a linear function of the catalytic salt. Too much acid, 0.2%, causes a more thorough decompn. with the production of ulminic acid and caramelin. CaCl₂, although similar to BaCl₂, acts as a strong dehydrating agent and falls into class (2). The larger primary coloration with Na₂SO₄ and Fe₂(SO₄)₃ is due to the dehydrating and oxidizing action of H₂SO₄. The large primary coloration with NH₄Cl, (NH₄)₂SO₄, NH₄ oxalate and FeSO₄.(NH₄)₂SO₄ is due to the action of NH₄ on sucrose; with NH₄Cl, the action of NH₃ exceeds that of HCl. The class (2) catalysts form a fluid mixt. very soon after heating; larger addns. cause foaming with intense odors suggesting C₆H₅CHO. The solns. become acid. Sucrose may act as a solvent for salts capable of disson. Granules of salts are often surrounded by a low-melting mixt. which contains sucrose in a fluid state. The sucrose may exert its high dielec. properties as a solvent; the disson. of salts in this "sucrose solvent" is similar to disson. in water. A mixt. of salts in the form of molasses was also tried. The effect is complicated not only by the presence of mixed salts but also by the colored org. substances of molasses whose effects have not been studied. The primary coloration with molasses is large; the secondary is small; the effect is due primarily to substances of class (3).

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712. Determination of potash and alkalies in wines and musts

By Semichon, Lucien; Flanzky, Michel; Lamazou-Betbeder, Miss

From [Annales des Falsifications et des Fraudes \(1930\)](#), 23, 517-26. Language: Unavailable, Database: CAPLUS

The principle of the method consists in destroying org. matter with HNO₃ with Hg as catalyst, and detg. K₂O as KClO₄. The following technic has been worked out and is recommended: evap. 50 cc. to sirupy consistency in a 200-cc., round-bottomed Pyrex flask (evapn. may even be carried to **caramelization**, or to partial carbonization, but should preferably be stopped when sirupy consistency is reached), add 25 cc. concd. HNO₃ and 2 drops Hg, evap. to 1 cc. If the soln. blackens showing incomplete destruction of org. matter, repeat the addn. of HNO₃, and evapn. till the org. matter is completely destroyed. Add 10 cc. boiling water to the hot soln., add excess of satd. Ba (OH)₂ soln. (about 5-10 cc.), boil, ppt. Ba(OH)₂ by passing a current of CO₂ for 2 min., boil 2 min., pass a moderate current of H₂S for 30 sec., boil off the excess of H₂S, wash into a 100-cc. volumetric flask, cool, make up to vol., filter. To 50 cc. of filtrate in a 75-cc. evapg. dish add a few drops of 1 + 2HClO₄, evap. to 10 cc. on the water bath, add 10 cc. of 1 + 2HCl₄, evap. on the water bath, heat carefully on a sand bath until the excess of HClO₄ is evapd., let cool, wash with 15, 2, 2, 2 and 2 cc. 96% alc. contg. 0.2% HCl₄, triturating each time and decanting through a filter, dissolve the KClO₄ in boiling water, add a little HClO₄, evap. first on the water bath and then on the sand bath as before, wash with alc. as before, transfer to a rated Gooch crucible, heat at 125-30° to const. wt. and weigh. The remaining alkalies can be detd. in the alc. filtrate by adding H₂SO₄ and igniting to sulfates, the amt. of alk.-earths being negligible. Na can be detd. via Blanchet's ere (C. A. 17, 3006). The work carried out in developing the method is described, giving data justifying the various steps of the technic. It is shown more particularly that the methods based on the detn. of K bitartrate give very unreliable results; they should be completely discarded, total tartaric being detd. by the Kling and Lassieur method (C. A. 4, 1590; 6, 3382) and total K₂O by the above method.

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713. Sound records formed with magnetic powder

By Plfeumer, F.

From [No Corporate Source data available \(1929\)](#), GB 333154 19300805, Language: Unavailable, Database: CAPLUS

Powd. magnetic material (such as may be prepd. by mixing an org. binder like molasses or sugar with soft iron powder and heating to effect **caramelization**, carbonization and conversion of the metal to steel, followed by quenching to effect hardening, drying and regrinding) is applied to a backing strip such as a cinematograph film. Iron contg. H prepd. electrolytically or ferro-Si or other suitable alloy of Fe or Ni also may be used.

~0 Citings

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714. The effect of heat on chocolate pastes in causing **caramelization** of their component sugars

By Lecoq, Raoul

From [Journal de Pharmacie et de Chimie \(1930\)](#), 11, 522-9. Language: Unavailable, Database: CAPLUS

From complete analyses of 4 grades of com. chocolate before and after being treated in a heated mixer, it is concluded that heating of chocolate pastes at temps. from 50° to 120° causes very pronounced "**caramelization**" (A) of sugars, manifesting itself in increased proportion of reducing sugars, chiefly at the expense of the initial sucrose content. A seems to depend on the length of treatment and the temp. It is produced to a lesser extent during the prepn. of com. brands requiring lower temps., but is especially evident in superheated "fondant" chocolates. The quantity of reducing sugars in terms of invert sugar may here exceed 25% of the initial sucrose.

~0 Citings

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715. Real temperatures of cossettes at different periods during the drying process

By Knutov, G. D.

From [Zhurnal Sakharnoi Promyshlennosti \(1930\)](#), 4, 41-6. Language: Unavailable, Database: CAPLUS

K. shows the relation between the speed of evapn. and the degree of hydration of sucrose mols. in concd. solns. The drying of cossettes at a temp. above 130° is possible without danger of **caramelization** and darkening of cossettes.

~0 Citings

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716. Analyses of refined sugars

By Zimmermann, B.

From [Listy Cukrovarnicke \(1930\)](#), 48, 265-9. Language: Unavailable, Database: CAPLUS

Analyses for moisture, polarization, invert sugars, ash, grain size and uniformity, luminescence, **caramelization**, absorption and taste were carried out according to the most recent methods.

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717. Medicinal preparations

By Steinkuhler, Max

From [No Corporate Source data available \(1927\)](#), DE 488201 19291224, Language: Unavailable, Database: CAPLUS

Addn. to 408,529, Ger, 408,529 describes the prepn. of therapeutically useful salt mixes. by caramelizing grape sugar with K_2CO_3 in known manner, heating the mass at 120° until CO_2 ceases to be evolved, and then adding $CaCl_2$ and a concd. soln. of Fe-Mn saccharate and $MgCl_2$ while stirring and then adding $CaCl_2$ and a concd. soln. of Fe-Mn salts may also be added, according to the intended use. This method is now modified by using other carbohydrates instead of grape sugar, and by adding, instead of other salts, colloidal solns. of metals or non-saline compds., as desired.

~0 Citings

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718. Sugar manufacture

No Inventor data available

From [No Corporate Source data available \(1927\)](#), DE 485357 19291030, Language: Unavailable, Database: CAPLUS

In preheating sugar juices, **caramelization** is avoided by making the supply of heat to the preheaters automatically dependent on the pressure difference in the juice conduit at points before and after the preheaters. App. is shown.

~0 Citings

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719. Crystallizing sugar

By Spreckels, C. A.

From [No Corporate Source data available \(1928\)](#), GB 310369 19280424, Language: Unavailable, Database: CAPLUS

Large symmetrical sugar crystals are obtained by blowing air or other gas through sugar solns. to effect agitation and evapn. Seed crystals may be added and sugar solns may be added as the crystals grow. The temp. is below that of **caramelization**. Cf. C. A. 24, 522.

~0 Citings

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720. Method of determination of degree of **caramelization of ground, roasted coffee**

By Rife, A.; Medrano, L.

From [Anales de la Real Sociedad Espanola de Fisica y Quimica \(1929\)](#), 27, 313-8. Language: Unavailable, Database: CAPLUS

The modified Hilger method was used. Ground coffee passing a 16-mesh and held on an 18-mesh metric screen was taken. Ten g. was placed in a 500-cc. flask, 300 cc. of 50% by vol. alc. added, shaken and left for 0.5 hr., 250 cc. filtered off, evapd. in a Pt or Ni dish on a water bath, then on a steam bath at 95-100° for 24 hrs., weighed, ignited to ash, and the ash content deducted. This method gives values 9.5% higher than those obtained by the true Hilger method.

~0 Citings

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721. Crystallizing sugar

By Spreckels, C. A.

From [No Corporate Source data available \(1928\)](#), GB 308686 19280326, Language: Unavailable, Database: CAPLUS

Sugar solns. are concd. and caused to crystallize by blowing air or other gas through them at a temp. sufficiently low to avoid loss by inversion or **caramelization** of the sugar. Numerous details and auxiliary treatments are described.

~0 Citings

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722. Coloring matters formed by the **caramelization of sucrose and by the action of lime on invert sugar**

By Garino, M.; Tosonotti, A.

From [Giorn. chim. ind. applicata \(1929\)](#), 11, 8-13. Language: Unavailable, Database: CAPLUS

The constituents of caramel prepd. by heating sucrose and termed caramelan, caramelen and caramelin by G'elis (Ann. chim. phys. [iii] 52,352 (1858) are not individual compds. but mixts. Caramelan may be freed from caramelen by repeated treatment with 84% alc., followed by evapn. of the soln. to dryness. Caramelen does not dissolve any large amt. of caramelin, and may be freed from this by means of cold water, in which caramelin is insol.; the coloring power of caramelen is about 18,000 Stammer units. Caramelin is probably not produced during the manuf. of sugar. The products obtained by **caramelization** of dextrose or invert sugar resemble those formed from sucrose chemically, but differ in other ways, the coloring power, for instance, being enormously lower. Glucic and apoglucic acids, formed when invert sugar is heated in presence of an alkali, are described. Certain phys. and chem. properties of all the above products have been investigated, the most noteworthy results being that solns. of both caramelan and the Ca salt of glucic acid exhibit marked surface activity, and that the intensity of color of a caramelan soln. is greatly increased on adds. of alkali.

~0 Citings

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723. Coloring matters of beet molasses

By Garino, M.; Rege, A.; Rubino, F.

From [Giornale di Chimica Industriale ed Applicata \(1929\), 11, 61-3](#). Language: Unavailable, Database: CAPLUS

The coloring matters in beet molasses fall into 2 groups: those produced in the **caramelization** of the sugar, and those produced by the action of lime on the inverted sugar.

~0 Citings

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724. The significance of sampling for chemical analysis

By Hamous, Josef

From [Listy Cukrovarnicke \(1929\), 47, 645-6](#). Language: Unavailable, Database: CAPLUS

Correct sampling does not account for losses due to carmelization of the heated sugar solns. Liquid entering one chamber from another is super-heated for that chamber. Such losses may be as high as 0.2%. **Caramelization** may be detd. by measuring the color produced during boiling.

~0 Citings

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725. Ink

By Schillberg, A. J.

From [Svensk Farmaceutisk Tidskrift \(1929\), 33, 201-6](#). Language: Unavailable, Database: CAPLUS

300 g. gallnuts free from the finest particles is soaked in a mushy consistancy for 8 days; this is stirred well each day, and then poured on a percolator, 3 l. percolate being obtained. 25 g. concd. H_2SO_4 and 120 g. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ in water plus 5 g. phenol and 15 g. phenyl blue are added in this order, are well mixed with the percolate and the whole is made up to 4.5 l. and set aside for 8 days before bottling. This makes an ink which does not form sediment; it has been time tested over many years. Gum should also be added if "Copy" is required. The ink does not meet the state "normal ink" requirements. The following does: To 25 g. cane sugar in clear sirup warmed over free flame (**caramelization** being avoided) add 28.8 g. FeCl_2 . When Fe reduction and evolution of HCl sets in, remove from flame and continue vigorous stirring to liberate excess HCl. Add warm water contg. 23.4 g. tannin, 7.7 g. gallic acid, and boil 3 mins., then add 30 g. gum (arabic?) and 1 g. phenol also in warm water and make up to 1 l. The aniline dye is added with the last liquid. This latter ink has not yet been time tested. Both inks flow very well but both attack steel pens.

~0 Citings

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726. Cellulose

By Dorner, Bela

From [No Corporate Source data available \(1928\), CA 284755 19281110](#), Language: Unavailable, Database: CAPLUS

Pulp is produced from straw-like materials by subjecting the uncooked material to a combined washing and disintegrating process, the disintegration being carried to a point where the cell structure is sufficiently opened up to permit ready access of wash waters, but insufficient to form a pulp which substantially retains dirty water, further disintegrating the material and further subjecting it to a chemical pulping process by two alk. cooks, the first with all amt. of alkali just sufficient to unite with silica present, and the second with a larger amt. of alkali sufficient substantially to remove non-cellulosic material, both cooks being carried out at temps. which are not high enough to effect far-reaching decompn. of the non-cellulosic org. materials, such as **caramelization** of carbohydrate materials. Cf. C. A. 23, 277.

~0 Citings

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727. (The antiseptic value of) hop resins

By Cavenails

From [Bulletin de l'Association des Anciens Eleves de l'Institut Superieur des Fermentations de Gand \(1928\)](#), 29, 377-84. Language: Unavailable, Database: CAPLUS

Comparative biol. tests showed that the antiseptic principles of hops are much more sol. in worts than in distd. H_2O . Max. extrn. of the antiseptic constituents is obtained with 1 hr.'s boiling, and boiling for a longer period reduces the antiseptic power of the wort, the decrease being more marked the higher the d. of the wort. With worts having a very high a d. the max. antiseptic power is reached at the end of 30 min. boiling. With worts having a d. of 10° Balling or less the antiseptic power is proportional to the amt. of hops; but with 15° wort the antiseptic power increases more slowly than the amt. of hops added. The optimum p_H value from the standpoint of antiseptic value is from 5 to 6: above 6 the antiseptic value is very considerably reduced. High N content of the wort greatly reduces the antiseptic power, probably because the lupulone is almost completely pptd. by coagulation of the proteins during boiling. Storage of hops in presence of water reduces the antiseptic power, but this action seems to affect only the H_2O -sol. antiseptic constituents and to have little or no effect on the wort-sol. constituents. When the wort was boiled in large flasks the antiseptic power was higher than when it was boiled in small flasks, probably because in the latter case there is a greater tendency to **caramelization** which affects the hop resins and reduces their antiseptic power.

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728. Better flavor developed in cocoa by improved roasting methods

By Gephart, Frank C.

From [Food Industries \(1928\)](#), 1, 62-4. Language: Unavailable, Database: CAPLUS

Roasting performs 2 important functions: it renders the shell more friable and easily removable when the beans are cracked, and it develops the sensitive flavor and aroma of the finished product. Roasting causes loss in H_2O , **caramelization** of starch, a loss in astringency due to change in the tannin complex, and possibly loss in theobromine content. Theobromine is present in the raw nib to the extent of approx. 1%, but after roasting it is reduced to 0.75%. The fat is rendered more easily extractable because of its release from the cellular structure of the bean. Fat is volatilized during the roasting process, and in long roasting the loss may be appreciable. AcOH and AcOH esters present in the fermented beans are largely lost during roasting, which develops the true flavor and aroma of chocolate. The chemistry of this change is not well understood although d-linalol has been found in roasted beans.

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729. A method for determining the decolorizing power and an analysis of bone charcoal

By Prochazka, R.

From [Listy Cukrovarnicke \(1928\)](#), 47, 14-5. Language: Unavailable, Database: CAPLUS

Into a tin digestion flask are placed 100 g. of the clarifying agent and 400 g. of a soln. of known color value and sp. gr. The mixt. is immersed in a 90° water bath for 15 min. with frequent stirring; it is filtered warm with a small quantity of kieselguhr. The sp. gr. and color value are detd. as before. The method prevents **caramelization** and is used in regeneration studies. Routine tests for CaS and $CaSO_4$ are insignificant. Org. matter is extd. in warm NaOH; the soln. should remain clear. For P_2O_5 , 5 g. bone charcoal are ignited in a Pt crucible in an elec. furnace. The residue is dissolved in a H_2SO_4 and HNO_3 mixt. NH_4 citrate soln. is added, and the mixt. is kept cool. The ppt. is washed free of Cl, dried, ignited and weighed as P_2O_5 . The first ignition insures a pure ppt.

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730. Desiccation of sugar beet and the extraction of sugar

By Owen, B. J.

From [Rept. Ministry Agr. \(1927\)](#), 84 pp.. Language: Unavailable, Database: CAPLUS

A full report is given of an investigation into the De Vecchis process (C. A. 18, 1761) carried out at Eynsham. The conditions necessary for drying beet cossettes were examd., first in lab. expts. and then in 3 types of driers, viz., (a) a cylindrical mass drier similar in principle to that of Brit. 235,273; (b) a moving-belt drier of the type used by De Vecchis, and (c) a tray drier with 3 hot-air compartments, one perforated tray with cossettes being placed over the 1st, another over the 2nd and 2 over the 3rd, these positions representing successive stages of drying. Among the factors studied were the practicable thickness of the cossette layer (8-12 in.), the reduction in bulk (about 50%) and in resistance to air during drying, and the varying sensitiveness of the sugar to high temps. at different stages of drying. It was completely established that the drying can be carried out on a large scale without inversion of sugar or **caramelization**. So long as the cossettes were moist the temp. of the applied air (38-127°) had no effect on the sugar, but loss of sugar occurred from the use of high temps. (above 113°) on cossettes having a moisture content below 20%. It was accordingly considered inadvisable to continue heating after the moisture was expelled, no benefit being found to result from the prolonged heating advocated by De Vecchis for the coagulation of proteins. The drying process could thus be completed in less than 1 hr. The tray drier was adopted for most of the work as being easy to manipulate and control. Cossettes containing 3-5% of moisture suffered no deterioration on storage; after long exposure to the air the moisture content rose to 11-13%, but not beyond, and in large piles only the outermost layers of cossettes (to a depth of about 6 in.) lost their original crispness. Extn. of the dried cossettes in a battery of small diffusion vessels, each provided with a calorisor for heating the juice passing from one vessel to the next, yielded juices of 45-50° Brix with purities of about 90%. These thick juices had excellent phys. characteristics, being light in color and clear, and not darkening perceptibly on exposure to air. The difficulty experienced in obtaining gravities above 50° Brix, together with microscopical evidence and osmotic expts., led to the conclusion that the cells of the beets are not ruptured by the drying process, and that the subsequent extn. of the sugar is an osmotic phenomenon as in the case of fresh beets. A continuous diffuser in the form of a vertical cylinder with a helical conveyor to raise the cossettes against the descending juice (cf. C. A. 21, 2198) was also used successfully for the extn. of the sugar. Serious filtration difficulties were experienced with De Vecchis' method of purifying the juice with lime and superphosphate. Satisfactory working was attained, however, by a mech. removal of suspended impurities in a centrifugal clarifier, either before or after liming, the ppt. produced by superphosphate being then easily filterable. The color of the purified juice can, if necessary, be further improved by treatment with active carbons. Without the latter treatment, however, a strike of white sugar could be obtained from the juice reinforced by a proportion of second-product sugar. The amt. of effluent from flumes and beet washing is, of course, the same for the desiccation process as for the diffusion process, but that from the working of the cossettes is less for the former than the latter, and would in a normal desiccation factory be distributed over a long working period. An appendix dealing with beet-factory effluents describes a revolving double screen by which the coarse and finer suspended matters can be separately removed from the waste waters from flumes and washers, and some suggestions are made for the treatment of process affluent.

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731. Notes on some pharmaceutical preparations

By Grier, James

From [Pharmaceutical Journal \(1927\)](#), 119, 635. Language: Unavailable, Database: CAPLUS

The prepn. compd. confection of guaiacum of the Brit. Pharm. Codex is not firm enough to hold the powders in suspension; they settle to form a dense mass, making the prepn. appear defective. Compd. phenacetin tablets, Brit. Pharm. Codex, being granulated with gum acacia, disintegrate in H₂O only after hrs., hence fail when needed quickly, as in nervous troubles. A green coloration noted in a mixt. of NaHCO₃, o-C₆H₄(OH)CO₂Na, tincture of nux vomica, concd. infusion of senega and H₂O, is caused by an oxidase contained in the senega, acting on the alk. salicylate. When the senega infusion is boiled, or when a little CHCl₃ is added, the formation of the green color is much retarded. The color is prevented by adding to the prepn. a trace of Na₂S₂O₃ (0.5 grain:0.5 pint). The darkening of phosphoric sirups is claimed by F. to be caused by **caramelization** of sugar by H₃PO₄. G. found in a freshly opened bottle contg. Brit. Pharm. H₃PO₄ sufficient Fe to account for the formation of a highly colored Fe saccharophosphate noted by Timmis and Evers (C. A. 21, 156).

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732. Notes on some pharmaceutical preparations

By Franklin, J. H.

From [Pharmaceutical Journal \(1927\)](#), 119, 581-2. Language: Unavailable, Database: CAPLUS

The prepn. compd. confection of guaiacum of the Brit. Pharm. Codex is not firm enough to hold the powders in suspension; they settle to form a dense mass, making the prepn. appear defective. Compd. phenacetin tablets, Brit. Pharm. Codex, being granulated with gum acacia, disintegrate in H_2O only after hrs., hence fail when needed quickly, as in nervous troubles. A green coloration noted in a mixt. of $NaHCO_3$, $o-C_6H_4(OH)CO_2Na$, tincture of nux vomica, concd. infusion of senega and H_2O , is caused by an oxidase contained in the senega, acting on the alk. salicylate. When the senega infusion is boiled, or when a little $CHCl_3$ is added, the formation of the green color is much retarded. The color is prevented by adding to the prepn. a trace of $Na_2S_2O_3$ (0.5 grain:0.5 pint). The darkening of phosphoric sirups is claimed by F. to be caused by **caramelization** of sugar by H_3PO_4 . G. found in a freshly opened bottle contg. Brit. Pharm. H_3PO_4 sufficient Fe to account for the formation of a highly colored Fe saccharophosphate noted by Timmis and Evers (C. A. 21, 156).

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733. Methods for treating run-offs in the sulfodefecation process of white sugar manufacture

By de Villiers, O. d'Hotman

From [Revue Agricole et Sucriere de l'Ile Maurice \(1927\)](#), 4, 334-6. Language: Unavailable, Database: CAPLUS

The practice of sulfuring run-offs, and of heating with live steam after sulfuring is to be condemned, as it leads to inversion and **caramelization**. With the present light colored canes there is no excuse for these practices. Even the diln. of run-offs to be returned to pans should not be done by mixing with cold water and then heating with live steam, but by means of hot water and mech. agitation. The impurities in the products should be removed as far as possible by careful clarification of the juice instead of by trying to correct errors by treatment of the run-offs. These points are of especial importance in the manuf. of white sugar.

~0 Citings

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734. Desiccation (De Vecchis) process of beet sugar manufacture

By Garrett, C. Scott

From [Chemistry & Industry \(London, United Kingdom\) \(1927\)](#), 46, 1014-21. Language: Unavailable, Database: CAPLUS

This process consists essentially in drying the cossettes at 90-100° to a water content of 3%. They become crisp and brittle, the albuminoid matter is coagulated, and other changes take place which facilitate the extn. of the sugar by means of warm H_2O , and make it possible to store the material unaltered for considerable lengths of time. The dried cossettes are somewhat hygroscopic, but when they are stored in bulk the moisture does not penetrate beyond the surface layers. The dried cossettes can be compressed into a cake occupying about 37 cu. ft. per ton. No inversion or **caramelization** occurs during drying, as shown by a no. of tests in different places; provided that the temp. does not exceed 110°. Diffusion is carried out in standard equipment at 60-70°, a juice of 45-50° Brix or higher being obtained, with a greatly reduced quantity of colloidal matter. The pulp contains more N than ordinary beet pulp, and it may be fed either fresh or dried. The waste waters are free from putrefiable matter and can be run directly into streams. The purity of the diffusion juice is 2.5 to 3.5 higher than that of the juice in the beet. About 0.25 to 0.30%, on wt. of beets, of lime in the form of milk of lime is added to the diffusion juice, then about twice as much superphosphate (with 14-16% P_2O_5), and the temp. raised to 90-100°. Filtration is easy, and the cakes wash so freely that it is not necessary to use much H_2O , and yet the loss of sugar in press cake is only 0.06 to 0.07% on wt. of beets. The press cake is an excellent fertilizer, contg. 8.4 to 9% citrate-sol. P_2O_5 . The rise in purity due to defecation is 2 to 3.2 points, and with high purity beets proportionately less. The 2nd sugar is dissolved in the defecated juice, bringing its d. up to 60° Brix, and this sirup goes directly to the pans. A raw sugar with 96-97% sucrose is obtained, which may be refined by any of the usual methods. The molasses amounts to about 6% on beets. No NH_3 is evolved in the pans. The De Vecchis process requires the same size of plants for washing and slicing as the ordinary beet factory, but the extn. plant may have a much smaller capacity, because it can be operated throughout the yr. Preliminary cost figures show that the cost of plant is about 1/3 less than that for the ordinary process, and the cost of operation about 7% less. It appears that with the old process the sugar industry in England would not be able to survive the removal of the subsidy, but the De Vecchis process should enable the industry to stand on its feet.

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735. Caramelized flour

By Wallos, J.

From [No Corporate Source data available \(1927\)](#), US 1650308 19271122, Language: Unavailable, Database: CAPLUS

White flour is heated in a rotating retort which is provided with an internal agitating device.

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736. Leavened bread

By Wagner, T. B.

From [No Corporate Source data available \(1927\)](#), US 1649144 19271115, Language: Unavailable, Database: CAPLUS

Flour, yeast and other dough ingredients are mixed with sufficient HCl to effect maturing of the gluten of the flour, and with a "yeast activator" contg. sol. P and Ca compds. obtained from corn steepwater.

~0 Citings

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737. Briquetting ore concentrates

By Ostlund, V. C.

From [No Corporate Source data available \(1925\)](#), GB 256838 19260819, Language: Unavailable, Database: CAPLUS

A binder for use with Fe ore concentrates or other materials is prepd. by heating molasses sufficiently to effect **caramelization** of its sugar content. Dextrin or starch may be used also with "other cheap sugar solns."

~1 Citing

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738. Apparatus for caramelizing ground bread

By Brookes, S.

From [No Corporate Source data available \(1925\)](#), GB 254047 19260701, Language: Unavailable, Database: CAPLUS

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739. Caramel

By Garino-Canina, E.

From [Giorn. vinicolo ital. \(1926\)](#), Language: Unavailable, Database: CAPLUS

The industrial importance of the present work has already been discussed (Giorn. vinicolo ital. 1924). Expts. are described which deal with the phys.-chem. properties of caramel and their relation to its behavior as a coloring agent in enology. Three caramels were prepd. by heating sucrose to 100 until it had lost 7.5% wt.; (1) with no addn., (2) with 1% HNO₃ and (3) with 2% Na₂CO₃. The coloring power (Duboseq colorimeter), the sweetening power and the reducing power (Fehling after inversion) were all notably increased by adding Na₂CO₃; during **caramelization**. Flocculation tests, in which EtOH, H₂SO₄, tannin, gelatin, tartaric acid, AcOH and Pb(OAc)₂ were added to dil. alc. caramel, showed that, as an electronegative colloid, the soly. of caramel is not influenced by a colloid of the same sign (tannin), but is immediately flocculated by a colloid of opposite sign (gelatin). Tannin and gelatin together ppt. caramel in a form which has a high adsorbent power for the same caramel in soln. Electronegative cellulose does not adsorb an appreciable wt. of caramel and, therefore, can be used as a filter for caramel solns. Analytical data on an important. com. caramel are given, including d., ext., acidity, ash, reducing power before and after inversion, elec. cond., surface tension and viscosity. The influence of p_H on the flocculation was studied by adding different proportions of HCl to aq. caramel. The lowest concn. which brought about visible flocculation (slight after 24 hrs.) was Ph = 2.046. This value is of great importance in vermouth wine, for the acidity of the latter is often high enough to cause turbidity (flocculation), particularly when the caramel is prepd. from impure alk. glucose. The addn. of EtOH to aq. caramel renders it less stable to acids and raises the min. Ph value, causing flocculation. Tests of K₂SO₄ indicated that the flocculating action of such salts is small, 10 times the concn. normally present in wines being necessary. Caramel could not be fermented with saccharomycetes. The general importance of the results described above in wine-making is again discussed.

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740. The Influence of sodium carbonate upon the velocity of crystallization of sucrose at 50°

By Kukharenko, I. A.; Benine, G. S.

From [Sucrerie Belge \(1926\)](#), 46, 131-3. Language: Unavailable, Database: CAPLUS

The velocity of crystn. of sucrose at 50° in the presence of 0.5, 1 and 2% of Na_2CO_2 of the total wt. of the mother sirup was detd. on a lab. scale. At 50° Na_2CO_3 , exercises a retarding influence upon the velocity of crystn. of sucrose; it, therefore, appears to possess positive melassigenic properties. The more Na_2CO_3 a sucrose soln. contains, the greater is the retarding effect of the carbonate upon the velocity of crystn. The retarding influence of equal quantities of Na_2CO_3 increases with the increase of the supersatn. of the sucrose soln. The presence of Na_2CO_3 increases the soly. of sucrose in H_2O and, therefore, converts satd. solns. into non-satd. ones.

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741. The pH of the carbonation process in the manufacture of sugar and the properties of the proteins present

By Aten, A. H. W.; van Gilse, J. P. M.; van Ginneken, P. J. H.

From [Recueil des Travaux Chimiques des Pays-Bas et de la Belgique \(1926\)](#), 45, 792-802. Language: English, Database: CAPLUS

cf. C. A. 20, 847. The electrode vessel has been slightly altered (illustrated). The p_H at the 1st carbonatation was 10.8-11.1 in the last campaign, compared to 11.4-11.6 in the previous one, although the titrated alky. was practically the same in both seasons. The same observation was made for the 2nd carbonatation. This appears strange, and the point will be further investigated. Flocculation expts. with the diffusion liquor showed that max. flocculation occurs at a slightly lower p_H than that at which the filtrability is highest. This is probably due to the fact that a mixt. of proteins is present, and that the min. vol. of flocculated ppt. is not obtained at the same p_H at which the most rapid flocculation occurs. There is probably an isoelec. point of the 2nd order at which the protein salts would show a min. in swelling. This point is probably at a much higher p_H than the true isoelec. point. Further work is promised.

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742. Influence of absorption spectra of technical sugar products on the decolorizing efficiency of bone char

By Wayne, T. B.

From [Industrial and Engineering Chemistry \(1926\)](#), 18, 847-54. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50200a028

"A study of the decolorizing action of bone char on high-purity liquors and sirups, using the spectrophotometric method of Peters and Phelps, has shown that, in general, bone char does not show selectivity for any particular coloring matter. The widespread idea that bone char has difficulty in removing red coloring matters resulting from destruction of sugars by lime and heat is not borne out by the facts, as even in the case of these caramel-like substances the decolorizing action and selectivity for any particular type of coloring matter vary with the degree of **caramelization**. Bone char evidently has a selective action in the removal of green coloring matter derived from the cane because of the limited soly. of this class of impurities. The final residual coloring matter present in highly char-filtered liquors is of a type giving high absorption for light in the red end of the spectrum. Spectrophotometric analysis may be expected to prove an invaluable aid to improve refinery operation."

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743. A colloidal investigation of fat determination in milk. New methods for accurate fat determination in milk

By Grossfeld, J.

From [Zeitschrift fuer Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstaende \(1925\)](#), 49, 313-31. Language: Unavailable, Database: CAPLUS

cf. C. A. 19, 2855. The shaking out of milk fat by fat solvents is hindered by the colloidal milk protein. The difficulties encountered with previous methods of fat detn. are due chiefly to incomplete removal of the colloidal protein. The colloidal protein may be peptized by strong HCl, which, however, tends on heating to caramelize the lactose, thus causing a source of error. G. avoids this difficulty by gently boiling for 10 min. under a reflux condenser a mixt. of 50 cc. of milk, 100 cc. of concd. HCl and 100 cc. of trichloroethylene, thus carrying out the decompn. of protein by HCl and the extrn. of fat by trichloroethylene in one operation. At this temp. **caramelization** does not occur. This method gives the milk fat plus the fatty acids liberated by hydrolysis of lecithin. The results are 0.05% higher than those with the R.ovrddot.ose-Gottlieb method. Another method, based on coagulation of the milk protein, is as follows: 50 cc. of milk is dild. with 150 cc. of water and treated with 10 cc. of a CuSO_4 soln. (69 g. of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in 11.). After 10 min. or more, the ppt. is removed by filtration, dried and the fat extd. by (a) heating for 5-10 min. with 100 cc. of trichloroethylene under a reflux condenser, or (b) extg. for 6 hrs. with ether in a Soxhlet app.; (a) and (b) yield identical results. The coagulation method gives results 0.02% higher than those by the R.ovrddot.ose-Gottlieb method, the same quantities of milk being used. With increasing amts. of milk, the results by the coagulation method tend to be low.

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744. Chemical studies in the physiology of apples. III. The estimation of dry weight and the amount of cell-wall material in apples

By Archbold, H. K.

From *Ann. Bot.* (1925), 39, 109-21. Language: Unavailable, Database: CAPLUS

Finely minced 50-g. samples of apple pulp continue to lose wt. for 65 days in a ventilated oven at 100°, but dehydration is complete after 36 hrs. and the rate of loss thereafter is const. and due to slow **caramelization** and loss of water of compn. Drying for 36 hrs. at 100°, therefore, gives comparable results and was the method used. The figures thus obtained are lower than the sum of the alc.-insol. residue plus solids per 100 g. of pulp as calcd. from the d. of the juice. The juice apparently contains a constituent of high d., probably a higher alc., which is volatilized in drying. This constituent gradually decreases in stored fruit, the rate of loss being detd. by the storage temp. Attempts to isolate it are in progress. Detn. of cell-wall material by extrn. of the dried ground pulp with cold water to remove sugars, acids and sol. pectin gave results agreeing very well with those obtained by extg. the fresh tissue with alc. The water-insol. material plus sol. pectin is consistently higher than the alc.-insoluble material and the difference increases during storage, pointing to the formation of some alc.-sol. material during storage. This material has not been identified, but its presence has been confirmed by direct observation. In fruits stored at 1° (humidity percentage not stated) the ratio of dry wt. to fresh wt. remained const. through the storage period (October to August) while at 3° (humidity not stated) there was more rapid respiration and the ratio of dry to fresh wt. decreased with time. Cell-wall material decreases slightly in its ratio to fresh wt. in storage at 1°, more markedly at 3°.

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745. Effects of the method of desiccation on the carbohydrates of plant tissues

By Link, K. P.

From *Journal of the American Chemical Society* (1925), 47, 470-6. Language: English, Database: CAPLUS, DOI:10.1021/ja01679a030

cf. C. A. 17, 1658. Drying at temps. below 65° changed the sugar content of beet, corn and barberry leaves and corn ears. Drying at 65° and 80° proved successful with beet and corn leaves, which are tissues that dry rapidly. Killing and drying for 24 hrs. at 98° lowered the sugar content by **caramelization** and leaching in beet and corn leaves and corn ears and caused hydrolysis of the sucrose in barberry leaves. The Spoehr method of heating the tissue in a closed vessel for 30 min. at 98° raises the temp. to the killing point more quickly than direct heating at the same temp. in an open system. It is suggested that subsequent drying should be at a reduced temp. in a well-ventilated oven, thereby minimizing losses by leaching and **caramelization**. The method of preservation by heat is inapplicable with certain tissues; in such cases the method of preservation with EtOH is the only alternative.

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746. Change in optical activity of sucrose on heating

By Rakuzin, M. A.; Nesmeianov, A. N.

From *Zeitschrift fuer Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstaende* (1924), 48, 151-2. Language: Unavailable, Database: CAPLUS

The growing importance of caramel particularly in recent years for use by diabetics led to this investigation. Reduction in optical rotation is used as a measure of the transformation brought about by heating. Merely melting the product reduced the rotation considerably; rapid heating to the m. p. caused less change than slow heating. Heating at 180° (approx. m. p.) for 1/2 hr. caused complete **caramelization** (optical rotation destroyed). Continued heating always resulted in partial decompn. as indicated by gas evolution. It is recommended that for experimentation with diabetics an "inactive sucrose" be prepd. as follows: Use a bath at 200°, heat sucrose to melting, then quickly cool to 150-60° and hold for 2-4 hrs. or until completely inactivated. In this way a coffee-brown, sweet tasting product is obtained which gives a positive test with Fehling's soln.

~0 Citings

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747. The preparation of acid-fast caramels. II. The preparation of sucrose caramel

By Beal, Geo. D.; Applegate, Gladys

From [Journal of the American Pharmaceutical Association \(1912-1977\) \(1923\), 12, 850-3](#). Language: Unavailable, Database: CAPLUS, DOI:10.1002/jps.3080121005

Sucrose yields a good caramel by the Beal and Bowey method (cf. above). The color value is about the same as that of the product from glucose. **Caramelization** probably is a definite, endothermal reaction.

~0 Citings

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748. Formation of formic acid by **caramelization** of cane sugar

By Simpson, S. G.

From [Industrial and Engineering Chemistry \(1923\), 15, 1054-4](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50166a036

Expts. on the **caramelization** of cane sugar indicate that (1) HCO_2H is formed in considerable amts.; (2) the amt. of HCO_2H is governed by the degree of **caramelization**, which in turn is a function of the temp. and time of heating; (3) food products which are not heated above 160° should produce no appreciable amts. of HCO_2H ; and (4) with a known temp. and time of heating of a food product contg. a known sugar content the amt. of HCO_2H due to **caramelization** can be approx. estd. The results are shown graphically.

~0 Citings

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749. Report on the determination of moisture in dried fruits

By Hilts, R. W.

From [Journal of the Association of Official Agricultural Chemists \(1922\), 6, 40-8](#). Language: Unavailable, Database: CAPLUS

Various procedures for the detn. of H_2O in dried apricots, peaches, pears and apples were studied. Drying in an atm. of H_2 at 100° causes as much **caramelization** as drying in air. The official method of drying over H_2SO_4 without heat using Et_2O to obtain a high vacuum gave in 2 months only 3/4 of the loss observed by heating in vacuo at 70°. The distn. method of Dean and Stark (C. A. 14, 2145) using xylene, toluene, kerosene, amyl acetate, and combinations gave promising results on apples but not on other fruits. A full discussion of exptl. work precedes the directions of a method for drying 10 g. in an Al dish, 8.5 cm. in diam., placed directly on a metal shelf in a vacuum oven at 70° with a pressure not over 4 in. of Hg for 12 hrs. Admit 2 bubbles of air per sec. through H_2SO_4 . Cover the dishes with tops, cool in a H_2SO_4 desiccator and weigh as soon as cool. Collaborative results by this method were satisfactory but those in a H_2O oven at 100° were not for pears, peaches and apricots. Apples were not tried by collaborators. Results on 52 samples of apples showed that drying a 2-10-g. sample for 4 hrs. in a H_2O oven gives results comparable to those with the vacuum method.

~0 Citings

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750. Return of runoffs

By Fayd'herbe, P.

From [Revue Agricole et Sucriere de l'Ile Maurice \(1922\), 1, 116-21](#). Language: Unavailable, Database: CAPLUS

The present methods of making as much white sugar as possible and final molasses required too much fuel, labor and pan capacity, frequently yield sugar of inferior grade and keeping quality, and necessitate the use of such large quantities of SO_2 that there is distinct danger of inversion. All these objections are overcome by the following process which has been used successfully in practice. A first massecuite (preferably from sirup only) is run into crystallizers which are divided into 2 series, A and B. The runoffs from a previous strike of first massecuite which runoffs have been sepd. into high and low, either by the usual method or by double purging, are, without any previous treatment whatever, drawn into a vacuum app. and boiled separately to supersatn. To prevent crystn., the runoffs thus concd. are slightly overheated before being dropped. The concd. high runoffs are then added to massecuite A, and the low ones to massecuite B. After the massecuites have cooled completely in the crystallizers, they are purged separately, the runoffs of either again being divided into high and low. The high runoffs from massecuites A and B can be mixed and used again for massecuite A. The low runoffs which are used in massecuite B will yield final molasses. This mode of working saves steam, because only high-purity massecuites are boiled directly to grain, and because the runoffs are not dild. before being concd. again. The blowing-up of runoffs is avoided, thus saving labor and power. No additional clarification of runoffs is required. The sugar produced is of good quality and keeps well; its color is better, because the low grades are not boiled in the pan where the crystals would be liable to partial **caramelization**. Figures are presented to prove the assertions made.

~0 Citings

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751. Rapid determination of sulfur dioxide (in wine)

By Marcille, R.

From [Annales des Falsifications et des Fraudes \(1922\)](#), 15, 398-401. Language: Unavailable, Database: CAPLUS

To 10 cc. of wine in a wide-necked 250-cc. Erlenmeyer flask add 10 cc. of NaOH (60 g. per l.), evap. to half its vol., cool, add 100-150 cc. of H_2O , enough dil. H_2SO_4 to neutralize the NaOH, and 1-2 cc. of starch paste, and titrate with I equiv. to 1 or 2 mg. of SO_2 per cc. (4 or 8 g. l per l.). In the case of certain wines heating without eliminating alc. and aldehydes gives 200 mg. per l. less than the above method. The method is not suitable for wines contg. more than 5 g. of sugars per l. They are distd. in the presence of H_3PO_3 to **caramelization**, the distillate being collected in 10 cc. of NaOH (60 g. per l.) and treated as above. A detn. can be carried out in about 15 min. Duplicates on the same wine do not vary by more than 50%.

~0 Citings

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752. Cereal and fruit beverage

By Ellis, C.

From [No Corporate Source data available \(1922\)](#), US 1414557 19220502, Language: Unavailable, Database: CAPLUS

A "coffee substitute" is prepd. by roasting barley or similar cereal material to a temp. which somewhat darkens its color and mixing it with fruits such as raisins, figs, dates or prunes which have been roasted at a lower temp. to avoid **caramelization**.

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753. Malted food

By Wahl, R.

From [No Corporate Source data available \(1922\)](#), US 1410973 19220328, Language: Unavailable, Database: CAPLUS

A "breakfast-food" is prepd. by degerminating and grinding kiln-dried malt, mixing it with H_2O and kneading the mixt. to a dough, subdividing the dough and baking it to effect **caramelization**.

~0 Citings

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754. Results of investigation into the self-heating of hay

By Laupper, G.

From *Landwirtschaftliches Jahrbuch der Schweiz* (1920), 34, 1-54. Language: Unavailable, Database: CAPLUS

cf. C. A. 14, 632. The view put forward is that the moisture from withered hay in a stack is able to activate the oxidases present in dried green hay with consequent chem. action and heat evolution. Micro.organisms play no part in the process. The following sequence of events was ascertained: At 20-35°, activation of the oxidases, commencement of heating; at 35-45°, **caramelization** of sugar; at 45-70°, evolution of NH₃ and formic acid; at 60-70°, acceleration of the exothermic reaction; at 70-90°, decompn. of pectins, pungent odor; at 90-100°, first decompn. of protein, formation of H₂S and furfural; at 110-70°, formation of HNO₃ by oxidation of NH₃, explosive union between NH₄NO₃ and caramel C; at 170-250°, rapid progress of the exothermic reaction; at 250-80°, decompn. of cellulose and protein, formation of H₂S and furfural, ignition of pyrophoric Fe; at 300°, region of inflammability through access of O; at 320-40°, final decompn. of carbohydrates, formation of furfural and pyrophoric manganese. The injection of CO₂ into the stack does not remove the danger of fire.

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755. Detection of manurial pollution in milk by the ana. aerobic spore test

By Weinzirl, John

From *American Journal of Public Health* (1921), 11, 149-52. Language: Unavailable, Database: CAPLUS, DOI:10.2105/AJPH.11.2.149

In the test for ana. aerobic spores 0.5-1 cc. of melted paraffin is placed in a 15 mm. test tube, which is plugged with cotton and sterilized by dry or moist heat. With a sterile pipet 5 cc. of the milk under test are placed in each of 5 tubes containing paraffin. These tubes are then placed in an Arnold sterilizer and heated to 80° for 10 to 15 min. This melts the paraffin which rises to the surface, where upon cooling it hardens and forms the ana. aerobic seal. The heat also expels O absorbed by the milk, thus rendering ana. aerobic more complete. All vegetative bacteria in the milk are killed by the heat, only the spore forms remaining. Tubes are then incubated for 3 days at 37°. If ana. aerobes are present gas will be formed which lifts the paraffin plugs in the tube. Two positives out of 5 tubes condemns the milk as showing excessive pollution. Results tend to show that the test will reveal 75% positives. This result is probably too low, owing to **caramelization** of the lactose during autoclaving. When lactose was added the sensitiveness was 95.8%. This study seems to show the ana. aerobic spore test far superior to total count or visible dirt tests, and it apparently equals the B. coli test for this purpose.

~2 Citings

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756. Determination of lactose in altered milks

By Hildt, E.

From *Bulletin de la Societe Chimique de France* (1919), 25, 617-21. Language: Unavailable, Database: CAPLUS

According to the season, preserved milks for official exam. undergo change, especially in lactose content, and thus affect the accuracy of the figure for total solids obtained by drying at 100°. A method for the inversion of lactose without loss follows: In a 100-cc. graduated flask add to 10 cc. milk 3 cc. 5% Na metaphosphate, 60-70 cc. distd. water and 1 cc. N H₂SO₄. After mixing add 10-20 cc. of a soln. containing 49 g. H₂SO₄ and 180 g. Na phenolsulfonate or benzene-sulfonate per l. Fill to the 100-cc. mark with distd. water, mix and filter. Heat 50 cc. of the filtrate for 8 hrs. on the water bath, cool, restore the vol. with distd. water and titrate cuprometrically to obtain the "true" reducing power. The "apparent" reducing power is detd. before hydrolysis. From these values may be calcd. the correction to the figure for total solids obtained by drying at 100°, as well as a more accurate value for lactose. Examples are cited showing a 2-3-g. loss in the dried residue with corresponding change in the calcd. lactose content due to loss of water of crystn. of the lactose and to **caramelization**.

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757. Determination of lactose in altered milks

By Hildt, E.

From *Annales de Chimie Analytique et de Chimie Applique et Revue de Chimie Analytique Reunies* (1920), 2, 43-6. Language: Unavailable, Database: CAPLUS

According to the season, preserved milks for official exam. undergo change, especially in lactose content, and thus affect the accuracy of the figure for total solids obtained by drying at 100°. A method for the inversion of lactose without loss follows: In a 100-cc. graduated flask add to 10 cc. milk 3 cc. 5% Na metaphosphate, 60-70 cc. distd. water and 1 cc. N H₂SO₄. After mixing add 10-20 cc. of a soln. containing 49 g. H₂SO₄ and 180 g. Na phenolsulfonate or benzene-sulfonate per l. Fill to the 100-cc. mark with distd. water, mix and filter. Heat 50 cc. of the filtrate for 8 hrs. on the water bath, cool, restore the vol. with distd. water and titrate cuprometrically to obtain the "true" reducing power. The "apparent" reducing power is detd. before hydrolysis. From these values may be calcd. the correction to the figure for total solids obtained by drying at 100°, as well as a more accurate value for lactose. Examples are cited showing a 2-3-g. loss in the dried residue with corresponding change in the calcd. lactose content due to loss of water of crystn. of the lactose and to **caramelization**.

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758. Treating beet juice

By Kestner, P.

From [No Corporate Source data available \(1918\)](#), GB 135235 19191127, Language: Unavailable, Database: CAPLUS

Beet juice is concd. by heating under pressure for a short time and then cooling it by suddenly removing the pressure or otherwise. The resulting product is stated to contain the nitrogenous and other nutritious constituents of the juice and to be free from objectionable odor or taste. Juice of such concn. that it would boil under atm. pressure at 120° may be raised to 130° in a closed evaporator of the Kestner or other type, the heating is restricted to a few seconds to prevent **caramelization**. The steam produced may be used to dry the pulp from which the juice has been extd.

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759. The function of glycerol in some U. S. P. and N. F. preparations

By Ruddiman, Edsal A.

From [Journal of the American Pharmaceutical Association \(1912-1977\) \(1919\)](#), 8, 818-24. Language: Unavailable, Database: CAPLUS, DOI:10.1002/jps.3080081016

Twenty representative U. S. P. and N. F. preps., each containing glycerol, were prepd. (1) according to the standards; (2) the glycerol being replaced by sirup; (3) the glycerol being replaced by H₂O; (4) the glycerol being replaced by a soln. of invert sugar; and (5) the glycerol being replaced by a soln. of glucose of sp. gr. 1.21. The preps. were observed when 6 mo. old and again when 12 mo. old. In general the tests showed that glycerol is not necessary for the permanence of most pharmaceutical preps. except in a few cases, such as comp. soln. of hypophosphites and sirup of hypophosphites. In some, the large amt. of glycerol is objectionable because of the disagreeable taste which develops. Glycerol is preferable to sirup if the prepn. contains a large amt. of acid or of inorg. salts, because of the ready **caramelization** of sucrose.

~0 Citings

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760. Caramel

By Daniel, A.

From [No Corporate Source data available \(1919\)](#), US 1316019 19190916, Language: Unavailable, Database: CAPLUS

Caramel is produced by heating starch sirup, glucose, fruit-sugar, sucrose, molasses, milk-sugar or tracle or similar carbohydrates with HOAc and H₂O-extg. agent such as Ac₂O or NaOAc. E. g., sucrose may be heated with 10% of glacial HOAc and 10% of NaOAc at the b. p. under a reflux condenser for 6-8 hrs. The caramel formed may be pptd. from soln. by addition of Na₂CO₃ or NaOH. By doubling the amts. of HOAc and NaOAc used, the tinctorial power of the caramel is nearly doubled. When the carbohydrates used contain ash-forming constituents, **caramelization** may be effected with HOAc alone. A similar result is attained by heating to 160-170° a mixt. of sucrose with 10-20% NaOAc with consequent formation of HOAc in situ. The product obtained is suitable for coloring aqueous and alcoholic liquids. Heating under pressure accelerates the **caramelization**.

~0 Citings

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761. Invert sugar sirup

By Taussig, N. W.

From [No Corporate Source data available \(1917\)](#), FR 484259 19170918, Language: Unavailable, Database: CAPLUS

An aq. soln. of sugar is boiled with citric acid at a temp. just below that of **caramelization**, and the product suddenly cooled. The preferred temp. is 111.4°. Satisfactory results are obtained by maintaining the soln. at a temp. of 99-130° for a long time, then raising the temp. to the pt. just below caramelization and suddenly cooling. The addition of an edible gum is advisable, e. g., 0.47% citric acid and 0.14% gum arabic of the wt. of the dry sugar. Cf. C. A. 11, 1916.

~0 Citings

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762. Dyes; dyeing

By Malcolmson, N.

From [No Corporate Source data available \(1916\)](#), GB 112474 19180110, Language: Unavailable, Database: CAPLUS

A dye paste or pulp is obtained by injecting steam into a mass of raw seaweed while retaining the juices in the mass; the paste or pulp may be concd. by evapn. A dye ext. may be obtained by boiling olive, brown, or red seaweed in an acid soln., and green or khaki exts. may be obtained by treating the residue after the acid extn. with hot alkali; or the weed may be extd. first with hot alkali and then with boiling acid. The acid soln. may be evapd. until **caramelization** occurs, products of different shades being obtained thereby. Cf. 4,166, 1873, 56, 1879, 1,215, 1881, and 15,233, 1900.

According to the provisional specification, dyes are obtained by steeping seaweed in H₂O; the weed may be previously chopped up and stacked and allowed to decompose; pastes or exts. may be obtained by means of pressure or steam; the solns. may be concd. by evapn. or wood flour or other absorbent may be impregnated with the soln.; or wood flour may be ground up with the disintegrated seaweed. A variety of shades may be obtained by extg. with hot H₂O the residues resulting from the acid and alkali treatments described above. The various dyes may be used with mordants, or topping baths, or with other dyes: the use as mordants of potash or alum, ferrotannic compds., NH₄ chlorostannate, tannin, or used tea leaves as a substitute for tannin, is specified; the dyes may be pptd. by NaCl, and combine with Al₂O₃, etc.; NaCl or Na₂SO₄ may be added to the dye baths.

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763. Invert sugar

By Taussig, N. W.

From [No Corporate Source data available \(1917\)](#), GB 103989 19171011, Language: Unavailable, Database: CAPLUS

Invert. sugar sirup known as "nulomoline" is made by boiling an aq. soln. of pure cane sugar with citric acid to a temp. just below that of **caramelization**, and suddenly cooling. The sugar soln. with a very small quantity of citric acid and gum arabic is steam-heated to a temp. of 210-8° F. and maintained at that temp. for an hr. The mixt. is then boiled, and when the temp. reaches 232.5° F., cold H₂O is added and the mixt. is rapidly cooled. Any other organic acid that would give the same result may be used. The sirup may be used as a glycerol substitute and by tobacco manufacturers.

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764. Preparing chocolate mixtures

By Gloor, J.

From [No Corporate Source data available \(1916\)](#), US 1201573 19161017, Language: Unavailable, Database: CAPLUS

Mixts. containing chocolate and sugar are stirred rapidly by beating arms placed close together so that the resulting friction effects roasting, cooking and pulverization of the chocolate or cocoa beans and **caramelization** of the sugar. Sol. powdered cocoa and milk chocolate or other mixts. may be thus prepared. Cf. C. A. 10, 1238.

~0 Citings

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765. Coffee and chicory

By Carles, P.

From [Repertoire de Pharmacie \(1915\)](#), 27, 293-5. Language: Unavailable, Database: CAPLUS

As a result of the war the supply of chicory from Belgium and northern France has been cut off. Chicory has come to be very generally used among all classes of people not only to fortify the flavor of coffee but also as a separate and distinct flavor. It was thought that at this time other roots might be substituted for chicory. Examn. of a large number of samples did not reveal any such adulteration. Some of the samples showed much more caramel than others. If sugar is a natural constituent of chicory this caramel could be accounted for by variations in the roasting. If chicory root be macerated with water and allowed to stand 24 hrs., an alc. fermentation takes place with an abundant evolution of CO₂. An aq. soln. of raw chicory gives a strong rotation to the left, due to inulin and sugar. As the root is subjected to increasing intensities of roasting this rotation gradually diminishes and becomes slightly positive. As roasting approaches complete **caramelization** the dextro rotation approaches zero. This behavior shows the presence of dextrose and sucrose. Chem. analysis revealed as much as 40% sucrose and 10% of dextrose in some varieties of raw chicory. The amt. of sugars found varied with the soil, species, environment, etc.

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766. An imperishable essence for preparing non-alcoholic beverages

By Laessig, H.

From [No Corporate Source data available \(1913\)](#), DE 285090 19130812, Language: Unavailable, Database: CAPLUS

A soln. containing lactic acid, obtained by the fermentation of a liquid containing milk sugar, such as whey, is concd., with prevention of **caramelization** or condensation in the heat, preferably by freezing out, to about 5% lactic acid content, and this concd. soln. is mixed with an amt. of invert sugar sufficient to ensure preservation. The high content of lactic acid admits of the addition of the large amt. of sugar required to preserve the product, without obtaining an insipid taste. The invert sugar required may be produced, to advantage, in the lactic acid soln. itself, by adding cane sugar, after concn., and inverting this in the known manner by heating. The excessive sweet taste is thereby masked. E. g., lactic acid bacteria are added to whey, and the liquid is allowed to ferment at 35-45°. A serum containing about 20% lactic acid is obtained, and filtered. This serum is concd. by freezing to about 5% lactic acid content, and then about 4 kg. cane sugar are added to 3 liters of the liquid. The lactic acid-containing sugar soln. is then heated to about 100°, when inversion is effected. After filtration the product is ready for use with H₂O. Flavors, etc., may be added.

~0 Citings

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767. Hydrolysis of sugar solutions under pressure

By Hubbard, W. S.; Mitchell, W. L.

From [Journal of Industrial and Engineering Chemistry \(Washington, D. C.\) \(1915\)](#), 7, 609-10. Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50079a018

An attempt has been made to det. under what conditions hydrolysis of sugar (for the prepn. of invert sugar sirups for industries requiring a heavy sirup) can be carried on successfully without **caramelization**.

~0 Citings

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768. The connection between the unknown losses in raw sugar manufacture and the optically active nonsugars

By Herzfeld

From [Zeitschrift des Vereines der Deutschen Zucker-Industrie \(1914\)](#), 64, 684-94. Language: Unavailable, Database: CAPLUS

At least 0.5% should be considered the av. undetd. loss (if the undetd. loss is less than 0.4% the balance is probably in error). The loss due to **caramelization** cannot exceed 0.1%. Of the optically active nonsugars, the ones to be considered are metaepetic acid, asparagine and aspartic acid, glutamine, glutaminic and glutimic acids, araban and galactan. The rotatory power of each under various conditions is discussed, and the conclusion is that they cannot cause a total apparent loss of over 0.1%. Hence 0.3-0.4% undetd. loss is still to be accounted for. In the discussion, Claassen referred to his work on loss between thin juice and molasses (C. A. 7, 2493), where 0.1% loss was found, and concludes that most of this unknown loss must be sought before evapn. Lab. tests by various persons have never shown over 0.1% loss in diffusion and carbonation. Hence, C. holds that factory-scale expts. must be made to settle this point. A serious error in all factory work is measuring the juice. It would be very desirable to take a sugar balance sheet with the diffusion juice weighed, not measured.

~0 Citings

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769. Caramelization of sugar and commercial caramel

By Sangiorgi, Giuseppe

From [Giorn. farm. chim. \(1914\), 62, 256-61](#). Language: Unavailable, Database: CAPLUS

HCHO, in addition to furfural and Me₂CO, is produced in the **caramelization** of sugar by heating to 150-200°; it is especially easy of detection in freshly prepd. caramel. In com. caramel only the oxidation product, formic acid (likewise AcOH as the oxidation product of MeCHO), is present; 100 g. of com. caramel contain on an av. 0.01 g. furfural, 0.2064 g. Me₂CO, 0.164 g. formic acid and 1.0698 g. AcOH.

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770. Action of heat on sucrose considered from the point of view of the formation of unfermentable sugars

By Cognioue, G.

From [Bulletin des Societes Chimiques Belges \(1914\), 27, 237](#). Language: Unavailable, Database: CAPLUS

Excluding the temp. of 160° which gives products of **caramelization**, the temp. most favorable to the formation of unfermentable sugars is 150°; the amt. of these sugars may be regulated by controlling the duration of heating.

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771. Action of heat on sucrose considered from the point of view of the formation of unfermentable sugars

By Cognioue, G.

From [Livre jubilaire Van Laer \(1913\), 15-21](#). Language: Unavailable, Database: CAPLUS

Excluding the temp. of 160° which gives products of **caramelization**, the temp. most favorable to the formation of unfermentable sugars is 150°; the amt. of these sugars may be regulated by controlling the duration of heating.

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772. To what Temperature Must one Raise Solutions of Sucrose, Glucose, Maltose, etc., to Transform them into Caramel?

By Aulard, A.

From [Orig. Com. 8th Intern. Congr. Appl. Chem., \(Appendix\) \(1913\), 25, 493-9](#). Language: Unavailable, Database: CAPLUS

A. discusses the causes of **caramelization** in sugar processes. Conc. sugar solns. (d. 1.330) can be heated for an hr. at 150° without any color change. It requires a temp. of 190° to start **caramelization**. Since 190° is far above any temp. which is supposed to be used in sugar refineries A. concludes that **caramelization** is due to superheating certain portions of the liquid. To avoid this A. recommends the more extended use of vacuum type of evaporator giving some figures obtained with a Kestner model. A. states that the presence of organic salts in soln. does not tend to **caramelization**.

~0 Citings

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773. Waste Water Samples

By Leefers, L.

From [Archief voor de Suikerindustrie in Nederlandsch-Indie \(1913\), 21, 315-8](#). Language: Unavailable, Database: CAPLUS

The limit of sensitiveness of the test for sugar with the Pellet soln. is about 0.07%. A much surer test is to evap. the soln. in a Pt dish to dryness and then heat carefully at 200°. Small traces of sugar are detected by the formation of rings which color intensely from **caramelization**, passing over into glittering black sugar coal. Instead of taking samples of the waste condensation water from the barometric water columns, as is the usual practice, it is proposed to introduce a catch chamber between each effect and the barometric column, and draw samples from these, where the sugar solns. carried over will be more conc.

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774. The Qualitative Regulation of the Extract of Beer-Wort and Beer in Brewery Practice

By Rach, Carl

From [Orig. Com. 8th Intern. Congr. Appl. Chem. \(Appendix\) \(1913\), 26, 77-82](#). Language: Unavailable, Database: CAPLUS

To allow the required regulation of the sugar contents of worts R. proposes 3 new methods: (1) The conversion of the formed sugar in the wort ext. into unfermentable products by means of **caramelization**. A large portion of the first wort is heated in a pressure kettle with 25 to 30 lbs. pressure or exposed to a temp. of 105° to 110° R. This changes the malt sugar chemically into unfermentable wort ext. The caramelized wort is now added to the other wort in the kettle and boiled with hops as usual. (2) A large amt. of the first wort is evapd. in vacuum pans to sirupy consistency. The sepn. of the malt sugar is accomplished in a special manner at this stage. The residual product is an ext. poor in malt sugar which may be dissolved in water and added to the remainder of the wort in the kettle. (3) Conc. beer worts poor in malt sugar or maltose are produced; and these are used for krausening beers produced from worts low in malt sugar.

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775. The Preparation of Hardened Molasses

By Hazewinkel, J. J.; Lohr, P. L.

From [Archief voor de Suikerindustrie in Nederlandsch-Indie \(1913\), 20, 1809-17](#). Language: Unavailable, Database: CAPLUS

The subject was investigated to det. the source of loss in total dry matter generally experienced. The process of preparing hardened molasses may be divided into 2 parts, viz., the process below a certain limiting conc. and that above. With some concs. below this limiting conc., sucrose losses through inversion may arise, especially if the molasses is not previously neutralized with lime. At this stage no loss in dry matter either through the inversion or through glucose decomp. is experienced. With higher concs., approaching the limiting conc., this sucrose loss may become especially large and a loss in dry matter may also arise, through the decomp. of the dextrose and the levulose in whole or in part. Above this limiting conc. there is a slow loss of sucrose, glucose and dry matter through pure **caramelization**. In practice it is therefore well to try to reach this limiting conc. as quickly and at as low a temp. as possible. To this end only good vacuum pans, provided with pumps in good working order, should be used. The loss in Brix does not necessarily correspond exactly to that in dry matter. The conclusions above mentioned are to be considered as hypothetical only, and the investigation is to be continued.

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776. Experimental Studies on Creatine and Creatinine. IV. The Estimation of Creatine In the Presence of Sugar

By Rose, W. C.

From [Journal of Biological Chemistry \(1912\), 12, 73-80](#). Language: Unavailable, Database: CAPLUS

In diabetic urins the heating with N HCl soln. in autoclave, according to Benedict and Myers' modification of Folin's method, causes a **caramelization** of the dextrose and production of substances giving the Jaffe test with picric acid and alkali. This fact precludes the use of this method for creatinine on urin containing much sugar. Dextrose added to normal urins causes exactly the same interference in the final readings for creatinine. R. found that even in urins containing 8-10% dextrose there was no interference with the readings if the creatine were converted into creatinine by heating with twice the vol. of 3% H₃PO₄ solns. for 30 min. at 117-121°. This acid does not cause the oxidation of urinary pigments as does HCl. In normal urins clearer solns. are obtained when using H₃PO₄. Upon human and rabbit urins this modification is very successful but for unknown reasons is not so in the case of dog urins. Acetoacetic add and acetone in normal and pathological amts. did not cause any interference. Dextrose seems to give a transient Jaff'et test but if allowed to stand 5 min. before reading and by using the H₃PO₄ method all urins give excellent results.

~0 Citings

777. The Determination of Formic Acid in Foods

By Fincke, Heinrich

From *Zeitschrift fuer Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstaende* (1911), 21, 1.

Language: Unavailable, Database: CAPLUS

With one exception, all proposed methods for detn. of HC_2O_2 depend on the use of oxidizing agents, whereby the amt. of HC_2O_2 is detd. either from the oxidizing agent used up or from the reaction products. Such methods may only be employed with the greatest caution in food chem. where the amt. of HC_2O_2 is usually very small. Methods depending on the reaction of HC_2O_2 with conc. H_2SO_4 must also be used with caution as HNC and lactic acid both give CO with H_2SO_4 . Of the oxidation methods that with HgCl_2 is best. Aldehydes also reduce HgCl_2 , contrary to former observations. Several older methods for detn. of HC_2O_2 are briefly reviewed. The volumetric method of Auerbach and Pl.ovrddot.uddemann (C. A., 4, 2080) was tested and found very satisfactory. The gravimetric method used was as follows: To the neutral or faintly acid soln. of HC_2O_2 add 3-5 g. AcONa and at least 15 times as much HgCl_2 as the HC_2O_2 contained in the soln. Heat in an Erlenmeyer flask on a steam bath for 2 hrs., using a reflux condenser. The HgCl_2 is added as a soln. (100 g. HgCl_2 and 30 g. NaCl per liter). Collect the HgCl on a Gooch crucible, washing with H_2O and then with EtOH and Et_2O . Dry at 100° for 3/4-1 hr. and weigh; the $\text{HgCl} \times 0.0977 = \text{HC}_2\text{O}_2$. Results are very satisfactory. The volatility of HC_2O_2 with steam was studied. Solns. should be strongly acidified with a non-volatile organic acid before distilling. To obtain about 95% of the acid from solns. containing 0.1-0.277 g. in 100 cc. it is necessary to collect about 1000 cc. distillate. To separate HC_2O_2 from aldehydes and other volatile reducing substances the vapor is run through a boiling CaCO_3 suspension which retains all the HC_2O_2 but does not affect the aldehydes or HNC. In the presence of sugar, the soln. must be sufficiently diluted before distillation so there is no caramelization and no formation of HC_2O_2 or other reducing substances. In the presence of SO_2 , this must be oxidized in alkaline soln. with H_2O_2 (4 hrs. at ordinary temp.); the HC_2O_2 is not affected. The excess of H_2O_2 is removed with freshly pptd. HgO . In case salicylic acid is present to each 50 cc. of distillate 1 g. NaCl is added and the detn. made as usual.

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778. The Preparation of Caramel Color

By Herzfeld, A.

From *Deutsche Zuckerindustrie* (1910), 35, 617-8. Language: Unavailable, Database: CAPLUS

The author has studied the question of the prep. of a caramel that is fully sol. in 80% alc., and that gives a dark color and will not become Cloudy when cooled for a long time to -8° to -10° C. Saccharan that had been prepared previously would not do as it was insoluble in alc. By heating this dry saccharan to $180-90^\circ$, a product was obtained that was partly sol. in alc. When a water soln. of invert sugar was heated to a caramelization the desired substance was prepared. So it seems that it is necessary to have water present to invert the sucrose and then raise the temp. to $180-90^\circ$ for caramelization. Such a method produced the desired color substance. Further studies showed that the organic acids formed during the heating caused variations in the color substance. So 80% invert sugar simp was prepared and heated in a glass bottle in an oil bath and NH_3 added from time to time. The temp. was quickly raised to $170-80^\circ$ and the prep. so made fully complied with the desire, and further was not bitter in taste.

~0 Citings

779. Is There Caramelization in Rivas's Test?

By Horn, D. W.

From *American Journal of Pharmacy* (1835-1936) (1910), 82, 151. Language: Unavailable, Database: CAPLUS

In a recent paper, West accounted for the appearance of yellow to brown colors on heating glucose broths with NaOH in Rivas's test for *B. coli* by stating that "the sugar is probably caramelized by the NaOH ." It seems likely that the yellow color is due to some Na glucose compd. of the nature of an alcoholate. On further heating, the major part of the glucose is transformed into lactic acid and other of the organic acids mentioned by Gand, and part of it is resinified as a result of its aldehyde group.

~0 Citings

780. Occurrence of Formaldehyde in Sugar Cane Juice and Sugar-house Products

By Yoder, P. A.; Taggart, W. G.

From [Journal of Industrial and Engineering Chemistry \(Washington, D. C.\) \(1910\), 2, 260](#). Language: Unavailable, Database: CAPLUS

This investigation was undertaken to det. whether CH_2O used for preserving sugar-cane juices and sirups was entirely eliminated by boiling or whether part remains to be injurious to consumers. It has been claimed that in boiling solns. or at least in caramelizing sugar, CH_2O is formed, but other investigators question this on account of the unreliability of the test used. In his work it was found that Richardson's modification of Hehner's method, using a soln. of dried peptone instead of the albumose used by Richardson, was very satisfactory indeed. An exhaustive series of tests on compounds related to or accompanying CH_2O showed that only glycollic acid and ether gave the CH_2O test, and that the ether when thoroughly washed ceased to give it, so that we may conclude that it was contaminated with CH_2O , and probably the glycollic acid likewise. Furfurol, which has been assigned as the cause of the supposed test for CH_2O in caramelized sugar products, did not give the test from which we may conclude that the furfurol of other investigators actually contained CH_2O , but in so small a quantity that the less delicate test used failed to show it. Our method as applied to cane juice and sugar solns. is as follows: The sugar soln., acidified with H_3PO_4 , is distilled from a bath of boiling saturated NaCl soln. with a current of steam superheated to a point where there is little or no change in the vol. in the distillation flask. To 5 cc. of a 1% peptone soln. recently dissolved and filtered add 10 cc. conc. HCl containing 1 part FeCl_3 in 5000. Mix this with a glass rod which may remain in the tube to weight it down and aid in mixing while heating. Prepare any number of other samples and a set of standards for comparison of strength from 1 : 50,000 to 1 : 2,000,000, and a blank. The test tubes are suspended in a water bath heated to such a temp. that the tubes will bring it down to 82.5° . Keep them in the bath 5 min., shaking occasionally, then set in a bath of cold water. After cooling the color intensities are compared in Nessler tubes. It was found that the blanks with our reagents gave a slight coloration very close to the standard of 1 : 5,000,000. The method is not applicable to solns. weaker than 1 : 1,000,000. HNO_3 may be substituted for FeCl_3 , using 1.6 cc. N HNO_3 to 100 cc. conc. HCl , but there is no advantage in its use, rather the reverse. A water bath temp. of 50° or even 66° will not develop the color satisfactorily. The steam was superheated by passing through a copper spiral over a small flame, the temp. being controlled by a thermometer in the current of steam 5 in. above the neck of the flask. 115° gave the most satisfactory results. Other methods of heating were tried, but none gave as good results as the above. The distillate from sugar soln. not acidified showed only traces of CH_2O . In distilling an acidified juice or sugar soln. over the direct flame the succeeding fractions increase in CH_2O as **caramelization** approaches; and the brown residue, redissolved and redistilled, yields relatively large amts. of CH_2O . These results appear to show the formation of CH_2O during **caramelization**, but it is still not certain that the product which gives the CH_2O reaction is actually CH_2O . It is not furfurol. Sugar solns. distilled with superheated steam gave distillates showing only traces of CH_2O , and successive fractions have nearly constant content. In preliminary tests where the CH_2O was added, the sugar tended to hold back part of the CH_2O . Formaldehyde added to solns. to the amt. of 1 mg. per 100 cc. is recovered in such an amt. that it is easy to distinguish products to which it was added from those containing none. In the work on raw sugars and molasses it was found that H_2SO_3 and other S compds. interfered with the reaction. Notwithstanding this fact, there was an excess of CH_2O in products made from juice to which it had been added, very small in case of first sugar, but more pronounced in the molasses. The small amt. left in the sugar may justify the conclusion that in refining this excess is eliminated, but if the molasses is used for food or table sirup is made, the permissibility of its use may be questioned. The data now at hand are not sufficient for a definite answer. A method to prevent interference of other substances should be developed; comparative tests with a sirup and molasses made by different methods should be made, and the form in which the CH_2O is retained should be ascertained.

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781. The Formation of Formaldehyde in Solutions of Cane Sugar and its Bearing on Hehner's Test for Formaldehyde in Saccharine Mixtures

By Ramsey, A. Alexander

From [Journal and Proceedings of the Royal Society of New South Wales \(1907\), 41, 172-5](#). Language: Unavailable, Database: CAPLUS

By heating a solution of 100 g. sucrose and 5 oz. of water at $100-3^\circ$ for 1/2 hour and distilling, the distillate gave the reaction for formaldehyde by Hehner's test (Analyst, 21, 95 (1896)). With half the quantity of sugar and the same quantity of water, a test for formaldehyde was obtained even though there had been no **caramelization**. With juices made of fruits, water and sugar, worked under same condition formaldehyde was obtained. Further results on this will be forthcoming by the author.

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782. Hide Powder Methods

By Westenfelder, R. D.

From [Leather & Shoes \(1908\), 25, 12-20](#). Language: English, Database: CAPLUS

Simply washing hide powder with water does not make it of uniform absorptive power. The idea of chroming hide powder, first proposed by Berthold Weiss, and later more fully developed by the Association Official Agricultural Chemists, and the American Leather Chemists' Association, at times gave uniform results, and at other times did not. The cause for this lack of agreement arises from the fact that the powder is washed with tap water of varying degrees of temporary hardness, and only within the past year has this fact been recognized. Distilled water-"a neutral substance"-should always be used, since it has been shown that alkaline hide powders do not absorb all of the tannin, and ground sole leather is almost stripped of tannin by treatment with as little as 15 drops of 10% ammonia water per gallon of water. The author sets forth "an ideal method," which has been used by him since about 1896. Neither the condition of the raw hide nor the parts of same, "shank, belly or butt," seem to influence the uniformity of results when treated by this method. Briefly stated, the method is as follows: Into a three gallon crock, put 300 g. of hide powder and add water until crock is one-half full. Now add 20 g. of bisulphite of soda and 25 cc. of 66° sulphuric acid, and stir thoroughly. Wash, by decantation, until nearly acid-free, and add solution of sulphate of aluminum, stir thoroughly and neutralize with dilute ammonia water until slightly alkaline. Wash free from sulphates and soluble hide by siphoning through inverted funnel with cotton plug in stem. During the washing the powder should frequently be stirred with fresh portions of distilled water and allowed to settle. After washing, the powder is squeezed out by hand, finely broken up, and after one hour, covered with water containing 10 drops of glacial acetic acid per liter. Here it will keep for 7 or 8 days. Before use for analysis the required amount is put into a funnel with cotton plug in stem, and washed with successive 200-300 cc. portions of distilled water until free from sulphates and soluble hide. Since it is the acid radicle in chromed powders which gives the uniform absorptive power, this power decreases with age and basicity of same; hence the failure of dry chromed powders and those squeezed below a certain moisture content. The author's method claims, at all times, to give a uniform powder, even from inferior quality of hide. Sulphate of alumina is added simply to make the powder squeeze drier, and in no way influences the absorptive power. By using powder prepared as above, no **caramelization** of non-tannin residues takes place as the acid is neutralized with ammonia. To obtain ground hide powder, only the shanks of the hides are used. These are cut off in the beam house, flesh-cleaned, and hung up until bone-dry. They are then soaked in cold water, 10 to 12 hours, cut into pieces one to two inches square, dried, chopped fine with Brecht cleaver chopper, and finally ground in an ordinary grain or bone mill. Both strictly granular, and extremely powdery hide powders, should be avoided, the best results being obtained from those which are semi-granular. Our meagre knowledge of tannins and non-tannins does not permit the statement that one is a tanning agent and the other not. "Flasiewicz has suggested that tannins should be regarded as gummides or dextrides, and the formation of reducing sugars-by the action of acids-is due to this action on gums." Fairly strong non-tannin solution, when poured into strong alcohol, gives products resembling dextrin. Due to action of excessive acidity, some tannery liquors become ropy and even jelly, which extremely colloidal nature of the non-tannins stops the tanning process, except by those tannins of a more distinctly sub-crystalline nature. The same non-tanning effect has been observed, when the colorless non-tannin filtrate, from a weak tan solution, is faintly acidified with sulphuric acid and repeatedly returned through the hide powder in the funnel. The final filtrate is no longer colorless, the acid having removed matter only feebly held by the hide. The author believes that, under normal conditions, some of the so-called non-tannins enter into combination with hide matter to form true leather substance. To what extent this takes place in practice is not definitely known. The author prepared a quantity of non-tannins from chestnut liquor, made with distilled water. This was done by completely detannizing said liquors by repeated treatments with hide powder, concentrating filtrate in vacuo, and finally drying on water bath. The resulting mass was then powdered, dissolved, and analyzed for non-tannins, "when it was found that 50% of the total matter had been absorbed by the hide." The conclusion is that the non-tannins before concentration contained tanning substances not indicated by the gelatine test. The redissolving of chromium hydroxide, precipitated by ammonia, in the presence of sugar, and some organic acids, is given as a parallel phenomenon. Non-tannins strongly influence the tanno-gelatine precipitate. A tannin solution so weak as to give only a turbidity with gelatine, gives a flocculent precipitate upon the addition of oak wood non-tannins. Also a fresh tan solution with basic chrome salts, gives at first only turbidity, a precipitate not forming for several days. Gallic acid has an action similar to that observed with oak-wood non-tannins. Instances are given where the "filter bell method" gives highly colored percolates, containing both soluble hide and tannin. Some tanning materials, upon continued extraction with boiling water, show persistent test with gelatine, but upon concentration of the liquid, these tannin-like substances precipitate, become insoluble, and inactive to gelatine. These insolubles may be considered either as anhydrides of the tannins, or of "some of the constituents of the so-called non-tannins," in the latter case, "it might be considered in the light of gallo-tannic acid, as being first anhydride of gallic acid." Or, the non-tannins may be likened to purified and dialyzed caramel which has both "soluble and insoluble modification." "The latter has its solubility restored by the action of alkalis, followed by that of acetic acid and subsequent dialysis" (Watts's Diet. Chem.). In light of these statements, hide may be considered as having the power to cause this insoluble modification, with the results that the non-tannins become fixed in its fibers to form pure leather substance. Considering the insolubles as strictly non-tannin in nature, the statement that all are anhydrides of tannins does not hold good. If this is the case, the shaking of unfiltered tan solutions with hide powder might cause an error in the non-tannin figure, since the insolubles would be more soluble in detannized solution. "The fixation of the non-tannins by the hide most probably accounts for the differences in the degree of tannage, as obtained with various tanning substances." The part which the nontannins play in the formation of leather is also indicated in the analysis of the leather itself, when it develops that the ratio of tannins to non-tannins in partially tanned leather, is as well contained as in that which is fully tanned. The degree to which this combination takes place is not determinable in the laboratory, and in practice, is influenced by liquor conditions, methods of handling, etc., or even by the nature of the non-tannins. Because of the extremely slow diffusion of colloids, the shaking or stirring in non-tannin determinations must be thoroughly done, otherwise, the dilution factor for the water in the wet hide does not give correct results, since equilibrium has not been established. The shaking or stirring should not stop the moment it ceases to react with gelatine, but should continue until the dilution is complete. This condition is not brought about by the milk shaker because the agitation is not vigorous enough to cause perfect diffusion, and the non-tannins are practically held out. The time of agitation should not be limited, as some foamy liquids, especially hemlock, require more time for complete detannization. To replace the milk shaker a centrifugal stirrer was devised, and has been used for years with excellent results. To 20 g. of squeezed hide powder, in stirring bottle, add 200 cc. of tan solution, 5 drops of glacial acetic acid, and stir 5 minutes or until foam disappears. Now add 20 g. more hide powder and proceed

to stir as above. Pour the whole magma into funnel with cotton plug in stem, let drain, gently pack hide powder in funnel, and return percolate until clear. In obstinate cases, liquor is squeezed from the hide, and filtered through asbestos in carbon filter. Acetic acid is added to the tan solution to promote more complete absorption of the tanning substances. This method is preferable to that of trying to regulate the acidity of chrome powders, since the amount added is the same in every case, and results in uniformity. Non-tannin residues are not visibly changed by its use, and its presence is especially necessary for complete detannization of bisulphited extracts and alkaline tannates. Furthermore, it accords with tannery practice. Acetic acid lessens the absorption of gallic acid, while salts have the opposite effect. The author supports the view that the affinity of hide for tanning rather than for non-tanning substances, is selective and physical, depending on the equilibrium established. Reference is made to articles by Gardner and Carter, who have shown that cotton fiber saturated in a 0.5% tannic acid solution will still absorb in a solution 0.2%, the balance being reached at 0.02% where some tannic acid goes back into solution. The absorption is greatly increased in the presence of acetic acid. The assumption is made, therefore, that in the presence of non-tannins, the tanning substances are not all absorbed by one shaking, but only by repeated percolations through hide powder. This is especially true of the very weak tan solutions where the point of balance is nearly reached. The American Leather Chemists' Association method of squeezing the non-tannin liquor from the hide is in error since those tannins which are not firmly fixed in the hide are squeezed out and react with gelatine in the non-tannin filtrate. The author finds the gelatine test to be "illusive," giving both positive and negative results. Some non-tannin solutions which previously gave no reaction, after heating and standing will give a reaction with gelatine. This may be due to the solvent power of the non-tannins, or of an excess of gelatine, or of both on the tanno-gelatine. With his method, tannins are never found in the non-tan filtrate, and are rarely ever tested for, but with hide powder four or five days old, tests are always made for soluble hide. This test is made with Merck's gallo-tannic acid, and in case of reaction, the filtrate is treated with from 5 to 10 mg. of the above, and percolated through the hide powder until clear. 90% of the gallo-tannic acid is absorbed by the hide, the other 10% being a negligible quantity. Tan solutions should be filtered before stirring with the hide powder, since in the detannized liquor, the so-called reds are more soluble than in the original liquor, and leads to an error in the non-tannin figure. The more uniform non-tannin figures by the filter bell method, on materials of the same kind and manufacture, may result from the fact that the insolubles are subjected only to the original liquor. The author uses stronger solutions for analyses than called for by the official methods of the American Leather Chemists' Association, and would use still stronger ones were it not for the difficulty in observing the clarity of the soluble solid filtrates. The following quantities per liter are used: Liquid oak, chestnut and hemlock extracts, 21.5 to 22.0 g.; dry quebracho and mangroves, 8 to 9 g.; liquid quebracho 16 to 18 g.; and other extracts in proportion to give from 0.42 to 0.46 g. of total solids, residues per 50 cc. of solution. Amount of hide powder, 40 g. wet, equivalent to 12 g. dry. Materials for extraction, except spent bark, etc., are taken in such quantities as to yield a solution of the same total solids as given above for extracts. One hundred parts of water are taken for 1 part of material, and the percolates, which are always collected outside the extraction, are concentrated in vacuo to one-half or one liter as required. Extractions from spent materials are necessarily weaker, and require from 20 to 30 g. of wet hide powder (6 to 9 g. dry) for 200 cc. of solution. For these weak solutions the Lowenthal method may be used with equal accuracy where the results are merely for factory control. In support of his belief that the absorption of non-tanning substances increases in the presence of tannin, the author cites some experiments of Dreaper and Wilson (J. Soc. Chem. Ind., 1906, 515, et. seq.), which show that the absorption of gallic acid constantly increases as the tannin content of the solution is raised. What is true of gallic acid is also claimed to be true for complex non-tannins, and the opinion is expressed that the absorption of gallic acid by the hide is permanent. The presence of acetic and hydrochloric acids greatly reduces the absorption of gallic acid.

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783. Substitute for chicory and coffee.

No Inventor data available

From [No Corporate Source data available \(1906\), FR 373106 19070502](#), Language: Unavailable, Database: CAPLUS

Process of manufacturing a substitute for chicory and coffee, consisting in heating flour or other starchy substance to **caramelization**, exhausting the product with H₂O, and pouring the liquid obtained over kiln-dried, pulverized, and winnowed beet root pulp, 400 kg. of the latter to 100 kg. flour.

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784. The Bleaching Action of Hydrosulphite on Caramel and Intermediary Coloring Matters Formed by Heating Saccharose

By Herzfeld, A.

From [Zeitschrift des Vereines der Deutschen Zucker-Industrie \(1908\), 57, 1088-97](#). Language: Unavailable, Database: CAPLUS

The different products formed by the **caramelization** of saccharose were separated by treatment with methyl and ethyl alcohol, and they were studied along with various commercial brands of caramel. They are all bleached to a certain extent by hydrosulphites, the degree of decoloration varying with the nature of the substance. Hydrosulphites bleach in alkaline and in acid solution, but the degree of alkalinity or acidity has a marked influence on their effect. Under similar conditions hydrosulphite is from 20 to 40 times as powerful as SO_2 . The decoloration is permanent in some cases, in others it is of short duration only. Highly colored products, as a rule, reassume a darker color more rapidly than light colored substances. Certain regularities or laws governing the action of hydrosulphites on caramel could not be established.

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785. The Effect of Sodium Hydrosulphite on the Coloring Matters of Sugar Beets

By Rytel, C.

From *Zapiski* (1907), 6, 254. Language: Unavailable, Database: CAPLUS

The author reports result in bleaching with sodium hydrosulphite, normal beet juice and also beet juices made alk. either with lime or ammonia. He used the Stammer colorimeter for color comparisons. The best results were obtained on juices after making alk. with lime. He reports some investigation on the bleaching of **caramelization** products of sugar.

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786. The Estimation of Starch Sirup in Sugar-Containing Products

By Herzfeld, A.

From *Zeitschrift des Vereines der Deutschen Zucker-Industrie* (1907), 2, 611-20. Language: Unavailable, Database: CAPLUS

This paper is in large part a criticism of the method of Juckenack and Pasternack (*Z. Nahr.-Genussm.*, 8, 17-19 (1904)) for estimating starch sirup in fruit juices and other sugar-containing products. This method is based upon the assumption, 1st that the proportion of dextrin and glucose in commercial starch sirups is approximately uniform and that the specific rotation of the inverted solids is fairly constant, and 2d that the solids of pure fruit sirups consist only of invert sugar and sucrose. Upon the basis of these assumptions a table is constructed giving the percentage of starch sirup (18% water content) corresponding to any given specific rotation of the solids in the product after inversion. The author has applied this method to the analysis of 8 American and 13 German starch sirups and sugars. In comparing the analytical results of the products from the two countries. the following conclusions were drawn: The lowest polarization of the American sirups was + 160.6°, the highest + 177°; with the German sirups the lowest figure was + 149.6°, the highest + 181.2°. The American sirups were all extremely clear, completely free of the finest dirt particles and of wonderful brilliancy. In the latter respect the German samples were all greatly inferior. The invert polarization in the American sirups varied between +159.2° and + 174°; in the German between + 138.4° and + 161.2°. The Brix (solids) of the American sirups varied from 79.9°-82.6° and of the German from 77.9° -82°. As a result of the use of HCl for inversion the American sirups all showed more chlorine (0.153-0.426% Cl) than the German sirups (0.0049-0.185% Cl). The American sirups contained from 0.006%-0.088% SO_2 and the German from 0.000%-0.017%. The author at first attributed the excess of SO_2 in the American sirups to the employment of dilute sulphurous acid in steeping the corn, but finally concluded that it was added for bleaching. Juckenack's method for calculation of starch sirup employs + 134.1° as the specific rotation of the solids of the latter. This figure, while in close agreement with the majority of German products, is somewhat too low for the American class of goods and the method of calculating adulteration when the latter are used gives only approximate results. With sirups or molasses containing raffinose or **caramelization** products. the method may lead to very erroneous conclusions. This is also true of certain artificial honeys (C. A., 1907, 645), with one sample of which Juckenack's table indicated 9% starch sirup when in reality none was present.

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787. Liquefaction of Starch Paste

By Boidin, A.

From *Compt. rend.* (1907), 143, 511. Language: Unavailable, Database: CAPLUS

In continuation of previous studies upon this subject the author shows that magnesium phosphate renders starch paste viscous the same as the dibasic phosphates of the alkalies; the latter, however, produce **caramelization** while the magnesium phosphate gives colorless pastes which gelatinize upon cooling when sufficiently concentrated. Tribasic calcium phosphate, on the other hand, produces a fluid paste. Liquid solutions of paste may be obtained from grain, either by converting the dibasic phosphates which are present, into calcium phosphate by heating with calcium chloride solution or by converting the same into monobasic phosphates by means of the requisite amount of mineral acid. The latter method has been employed successfully by the author in the liquefaction of raw starch for the distillery, previous to the saccharification with diastase.

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788. Falsification of coffee. [machine translation]

By de Nansouty, Max

From [Rev. intern. falsific. \(1898\)](#), 11, 37. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Greener coffee is mixed frequently with averaged coffee and flattering then with dyes, or unsingled commodity is sold for selected commodity. Finally one makes artificial coffee beans of clay, or one increases the weight badly dried coffee, by letting the same steam absorb. Burned coffee multiple becomes as indicated, falsified crude coffee uses. For the weight increase steam serves or additions of fat, eggs, sugars, which by **caramelization** burned of coffee results a very pleasing color. From fragments of burned coffee and frame stem flour one prepares artificial beans. Ground coffee is mixed with all possible substitutes, even with garbage.

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789. Still another utilization of the yeast as food. [machine translation]

No Author and Editor data available

From [Wchschr. Brauerei \(1898\)](#), 15, 162. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Following the reports concerning the procedure of Peeters and Goodfellow (see page 964) on the experiments by Siebel is reported, which to aim at, to prepare from the yeast the milk similar a food. Brewers' yeast is squeezed off, after it is waters in the usual way with or without addition of carbonic acid ammonia, well and partly dried. Then it becomes with approximately a quarter grape sugar and somewhat fine starch together-sly, whereby the before dry and solid components combine to a syrup-like mass, which has both after consistency and reputation, and in the composition with condensed milk a large similarity. The inventor Hetenzucker calls the in such a way manufactured syrup, which can be manufactured also in the form of powder or tablets. It hopes to be able to use the emulsion made with water of the preparation in place of skimmed milk multiple. In both are not dissimilar to the chemical composition, which however not is decisive. Dissolved yeast sugar, skimmed milk; Water....., 82.3%, 88.5%; Protein materials....., 6.5%, 4.1%; Sugar materials....., 8.2%, 5.3%; Fat....., 0.7%, 1.4%; Starchy components etc....., 1.5%, -; Ash., 0.8%, 0.7%. If one drains the yeast sugar at a sufficient high temperature, then a partial **caramelization** occurs, whereby a brown, aromatic product will obtain, which, with boiled, supplies boiling water a beverage, which is to stand in color, consistency and taste between coffee and chocolate, but regarding its nutritive value highly over both. The beverage is to work energizing like coffee, without having naturally its poisonous side effects.

~0 Citings

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790. The Split Products of Caramel. [machine translation]

By Stolle, F.

From [Z. Ver. Ruebenzuck.-Ind. \(1903\)](#), 1903, 1149-57. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. When the hydrolysis caramel to with 3% H₂SO₄ develop, see the following. 1. More humic bodies, (approximately 15% of the starting material), which in water, alcohol, glacial acetic acid, acetone, etc. is insoluble and with the oxidation with HNO₃ (density 1.15) oxalic acid supplies. 2. Similar hexose, those characterizes levulinic acid from water as hydrate by the calcium salt. 3. The glucose (melting point 93°), from methyl alcohol as anhydride (melting point 148°) crystallized. Spec. Rotatory ability equal that the glucose. The osazone (melting point 201.9°), purifies, circularly grouped needles, by much water one decomposes. The hexose is an aldose, supplies with the oxidation with HNO₃ (density 1.15) right tartaric acid and with Br a Pentaoyxycapronic acid, whose calcium salt shows higher turn than that of the gluconic acid and still more to be examined. It is not to be decided yet whether the hexose is more stereoisomeric identically to the glucose or their. Investigations to stocks of the reduction ability caramel to resulted in that the separated copper quantity increases with the boiling period. At one cooking period of 2 minutes the cu quantity of the existing Caramelan mixture is directly proportional. 1 Part Caramel = 0.3 parts Copper or 1 Part Copper = 3.33 parts Caramel. With a Caramelization temperature of 170 to 180° only simple cleavage of water takes place. CO₂ steps (beside acetone) only with 190° and over it up. That at 190° the procedure after the equation $C_{12}H_{22}O_{11} = C_{12}H_{18}O_9 + 2H_2O$ runs, became by cryoscopic stocks molecular weight was confirmed; found 309.3, calculated 306.18.

~0 Citings

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791. The Chemical Nature of the Overheating Products of Sugar. [machine translation]

By Stolle, F.

From [Z. Ver. Ruebenzuck.-Ind. \(1903\), 1903, 1138 to 1349](#). Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Author pursued the variations, which suffer the clarification and insulating materials when heating, by a set of investigations, with which except the reduction ability also the direct polarization, sugar from CLERGET, Ash, water and the organic sugar were considered. Author concludes from his investigations that at heating particularly at application of high temperatures large decomposition of the sugar takes place, with which except glucose and fructose also dextrine containing compounds develops, which can suffer again further decomposition. The caramelization occurring with each south is not so large against it in normal factories, as was so far accepted; there is accordingly also the losses only small resulting from formation of caramel bodies.

~0 Citings

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792. Method for the Production of Sterilized and Pasteurized Milk. [machine translation]

No Inventor data available

From [Ger. Offen. \(1903\), DE 141495 19030504](#), Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. In closed containers, (bottles), at 100° and over it milk heated up becomes immediately after open ones of the sterilizers by blowing up cold water or other cold liquids in finely distributed or in dust form on the surface of the closed milk containers, (bottles), due to developing a vacuum in the latter, obtained during the cooling in lively boiling. Consequently, no skin on the milk can develop, and the fat distribution is very even; furthermore the contact with that is decreased hot glass and caramelization of the sugar is in the back-stopped, so that taste and color remain excellent. Jumping of the bottles should be impossible despite the high temperature difference.

~0 Citings

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793. On the Procedures with the Caramelization of Malt and Beer Spices. [machine translation]

By Prior, E.

From [Angewandte Chemie \(1903\), 16, 293-97](#). Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Author has, (Bair. Brauer Journ. vo. 1, pg. 741), shown that one can convert sugar width units Darr- or Green-malt by strained steam into caramel malt and replace by it roasting in drum polishing. One caramelized, the so-called front spices by two-hours heating up with steam of 2 1/2 atm positive pressure, whereby the spices keep a pure, caramel-like taste. Experiments resulted in that the sugars, Achroodextrine, pentosan contained in the spices and nitrogen substances as well as in the caramelizing of the spice do not participate, even if they suffer decomposition lower formation of acid and furfural. The caramelizing of many had increased by a dismantle product of the strength causes lower separation of brown, in water insoluble, probably the Humin bodies or humic acid intimate bodies. The dismantle product could be probably Achroodextrin IV. An increased content to lactic acid impairs the caramelizing durch hydrolytic transformation of the Achroodextrins IV in glucose.

~0 Citings

794. On Sherry and Malaga Wine. [machine translation]

By Rocques, X.

From [Revue gen. de Chim. pure et appl. \(1903\), 5, 43-52](#). Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Author connected the results to his activity of several years with Spanish liquor wines. Andalusia has two wine centers, Jerez de la Frontera and Malaga, in which 3 wine types are manufactured, Sherry, Malaga and Madeira wines. When basis wines, which one can group as drying, sweet and color wines, serve their manufacture. The drying wines will receive in Jerez by complete anaerobic digestion of the cider. The grapes are strongly apply plaster. 812 kg of grapes, which 500 liters cider supplies, receive a dose gift from 1.14 kg gypsum. The alcohol received by fermentation amounts to 13 to 16% volumes and by spirit on 16 to 18%. Depending upon the run of fermentation, which does not let itself foresee, receives an easy, very weakly colored wine, the mentioned : Fino, a Flor or Amontillado, or a fiery, strongly colored wine: Oloroso or sherry. The wines store then in not completely filled barrels in the so-called brine-race at least 5 year long and depending upon their shrinkage with young wine are refilled. Under the influence of the plaster, the glycerin formation ostensible is impaired, so that the wines appear more strongly splattered, than they are actual. Old wines have glycerin ratio due to the alcohol evaporation a very high alcohol. Increasing of the sulfuric acid content is remarkable. The marking of the bouquet materials obtain into the alcoholic distillate, determines and changed over compound. In the liter wine were contained in mg the following. Aldehydes, Ether, Higher Alcohols, Furfurol, Sa. Oloroso, 199, 431, 192.4, 826. Amontillado, 383, 342, 195, 3, 926. On 100 ccm pure alcohol, 470 and 488 mg each of volatile materials come. The Sherry barrel is referred with a skin by Mycoderma vini, which mushroom lends easily bitter, the nut taste of the wine estimated in England. The sweet wines will receive by soundless-making of the cider with alcohol. From grape sorts, Pedro Ximenes and Moscatel are in the main use. For the increase of the sugar content one lets the grapes dry multiple 5 to 20 days in the sun. In the examined sweet wines outweighed regelmässig the fructose. To the production of the color wines the ciders are partly caramelized. The cider thickened up to the syrup obtains to consistency and becomes arrope. Such a already several years old, intact remained cider 43% liquid and 57% firm of parts, a density of 1.376, contained 50.03 g glucose, 42.44 g fructose in 100 ccm. First outweighed liquid in the firm, the latter in the portion. By **caramelization**, the normal levorotation up to the clockwise rotation changed, which decreases reduction abilities, strongly the total excerpt however hardly changes lower increase of the non-sugar material. Arrope becomes now again on 2/5 of its volume in-cooked, if the desired degree of the caramel is reached, water and fresh cider or by alcohol mutely made cider into the heat container done, and the whole ferment calmly. The color wines contain 4.5 to 6.8 g non-sugar in 100 ccm. By blending, discussed drying, sweet and color wines manufactures now the commercial wines. Sherry is nearly unmodified drying wine. Spanish Madeira is a dilution of all three master wines, Malaga of the sweet and color wines. No. of 1 to 8 drying wines, 1882 analyzed, 9 to 12 brine racing wines are 15 to 20 years old, 13 to 15 very old brine racing wines. No. 16 to 26 are analyzed, old from them 16 to 19 drying wines, 20 to 23 brine racing wines 15 to 20 years 1897. No. 27 to 31 are sweet wines, 32 to 34 color wines, 35 to 38 commercial wines. From the 18 analyzes of the commercial wines connected in the original those are extremely lying connected in the table, (see original document for table).

~0 Citings**795. Over the liquefaction of the starch-flour and the starch of the grain granules. [machine translation]**

By Boidin, A.

From [Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences \(1906\), 143, 511-12](#). Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. In reference to the work of FERNBACH and WOLFF (page 229 and 1046) and its own work over the influence of the phosphates on the viscosity of the starch bodies (Bull. de l'Assoc. des Chim. de Sucre et Dist. 22. 112. 321; C. 1904. II. 1192. 1751) communicate further investigations to author over the object. Magnesium phosphate such as Dipotassium and disodium phosphate liquefied the starch; while the latter however a **caramelization** of the solutions give colorless pastes, which solidify with the cooling to magnesium phosphate in the heat. Tricalcium phosphate does not supply liquid starch, however develops when heating up cleaned starch with the presence of calcium sulfate an easy flowing liquid, which consists of dextrine and sugars. One heats however the cleaned starch with Dipotassium phosphate and distilled water then receives a viscous solution, which does not contain a trace of reducing sugar. If one converts the di-alkali phosphates of the grain granules by addition from chlorine calcium into calcium phosphate, then the starch won after heating these grains was liquid. If one adds one for the transformation of the Dipotassium phosphate in monopotassium phosphate necessary quantity of acid too, then one receives a clear and mobile solution. The won facts find their use in the industry for years. The starch substances with the necessary quantity of acid, in order to transfer the polybasic alkali phosphates into the monobasic, heated and in such a way the obtained liquid. Starch by the addition of a small quantity of saccharified mushroom sugared.

~0 Citings

796. On the presence of formaldehyde in the products of the caramelization. Explanation from it is coming from facts. [machine translation]

By Trillat, A.

From *Bull. Soc. Chim. Paris* (1906), 35(3), 681-85. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. C. 1906. I. 1193.

~0 Citings

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797. Over the presence of formaldehyde in the caramelized substances. [machine translation]

By Trillat, A.

From *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences* (1906), 142, 454-56. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. Formaldehyde is not only in the gaseous products with imperfect burning of many substances, in particular with that of the sugar (see page 917. 951. 978), but is also in the residue, i. e. enclosed in the caramel. The quantity of the formaldehyde increases degrees of the caramelization with that; thus became with the caramelized temperature of 125° only traces, with 150° 0.09 g, with 150-180° 0.135 g, with 180-200° 0.27 g formaldehyde on 100 g residue found, during the escaped formaldehyde at the mentioned temperatures and traces, amounted to 0.3 g, 1.1 g, 2.2 g to 100 g caramel. The caramel of the trade contains often free formaldehyde in very intermittent quantities. Thus contained three from the examined five sample 30 mg, 45 mg and 325 mg to 100 g caramel. Caramel possesses antiseptic characteristics. *Bact. coli comm.* became in 10% caramel solution killed after 24 hours. The lactic acid fermentation is slowed down by addition by caramel (from 2%). The caramelized sugar loses a part of its fermentative. The formaldehyde quantities introduced in the food with caramel are to be neglected uncommonly small and probably in the majority of the cases.

~0 Citings

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798. Observations Over the Role of the Formaldehyde With the Caramelization of the Sugar. [machine translation]

By Trillat, A.

From *Bull. de l'Assoc. de Chim. de Sucr. et Dist.* (1905), 23, 652-55. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. In caramel samples, which were manufactured on more or less high temperature by heating with sugar, in some samples of the trade and also in on 125°, sugar heated up, and presence of formaldehyde could be always proven. Its present would allow the reductions - and fermenting ability of these products affect. The formation of CH₂O possesses also during the destruction of sugar by contact with overheated heating surfaces, practical meaning and explanation of the partial changes of the reduction ability in the heated masses (see PELLET, *Bull. de l'Assoc. de Chim. de Sucr. et Dist.* vo. 22, pg. 758; C. vo. 1905, I. pg. 1441). The presence of CH₂O was also the observation of RIFFARD (*Bull. de l'Assoc. de Chim. de Sucr. et Dist.* vo. 22, pg. 888), which explain that burning of sugar cane is not fermentable. Beside free CH₂O, another ostensible part of the formed CH₂O and polymerizes itself forms products, which are the methylenitan or the analogously formed; possibly the caramel is formed simply by cooperating these polymerization products. For this, the further observation of the authors speaks, that formaldehyde solutions supply a brown, uncrystallizeable substance at higher temperature, presence of small quantities of alkali or metal oxides, which possesses at least extrinsic of all characteristics, also smell and taste of the caramel are prepared from sugar on 100 parts. Alkali are available on 4 to 5 parts CH₂O, then it carries out the transformation in few minutes.

~0 Citings

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799. Contribution for the study of heating the grain granules. [machine translation]

By Boidin

From *Bull. de l'Assoc. des Chim. de Sucr. et Dist.* (1905), 23, 133-35. Language: Unavailable, Database: CAPLUS

[Machine Translation of Descriptors]. After MAERKER and MORGEN grain suffer with 1/2-hour. Heat up under 3 at. to 3% going decomposition, to whose restriction the application of tartaric acid or mineral acid is recommended. Author found now that the corn grain holds back due to content of K_2HPO_4 like an alkali. With pure starch, which under pressure heats up, caramel K_2HPO_4 produces, just as a trace of acid **caramelization**. KH_2PO_4 does not work against it caramel. Just like K_2HPO_4 the equivalent quantity NaOH works. The starch paste received with K_2HPO_4 is after 3-hours Heat up under 4 at high-viscosity, iodine coagulates and does not reduce FEHLING solution not, during to water and KH_2PO_4 a mobile at dextrin rich and to 15% glucose containing liquid supplied with the cool one, blues. The glycogenesis is not the result of the presence of a small quantity of acid, as SOXHLET assumes, but seems rather by the formation by acid during heating to be caused. With washed corn starch a bright, liquid, was received sugar-rich liquid the unwashed control sample became brown and solidified with the cool one. By application from alkaline-earth salts, those according to the formula: $4Na_2HPO_4 + 4CaCl_2 = 8NaCl + CaH_4 + (PO_4)_2Ca_3(PO_4)_2$ influence, left themselves the development the K_2HPO_4 eliminate, and it resulted with corn a little colored, perfectly clear and liquid mash. Whether still different compounds affect a heating of the grain granules unfavorable, is to be determined by further investigations.

~0 Citings

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800. IMPROVEMENT IN SUGAR MANUFACTURES

By Aschenbrenner, Herman M.

From [U.S. \(1873\)](#), [US 146040 A 18731230](#), Language: English, Database: CAPLUS

To all whom it may concern: Be it known that I, HERMAN M. ASCHENBRENNER, of Havana, Cuba, have invented a new and useful Improvement in Sugar-Making, of which the following is a specification: The object of the invention is to produce from sugar-cane, beet-root, and the like, with the least possible loss of saccharine matter, expenditure of labor and money, and in the shortest possible time, the largest amount of dry, pure, and naturally white sugar, without any molasses whatever, and in any marketable shape desired, by a new method in which it is sought to avoid the manifold mistakes under which the present method of sugar-making labors, the most prominent of which are the following: Large waste of saccharine matter in the extraction of cane-juice, formation of gases produced by boiling of the juice, and most injurious to the quality of the sugar; loss by **caramelization**; loss by formation of molasses, production of comparatively inferior sugar, notwithstanding the costliest apparatus employed, large waste of fuel, water, labor, time, and money. The following is a description of the said method or process and the apparatus used: Figure 1 is a plan view of the apparatus. Fig. 2 is a longitudinal sectional elevation. Fig. 3 is a longitudinal sectional elevation of Fig. 1. Fig. 4 is an enlarged view of a portion of the apparatus as represented in Fig. 2, showing the details.

~0 Citings

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801. Comparison of the standard methods for the estimation of starch

By Wiley, H. W.; Krug, W. H.

From [Journal of the American Chemical Society \(1898\)](#), 20(4), 253-66. Language: English, Database: CAPLUS, DOI:10.1021/ja02066a002

Several different methods for the determination of starch have been examined. All the described methods for determining the percentage of starch by polarization, whether with the soluble starch or with dextrose made therefrom, are liable to grave errors and none of them can be relied upon to give accurate results. The methods depending upon hydrolysis in an atmosphere of steam under pressure are obnoxious to the danger of **caramelization**. This seems to be entirely prevented by the addition of a very small quantity of an organic acid. The direct weighing of the starch, according to the method of Lindet, after solution of the protein by means of pepsin, has many advantages for practical work, especially in starch factories. Small particles of other matters, however, of no greater size than the starch grains themselves, pass through the bolting-cloths and are reckoned as starch in the final weighings. This error is partly compensated for by a portion of the starch remaining attached to the filter and the final result by the Lindet method is in some cases approximately correct. The combination of the Lindet method, in so far as the solution of the protein is concerned, with the diastase method has given most encouraging results and it is probable that a satisfactory method of starch estimation can be worked out in this line. The diastase method without pressure gives satisfactory results when the diastase is freshly prepared and used in proper quantities and at an appropriate temperature. The diastase exerts only a small solvent action on the pentosans and the final hydrolytic products obtained are not contaminated with any appreciable amounts of pentose sugars.

~0 Citings

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802. Pyrolytic carbon-coated stainless steel felt as a high-performance anode for bioelectrochemical systems

By Guo Kun; Hidalgo Diana; Tommasi Tonia; Rabaey Korneel

From [Bioresource technology \(2016\)](#), 211664-668, Language: English, Database: MEDLINE

Scale up of bioelectrochemical systems (BESs) requires highly conductive, biocompatible and stable electrodes. Here we present pyrolytic carbon-coated stainless steel felt (C-SS felt) as a high-performance and scalable anode. The electrode is created by generating a carbon layer on stainless steel felt (SS felt) via a multi-step deposition process involving α -D-glucose impregnation, **caramelization**, and pyrolysis. Physicochemical characterizations of the surface elucidate that a thin ($20\pm 5\mu\text{m}$) and homogenous layer of polycrystalline graphitic carbon was obtained on SS felt surface after modification. The carbon coating significantly increases the biocompatibility, enabling robust electroactive biofilm formation. The C-SS felt electrodes reach current densities (j_{max}) of $3.65\pm 0.14\text{mA/cm}^2$ within 7 days of operation, which is 11 times higher than plain SS felt electrodes ($0.30\pm 0.04\text{mA/cm}^2$). The excellent biocompatibility, high specific surface area, high conductivity, good mechanical strength, and low cost make C-SS felt a promising electrode for BESs.

~0 Citings

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803. Iron (Fe(2+))-catalyzed glucosamine browning at 50°C: identification and quantification of major flavor compounds for antibacterial activity

By Hrynets Yuliya; Bhattacharjee Abhishek; Ndagijimana Maurice; Hincapie Martinez Daylin Johana; Betti Mirko

From [Journal of agricultural and food chemistry \(2016\)](#), , Language: English, Database: MEDLINE

Glucosamine **caramelization** at 50°C with (GlcN/Fe(2+)) or without iron (GlcN) was studied over time from 0 to 48 h. Generation of reactive oxygen species (ROS), H_2O_2 and $(1)\text{O}_2$, along with α -dicarbonyls, fructosazine and deoxyfructosazine were evaluated. Singlet oxygen generation increased over time and was greater in GlcN/Fe(2+) caramel solution. The presence of iron significantly increased the concentration of α -dicarbonyls at an early incubation time (3 h). Fructosazine and deoxyfructosazine were the major degradation products at 48 h comprising together up to 37 and 49% in GlcN and GlcN/Fe(2+), respectively. GlcN/Fe(2+) (48 h) exhibited a MIC₅₀ against highly heat-resistant *Escherichia coli* AW 1.7, at pH 5, but not at pH 7. Despite several antimicrobial compounds being produced during **caramelization**, GlcN/Fe(2+) created a synergistic environment for the fructosazine-organic acids to confer their antimicrobial activity. GlcN caramel solutions have the potential to serve as both flavoring compounds and antimicrobial agents in formulated food systems.

~0 Citings

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804. The effect of spray drying on sucrose-glycine caramel powder preparation

By Huang Kai; Zhang Ping-Jun; Hu Biao; Yu Shu-Juan; Huang Kai; Zhang Ping-Jun

From [Journal of the science of food and agriculture \(2016\)](#), 96(7), 2319-2327, Language: English, Database: MEDLINE

BACKGROUND: Caramel is used as food colorant in many parts of the world. However, there have been no studies investigating the effects of spray drying on sucrose and glycine solutions. In this study, model sucrose and glycine solutions at different pH levels (pH 4, 3, 2 and 1) were treated with different inlet air temperatures (160, 180, 200, 220 and 240 °C) for durations of 50 s in the spray drying process. RESULTS: With increasing inlet temperatures and decreasing pH, the morphology of the caramel agglomerates tended to be more scattered; however, the solubility of the caramel decreased. With increasing inlet temperature, the glycine and sucrose contents decreased but the fructose and glucose contents increased. CONCLUSION: The content of the intermediate products, browning intensity and amount of 5-hydroxymethyl-2-furaldehyde (HMF) increased with increasing inlet temperature and decreasing pH. Therefore, the amount of sucrose degradation and the change in pH can be used to evaluate caramel properties in the spray drying process. © 2015 Society of Chemical Industry.

~0 Citings

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805. Studies on the Formation of Maillard and **Caramelization** Products from Glucosamine Incubated at 37 °C

By Hrynets Yuliya; Ndagijimana Maurice; Betti Mirko

From [Journal of agricultural and food chemistry \(2015\)](#), 63(27), 6249-61, Language: English, Database: MEDLINE

This experiment compared the in vitro degradation of glucosamine (GlcN), N-acetylglucosamine, and glucose in the presence of NH₃ incubated at 37 °C in phosphate buffer from 0.5 to 12 days. The reactions were monitored with UV-vis absorption and fluorescence emission spectroscopies, and the main products of degradation, quinoxaline derivatives of α -dicarbonyl compounds and condensation products, were determined using UHPLC-UV and Orbitrap mass spectrometry. GlcN produced two major dicarbonyl compounds, glucosone and 3-deoxyglucosone, ranging from 709 to 3245 mg/kg GlcN and from 272 to 4535 mg/kg GlcN, respectively. 3,4-Dideoxyglucosone-3-ene, glyoxal, hydroxypyruvaldehyde, methylglyoxal, and diacetyl were also detected in lower amounts compared to glucosone and 3-deoxyglucosone. Several pyrazine condensation products resulting from the reaction between dicarbonyls and GlcN were also identified. This study determined that GlcN is a significantly unstable molecule producing a high level of degradation products at 37 °C.

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806. The Maillard reaction of a shrimp by-product protein hydrolysate: chemical changes and inhibiting effects of reactive oxygen species in human HepG2 cells

By Zha Fengchao; Wei Binbin; Chen Shengjun; Dong Shiyuan; Zeng Mingyong; Liu Zunying
From *Food & function* (2015), 6(6), 1919-27, Language: English, Database: MEDLINE

Recently, much attention has been given to improving the antioxidant activity of protein hydrolysates via the Maillard reaction, but little is known about the cellular antioxidant activity of Maillard reaction products (MRPs) from protein hydrolysates. We first investigated chemical characterization and the cellular antioxidant activity of MRPs in a shrimp (*Litopenaeus vannamei*) by-product protein hydrolysate (SBH)-glucose system at 110 °C for up to 10 h of heating. Solutions of SBH and glucose were also heated alone as controls. The Maillard reaction greatly resulted in the increase of hydroxymethylfurfural (HMF) and browning intensity, high molecular weight fraction, and reduction of the total amino acid in SBH with the heating time, which correlated well with the free radical scavenging activity of MRPs. MRPs had stronger inhibiting effects on oxidative stress of human HepG2 cells than the original SBH, and its cellular antioxidant activity strongly correlated with free radical scavenging activity, but less affected by the browning intensity and HMF level. The **caramelization** of glucose partially affected the HMF level and free radical scavenging activity of MRPs, but it was not related to the cellular antioxidant activity. The cellular antioxidant activity of MRPs for 5 h of heating time appeared to reach a maximum level, which was mainly due to carbonyl ammonia condensation reaction. In conclusion, the Maillard reaction is a potential method to increase the cellular antioxidant activity of a shrimp by-product protein hydrolysate, but the higher HMF levels and the lower amino acid content in MRPs should also be considered.

~0 Citings

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807. Low-surface-area hard carbon anode for na-ion batteries via graphene oxide as a dehydration agent

By Luo Wei; Bommier Clement; Jian Zelang; Li Xin; Carter Rich; Vail Sean; Lu Yuhao; Lee Jong-Jan; Ji Xiulei
From *ACS applied materials & interfaces* (2015), 7(4), 2626-31, Language: English, Database: MEDLINE

Na-ion batteries are emerging as one of the most promising energy storage technologies, particularly for grid-level applications. Among anode candidate materials, hard carbon is very attractive due to its high capacity and low cost. However, hard carbon anodes often suffer a low first-cycle Coulombic efficiency and fast capacity fading. In this study, we discover that doping graphene oxide into sucrose, the precursor for hard carbon, can effectively reduce the specific surface area of hard carbon to as low as 5.4 m²/g. We further reveal that such doping can effectively prevent foaming during **caramelization** of sucrose and extend the pyrolysis burnoff of sucrose caramel over a wider temperature range. The obtained low-surface-area hard carbon greatly improves the first-cycle Coulombic efficiency from 74% to 83% and delivers a very stable cyclic life with 95% of capacity retention after 200 cycles.

~0 Citings

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808. Separation and determination of 4-methylimidazole, 2-methylimidazole and 5-hydroxymethylfurfural in beverages by amino trap column coupled with pulsed amperometric detection

By Xu Xian-Bing; Liu Ding-Bo; Yu Pei; Zhao Zhen-Gang; Yu Shu-Juan
From *Food chemistry* (2015), 169224-9, Language: English, Database: MEDLINE

A method for simultaneous determination of 4-methylimidazole (4-Mel), 2-methylimidazole (2-Mel) and 5-hydroxymethylfurfural (HMF) in beverages was developed using solid-phase extraction (SPE) and amino trap column coupled with pulsed amperometric detection (AMTC-PAD). A single amino trap column (P/N: 046122) was first applied to separate the targeted analytes in samples after SPE pretreatment. This method demonstrated low limit of quantification (0.030mg/L for methylimidazoles and 0.300mg/L for HMF) and excellent linearity with correlation of determination ($R(2)=0.999$ for 2-Mel, 0.997 for 4-Mel and 0.998 for HMF). Nearly no 2-Mel was found in all soft drinks. However, 4-Mel could be detected in cola drinks and soft drinks containing caramel colour (ranging from 0.13 to 0.34mg/L), whereas HMF were only found in cola drinks (ranging from 1.07 to 4.47mg/L). Thus, AMTC-PAD technique would be a valid and inexpensive alternative to analysis of 4-Mel, 2-Mel and HMF.

~0 Citings

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809. Effect of ascorbic acid on the properties of ammonia caramel colorant additives and acrylamide formation

By Chen Hongxing; Gu Zhengbiao

From *Journal of food science* (2014), 79(9), C1678-82, Language: English, Database: MEDLINE

Ammonia caramels are among the most widely used colorant additives in the food industry. They are commonly prepared through the Maillard reaction and **caramelization** of mixtures of reducing sugars with ammonia or ammonium salts. Antioxidants are known to inhibit acrylamide formation during the Maillard reaction, and they may affect the properties of the ammonia caramel products. Thus, the objective of this study was to investigate the effect of the antioxidant ascorbic acid on the properties of ammonia caramel. A mixture of glucose and ammonia was allowed to react at 120 °C for 60 min in the presence of ascorbic acid at final concentrations of 0 to 0.08 M. The ammonia caramels obtained from these reactions were all positively charged. As the concentration of ascorbic acid increased, the color intensity of the ammonia caramel showed a decreasing trend, while the intensity of the fluorescence and total amount of pyrazines in the volatiles showed a tendency to increase. The addition of ascorbic acid did not result in obvious changes in the UV-visible spectra of the ammonia caramels and the types of pyrazines in the volatiles were also unchanged. It is noteworthy that the addition of 0.02 to 0.08 M ascorbic acid did reduce the formation of the by-product acrylamide, a harmful substance in food. When the concentration of ascorbic acid added reached 0.04 M, the content of acrylamide in the ammonia caramel was 20.53 µg/L, which was approximately 44% lower than that without ascorbic acid. As a result, ascorbic acid can be considered to improve the quality and safety of ammonia caramels.

~0 Citings

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810. An overlooked effect of glycine betaine on fermentation: prevents **caramelization** and increases the L-lysine production

By Xu Jianzhong; Xia Xiuhua; Zhang Junlan; Guo Yanfeng; Zhang Weiguo

From *Journal of microbiology and biotechnology* (2014), 24(10), 1368-76, Language: English, Database: MEDLINE

This article focuses on the effects of glycine betaine on preventing **caramelization**, and increasing DCW and L-lysine production. The additional glycine betaine not only decreased the browning intensity (decreased 4 times), and the concentrations of 5-hydroxymethylfurfural (decreased 7.8 times) and furfural (decreased 12 times), but also increased the availability of glucose (increased 17.5%) for L-lysine production. The DCW and L-lysine production were increased by adding no more than 20 mM glycine betaine, whereas the DCW and L-lysine production were decreased with the reduction of pH values, although pH had a better response to prevent **caramelization** than did glycine betaine. For L-lysine production, the highest increase (40%) was observed on the media with 20 mM glycine betaine. The crucial enzymes in glycolysis and L-lysine biosynthesis pathway were investigated. The results indicated that additional glycine betaine increases the activity of enzymes in glycolysis, in contrast to the effect of pH. All the results indicated that glycine betaine can be used to prevent **caramelization** and increase the L-lysine production. By applying this strategy, glucose would not have to be separated from the culture media during autoclaving so that factories can save production costs and shorten the fermentation period.

~0 Citings

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811. Effect of almond processing on levels and distribution of aflatoxins in finished products and byproducts

By Zivoli Rosanna; Gambacorta Lucia; Perrone Giancarlo; Solfrizzo Michele

From *Journal of agricultural and food chemistry* (2014), 62(24), 5707-15, Language: English, Database: MEDLINE

The fate of aflatoxins during processing of contaminated almonds into nougat, pastries, and almond syrup was evaluated by testing the effect of each processing step (blanching, peeling, roasting, **caramelization**, cooking, and water infusion) on the distribution and levels of aflatoxins. Blanching and peeling did not reduce total aflatoxins that were distributed between peeled almonds (90-93%) and skins (7-10%). Roasting of peeled almonds reduced up to 50% of aflatoxins. Up to 70% reduction of aflatoxins was observed during preparation and cooking of almond nougat in caramelized sugar. Aflatoxins were substantially stable during preparation and cooking of almond pastries. The whole process of almond syrup preparation produced a marked increase of total aflatoxins (up to 270%) that were distributed between syrup (18-25%) and spent almonds (75-82%). The increase of total aflatoxins was probably due to the activation of almond enzymes during the infusion step that released free aflatoxins from masked aflatoxins.

~1 Citing

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812. Kilogram-scale production of SnO₂ yolk-shell powders by a spray-drying process using dextrin as carbon source and drying additive

By Choi Seung Ho; Kang Yun Chan

From *Chemistry (Weinheim an der Bergstrasse, Germany)* (2014), 20(19), 5835-9, Language: English, Database: MEDLINE

A simple and general method for the large-scale production of yolk-shell powders with various compositions by a spray-drying process is reported. Metal salt/dextrin composite powders with a spherical and dense structure were obtained by spray drying and transformed into yolk-shell powders by simple combustion in air. Dextrin plays a key role in the preparation of precursor powders for fabricating yolk-shell powders by spray drying. Droplets containing metal salts and dextrin show good drying characteristics even in a severe environment of high humidity. Sucrose, glucose, and polyvinylpyrrolidone are widely used as carbon sources in the preparation of metal oxide/carbon composite powders; however, they are not appropriate for large-scale spray-drying processes because of their **caramelization** properties and adherence to the surface of the spray dryer. SnO₂ yolk-shell powders were studied as the first target material in the spray-drying process. Combustion of tin oxalate/dextrin composite powders at 600 °C in air produced single-shelled SnO₂ yolk-shell powders with the configuration SnO₂ @void@SnO₂. The SnO₂ yolk-shell powders prepared by the simple spray-drying process showed superior electrochemical properties, even at high current densities. The discharge capacities of the SnO₂ yolk-shell powders at a current density of 2000 mA g⁻¹ were 645 and 570 mA h g⁻¹ for the second and 100th cycles, respectively; the corresponding capacity retention measured for the second cycle was 88 %.

~0 Citings

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813. Sensory characterization of doda burfi (Indian milk cake) using Principal Component Analysis

By Chawla Rekha; Patil Girdhari Ramdas; Singh Ashish Kumar

From *Journal of food science and technology* (2014), 51(3), 558-64, Language: English, Database: MEDLINE

Traditional sweetmeats of various countries hold a great and promising scope in their improvement and in order to tap the potential of the same, several companies and co-operative federations have started their organized production. Doda burfi, a heat desiccated and popular sweetmeat of northern India, is one of the regional specific, unfamiliarized products of India. The typical sweetmeat is characterized by caramelized and nutty flavour and granular texture. The purpose of this study was to determine the close relationship among various sensory attributes of the product collected from renowned manufacturers located in four different cities and to characterize an overall acceptable product. Individuals from academia participated in a round table discussion to generate descriptive terms related to colour and appearance, flavour and texture. Prior to sensory evaluation, sensory panel was trained and briefed about the terminology used to judge the product involving a descriptive intensity scale of 100 points for describing major sensory attributes. Results were analyzed using ANOVA and principal component analysis. Correlation table indicated a good degree of positive association between the attributes such as glossy appearance, dark colour, caramelized and nutty flavour and cohesive and chewy texture with the overall acceptability of the product.

~0 Citings

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814. Identification and characterization of an archaeal kojibiose catabolic pathway in the hyperthermophilic *Pyrococcus* sp. strain ST04

By Jung Jong-Hyun; Seo Dong-Ho; Holden James F; Park Cheon-Seok
From [Journal of bacteriology](#) (2014), 196(5), 1122-31, Language: English, Database: MEDLINE

A unique gene cluster responsible for kojibiose utilization was identified in the genome of *Pyrococcus* sp. strain ST04. The proteins it encodes hydrolyze kojibiose, a disaccharide product of glucose **caramelization**, and form glucose-6-phosphate (G6P) in two steps. Heterologous expression of the kojibiose-related enzymes in *Escherichia coli* revealed that two genes, Py04_1502 and Py04_1503, encode kojibiose phosphorylase (designated PsKP, for *Pyrococcus* sp. strain ST04 kojibiose phosphorylase) and β -phosphoglucomutase (PsPGM), respectively. Enzymatic assays show that PsKP hydrolyzes kojibiose to glucose and β -glucose-1-phosphate (β -G1P). The K_m values for kojibiose and phosphate were determined to be 2.53 ± 0.21 mM and 1.34 ± 0.04 mM, respectively. PsPGM then converts β -G1P into G6P in the presence of 6 mM MgCl₂. Conversion activity from β -G1P to G6P was 46.81 ± 3.66 U/mg, and reverse conversion activity from G6P to β -G1P was 3.51 ± 0.13 U/mg. The proteins are highly thermostable, with optimal temperatures of 90°C for PsKP and 95°C for PsPGM. These results indicate that *Pyrococcus* sp. strain ST04 converts kojibiose into G6P, a substrate of the glycolytic pathway. This is the first report of a disaccharide utilization pathway via phosphorolysis in hyperthermophilic archaea.

~0 Citings

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815. Hydroxymethylfurfural: a possible emergent cause of honey bee mortality?

By Zirbes Lara; Nguyen Bach Kim; de Graaf Dirk C; De Meulenaer Bruno; Reybroeck Wim; Haubruge Eric; Saegerman Claude
From [Journal of agricultural and food chemistry](#) (2013), 61(49), 11865-70, Language: English, Database: MEDLINE

Hydroxymethylfurfural (HMF), a common product of hexose degradation occurring during the Maillard reaction and **caramelization**, has been found toxic for rats and mice. It could cause a potential health risk for humans due to its presence in many foods, sometimes exceeding 1 g/kg (in certain dried fruits and caramel products), although the latter still is controversial. HMF can also be consumed by honey bees through bad production batches of sugar syrups that are offered as winter feeding. In Belgium, abnormal losses of honey bee colonies were observed in colonies that were fed with syrup of inverted beet sugar containing high concentrations of HMF (up to 475 mg/kg). These losses suggest that HMF could be implicated in bee mortality, a topic that so far has received only little attention. This paper reviews the current knowledge of the presence of HMF in honey bee environment and possible consequences on bee mortality. Some lines of inquiry for further toxicological analysis are likewise proposed.

~2 Citings

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816. Impacts of selected dietary polyphenols on **caramelization** in model systems

By Zhang Xinchun; Chen Feng; Wang Mingfu
From [Food chemistry](#) (2013), 141(4), 3451-8, Language: English, Database: MEDLINE

This study investigated the impacts of six dietary polyphenols (phloretin, naringenin, quercetin, epicatechin, chlorogenic acid and rosmarinic acid) on fructose **caramelization** in thermal model systems at either neutral or alkaline pH. These polyphenols were found to increase the browning intensity and antioxidant capacity of caramel. The chemical reactions in the system of sugar and polyphenol, which include formation of polyphenol-sugar adducts, were found to be partially responsible for the formation of brown pigments and heat-induced antioxidants based on instrumental analysis. In addition, rosmarinic acid was demonstrated to significantly inhibit the formation of 5-hydroxymethylfurfural (HMF). Thus this research added to the efforts of controlling **caramelization** by dietary polyphenols under thermal condition, and provided some evidence to propose dietary polyphenols as functional ingredients to modify the caramel colour and bioactivity as well as to lower the amount of heat-induced contaminants such as 5-hydroxymethylfurfural (HMF).

~0 Citings

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817. Studies on the formation of methylglyoxal from dihydroxyacetone in Manuka (*Leptospermum scoparium*) honey

By Atrott Julia; Haberlau Steffi; Henle Thomas
From [Carbohydrate research](#) (2012), 3617-11, Language: English, Database: MEDLINE

Dihydroxyacetone (DHA) and methylglyoxal (MGO) are unique carbohydrate metabolites of manuka honey. A method for the reliable quantification of DHA in honey samples was established, based on derivatization with o-phenylenediamine (OPD) and subsequent RP-HPLC with UV detection. The previously unknown reaction product of DHA and OPD was identified as 2-hydroxymethylquinoxaline by spectroscopic means. DHA was exclusively determined in 6 fresh manuka honeys originating directly from the beehive as well as 18 commercial manuka honey samples, ranging from 600 to 2700 mg/kg and 130 to 1600 mg/kg, respectively. The corresponding MGO contents varied from 50 to 250 mg/kg in fresh and 70 to 700 mg/kg in commercial manuka honey samples. A good linear correlation between DHA and MGO values in commercial manuka honeys was observed, resulting in a mean ratio of DHA to MGO of 2:1. In contrast to this, the DHA-to-MGO relation was much higher in fresh manuka honeys but approximated to a ratio of 2:1 while honey ripening. Heating experiments revealed that MGO formation based on thermal treatment as a consequence, for example, of **caramelization** in honey does not occur. DHA and MGO can serve as suitable unique quality parameter for manuka honey.

~2 Citings

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818. Characterization of the polymerization of furfuryl alcohol during roasting of coffee

By Swasti Yuliana Reni; Murkovic Michael

From *Food & function* (2012), 3(9), 965-9, Language: English, Database: MEDLINE

The polymerization of furfuryl alcohol contributes to the formation of the brown colour in heated foods, in addition to the Maillard and **caramelization** reactions. During the heating of food, furfuryl alcohol is formed via the degradation of quinic acid or 1,2-enediols. Furfuryl alcohol is a mutagenic compound. In acidic conditions it is able to polymerize and form aliphatic polymers that show a brown colour. Herein we show that furfuryl alcohol polymerizes in a model system by incubating it in 1 M HCl at room temperature. Some of the reaction products are dimers, trimers, tetramers, and pentamers with methylene linkages. The degree of polymerization and the amount of those furfuryl alcohol oligomers increased with increasing reaction time. The results of this model system were used to characterize the polymerization of furfuryl alcohol which is produced during roasting of coffee. The coffee was roasted at 210 °C for 2, 3, 4, 5, and 6 min with a home coffee roaster. Furfuryl alcohol and its dimer were found in roasted coffee after 2 and 3 min of roasting respectively, reaching a maximum amount after 4 min. Perhaps due to further reactions, the dimeric furfuryl alcohol concentration starts to decrease after 4 min. We propose that the polymers of furfuryl alcohol contribute to the brown colour of roasted foods.

~0 Citings

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819. 1,2-dicarbonyl compounds in commonly consumed foods

By Degen Julia; Hellwig Michael; Henle Thomas

From *Journal of agricultural and food chemistry* (2012), 60(28), 7071-9, Language: English, Database: MEDLINE

1,2-Dicarbonyl compounds, formed from carbohydrates during thermal processing in the course of **caramelization** and Maillard reactions, are intensively discussed as precursors for advanced glycation endproducts in foods and in vivo. To obtain information about the uptake of individual compounds with commonly consumed foods, a comprehensive analysis of the content of 3-deoxyglucosone (3-DG), 3-deoxygalactosone (3-DGal), and methylglyoxal (MGO) together with 5-hydroxymethylfurfural (HMF) in 173 food items like bakery products, pasta, nonalcoholic and alcoholic beverages, sweet spreads, and condiments was performed. Following suitable cleanup procedures, 1,2-dicarbonyl compounds were quantitated after derivatization with o-phenylenediamine via RP-HPLC with UV detection. 3-DG proved to be the predominant 1,2-dicarbonyl compound with concentrations up to 410 mg/L in fruit juices, 2622 mg/L in balsamic vinegars, and 385 mg/kg in cookies, thus exceeding the corresponding concentrations of HMF. 3-DGal was found to be of relevance in many foods even in the absence of galactose. MGO was only of minor quantitative importance in all foods studied, except for manuka honey. Dietary intake was estimated to range between 20 and 160 mg/day for 3-DG and 5 and 20 mg/day for MGO, respectively.

~3 Citings

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820. Unraveling the chemical composition of caramel

By Golon Agnieszka; Kuhnert Nikolai

From *Journal of agricultural and food chemistry* (2012), 60(12), 3266-74, Language: English, Database: MEDLINE

Caramel is one of mankind's best known dietary materials obtained from carbohydrates by heating. Much effort has been expended toward the chemical characterization of the components of caramel but impeded by a lack of suitable analytical techniques sufficiently powerful for providing insight into an extraordinarily complex material. This paper reports the characterization of caramel formed by heating from glucose, fructose, and saccharose using a conceptually novel combination of mass spectrometrical techniques. The analytical strategy employed uses high-resolution mass spectrometry (MS) followed by targeted liquid chromatography-tandem MS experiments. Caramel is composed from several thousand compounds formed by a small number of unselective and chemoselective reactions. Caramelization products include oligomers with up to six carbohydrate units formed through unselective glycosidic bond formation, dehydration products of oligomers losing up to a maximum of eight water molecules, hydration products of sugar oligomers, disproportionation products, and colored aromatic products.

~0 Citings

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821. One step synthesis of C-dots by microwave mediated caramelization of poly(ethylene glycol)

By Jaiswal Amit; Ghosh Siddhartha Sankar; Chattopadhyay Arun

From *Chemical communications (Cambridge, England)* (2012), 48(3), 407-9, Language: English, Database: MEDLINE

A rapid, simple and one step microwave mediated method for synthesizing C-dots using poly(ethylene glycol) (PEG) as a precursor and passivating agent is reported. The C-dots possessed low cytotoxicity, were amenable to separation by electrophoresis, photostable and entered cancer cells, making them suitable candidates for bioimaging and biolabelling.

~3 Citings

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822. Comment on "Study of dielectric relaxations of anhydrous trehalose and maltose glasses" [J. Chem. Phys. 134, 014508 (2011)]

By Kaminski K; Włodarczyk P; Paluch M

From *The Journal of chemical physics* (2011), 135(16), 167102, Language: English, Database: MEDLINE

Very recently Kwon et al. [H.-J. Kwon, J.-A. Seo, H. K. Kim, and Y. H. Hwang, J. Chem. Phys. 134, 014508 (2011)] published an article on the study of dielectric relaxation in trehalose and maltose glasses. They carried out broadband dielectric measurements at very wide range of temperatures covering supercooled liquid as well as glassy state of both saccharides. It is worth to mention that authors have also applied a new method for obtaining anhydrous glasses of trehalose and maltose that enables avoiding their caramelization. Four relaxation processes were identified in dielectric spectra of both saccharides. The slower one was identified as structural relaxation process the next one, not observed by the others, was assigned as Johari-Goldstein (JG) β -relaxation, while the last two secondary modes were of the same nature as found by Kaminski et al. [K. Kaminski, E. Kaminska, P. Włodarczyk, S. Pawlus, D. Kimla, A. Kasprzycka, M. Paluch, J. Ziolo, W. Szeja, and K. L. Ngai, J. Phys. Chem. B 112, 12816 (2008)]. In this comment we show that the authors mistakenly assigned the slowest relaxation process as structural mode of disaccharides. We have proven that this relaxation process is an effect of formation of thin layer of air or water between plate of capacitor and sample. The same effect can be observed if plates of capacitor are oxidized. Thus, we concluded that their slowest mode is connected to the dc conduction process while their β JG process is primary relaxation of trehalose and maltose.

~0 Citings

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823. Diffructose dianhydrides (DFAs) and DFA-enriched products as functional foods

By Mellet Carmen Ortiz; Garcia Fernandez Jose M

From *Topics in current chemistry* (2010), 29449-77, Language: English, Database: MEDLINE

This review provides an overview of the current status of the chemistry and biology of di-D-fructose dianhydrides (DFAs) with a focus on their potential as functional foods. The history of this family of cyclic ketodisaccharides has expanded for almost 100 years and offers a paradigmatic example of artificial synthetic molecules that were identified as natural products later on and finally encountered in our own table. Issued from fundamental investigations on the reactivity of carbohydrates in strongly acidic media, DFAs remained laboratory curiosities for decades. Early reports on their isolation from plants raised doubts, until the formation of some DFA representatives by the action of microorganisms on fructans was reported in the middle 1980s. Since then, research on DFAs has run in parallel in the areas of microbiology and carbohydrate chemistry. Evidence of the potential of these compounds as functional food was accumulated from both sides, with the development of biotechnological processes for mass production of selected candidates and of chemical methodologies to prepare DFA-enriched products from sucrose or inulin. In 1994 a decisive discovery in the field took place in the laboratory of Jacques Defaye in Grenoble, France: the presence of DFAs in a commercial sucrose caramel was evidenced in a quite significant 18% mass proportion! The development of an efficient analytical protocol for DFAs and the stereoselective synthesis of individual standards allowed one to demonstrate that DFAs and their glycosylated derivatives (glycosyl-DFAs) are universally formed during **caramelization** reactions. They are not potential food products; they have actually always been in our daily food. Most important, they seem to exert beneficial effects: they are acariogenic, low-caloric, and promote the growth of beneficial microflora in the gut. Most recent evidence indicates that DFAs can even protect the intestinal tract against aggressive agents favor the assimilation of antioxidants, and act as a drug-like food for the treatment of colon ailments such as inflammatory bowel disease (Crohn disease). The development of efficient methodologies for the preparation of DFA-enriched caramels, compatible with the food and agricultural industry regulations, may lead to new natural functional foods and nutraceuticals based on DFAs in the near future.

~0 Citings

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824. Characteristic coloring curve for white bread during baking

By Onishi Masanobu; Inoue Michiko; Araki Tetsuya; Iwabuchi Hisakatsu; Sagara Yasuyuki
From *Bioscience, biotechnology, and biochemistry* (2011), 75(2), 255-60, Language: English, Database: MEDLINE

The effect of heating conditions on the crust color formation was investigated during the baking of white bread. The surface temperatures were monitored with thermocouples attached to the inside surface of the loaf pan cover. The trace of the surface color in the $L^*a^*b^*$ color coordinate system is defined as the characteristic coloring curve. The overall baking process was classified into the following four stages based on the characteristic coloring curve: i) pre-heating (surface temperature < 110 °C), ii) Maillard reaction (110-150 °C), iii) **caramelization** (150-200 °C), and iv) over-baking (surface temperature > 200 °C). A linear relationship was observed between the L^* decrease and the increase in weight loss of a sample at each oven air temperature. The L^* value appeared to be suitable as an indicator to control the surface color by baking conditions.

~0 Citings

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825. Investigation of thermal decomposition as the kinetic process that causes the loss of crystalline structure in sucrose using a chemical analysis approach (part II)

By Lee Joo Won; Thomas Leonard C; Jerrell John; Feng Hao; Cadwallader Keith R; Schmidt Shelly J
From *Journal of agricultural and food chemistry* (2011), 59(2), 702-12, Language: English, Database: MEDLINE

High performance liquid chromatography (HPLC) on a calcium form cation exchange column with refractive index and photodiode array detection was used to investigate thermal decomposition as the cause of the loss of crystalline structure in sucrose. Crystalline sucrose structure was removed using a standard differential scanning calorimetry (SDSC) method (fast heating method) and a quasi-isothermal modulated differential scanning calorimetry (MDSC) method (slow heating method). In the fast heating method, initial decomposition components, glucose (0.365%) and 5-HMF (0.003%), were found in the sucrose sample coincident with the onset temperature of the first endothermic peak. In the slow heating method, glucose (0.411%) and 5-HMF (0.003%) were found in the sucrose sample coincident with the holding time (50 min) at which the reversing heat capacity began to increase. In both methods, even before the crystalline structure in sucrose was completely removed, unidentified thermal decomposition components were formed. These results prove not only that the loss of crystalline structure in sucrose is caused by thermal decomposition, but also that it is achieved via a time-temperature combination process. This knowledge is important for quality assurance purposes and for developing new sugar based food and pharmaceutical products. In addition, this research provides new insights into the **caramelization** process, showing that **caramelization** can occur under low temperature (significantly below the literature reported melting temperature), albeit longer time, conditions.

~1 Citing

826. 3-deoxygalactosone, a "new" 1,2-dicarbonyl compound in milk products

By Hellwig Michael; Degen Julia; Henle Thomas

From *Journal of agricultural and food chemistry* (2010), 58(19), 10752-60, Language: English, Database: MEDLINE

1,2-Dicarbonyl compounds are formed in food during Maillard and **caramelization** reactions. 3-Deoxy-D-threo-hexos-2-ulose (3-deoxygalactosone, 3-DGal) and galactosone, two 1,2-dicarbonyl compounds originating from the degradation of galactose, were synthesized and converted to the respective quinoxalines, which were characterized by NMR spectroscopy. Analytical separation of the quinoxalines from the epimeric glucose-derived quinoxalines of 3-deoxyglucosone (3-DG) and glucosone was achieved by RP-HPLC on an RP-phenyl column. This method was used to study the relevance of galactose-derived 1,2-dicarbonyl compounds in a variety of foods. 3-DG and 3-DGal were quantified besides 3-deoxypentosone, methylglyoxal, and glyoxal after derivatization with o-phenylenediamine in lactose-hydrolyzed UHT milk, ranging from 2.5 to 18 mg/L and from 2.0 to 11 mg/L, respectively. The concentrations of both compounds tended to be higher in other lactose-hydrolyzed food items as well. During storage of lactose-hydrolyzed milk, the concentrations of the 3-deoxyhexosones first increased, but especially the concentration of 3-DGal tended to decrease on prolonged storage, pointing to lower stability of the compound. 3-DGal was also detected in galactose-free food items such as apple juice and beer. The possible formation of 3-DGal from 3-DG by 3,4-dideoxyglucosone-3-ene as an intermediate is discussed. Compared to the relatively high concentrations of 3-DG and 3-DGal, 3-deoxypentosone, methylglyoxal, and glyoxal were of only minor quantitative importance in all foods studied.

~1 Citing**827. Di-D-fructose dianhydride-enriched caramels: effect on colon microbiota, inflammation, and tissue damage in trinitrobenzenesulfonic acid-induced colitic rats**

By Arribas Belen; Suarez-Pereira Elena; Ortiz Mellet Carmen; Garcia Fernandez Jose M; Buttersack Christoph; Rodriguez-Cabezas Maria Elena; Garrido-Mesa Natividad; Bailon Elvira; Guerra-Hernandez Eduardo; Zarzuelo Antonio; et al

From *Journal of agricultural and food chemistry* (2010), 58(10), 6476-84, Language: English, Database: MEDLINE

In the present study we describe the preparation and chemical characterization of a caramel with a high (70%) content of difructose dianhydrides (DFAs) and glycosylated derivatives (DFAs). This product was obtained by thermal activation (90 degrees C) of highly concentrated (90% w/v) aqueous D-fructose solutions using the sulfonic acid ion-exchange resin Lewatit S2328 as **caramelization** catalyst. DFAs represent a unique family of cyclic fructans with prebiotic properties already present in low proportions (<15%) in commercial caramel. We report the antiinflammatory activity of the new DFA-enriched caramel in the trinitrobenzenesulfonic acid (TNBS) model of rat colitis, an experimental model that resembles human inflammatory bowel disease (IBD), and compare its effects with those obtained with a commercial sucrose caramel and with linear fructooligosaccharides (FOS). For this purpose, the effects on colon tissue damage, gut microbiota, short-chain fatty acid (SCFAs) production, and different inflammatory markers were evaluated. The administration of DFA-enriched caramel to colitic rats showed intestinal antiinflammatory effect, as evidenced macroscopically by a significant reduction in the extent of the colonic damage induced by TNBS. This effect was similar to that obtained with FOS in the same experimental settings, whereas commercial caramel was devoid of any significant antiinflammatory effect. The beneficial effect was associated with the inhibition of the colonic levels of the proinflammatory cytokines, tumor necrosis factor alpha (TNF alpha) and interleukin 1beta (IL-1beta), and the reduction in colonic myeloperoxidase (MPO) activity and inducible nitric oxide synthase (iNOS) expression. The DFA-enriched caramel also promoted a more favorable intestinal microbiota, increasing lactobacilli and bifidobacteria counts as well as inducing higher concentrations of SCFAs in the luminal colonic contents. These results reinforce the concept of DFAs and glycosyl-DFAs as dietary beneficial compounds with prebiotic properties and suggest that the novel DFA-enriched caramel here reported may be an interesting candidate to be explored for the dietary treatment of human IBD.

~0 Citings**828. Di-D-fructose dianhydride-enriched products by acid ion-exchange resin-promoted **caramelization** of D-fructose: chemical analyses**

By Suarez-Pereira Elena; Rubio Enrique M; Pilard Serge; Ortiz Mellet Carmen; Garcia Fernandez Jose M

From *Journal of agricultural and food chemistry* (2010), 58(3), 1777-87, Language: English, Database: MEDLINE

Caramelization commonly occurs when sugars, or products containing a high proportion of sugars, are heated either dry or in concentrated aqueous solutions, alone or in the presence of certain additives. Upon thermal treatment of sugars, dehydration and self-condensation reactions occur, giving rise to volatiles (principally 2-hydroxymethylfurfural, HMF), pigments (melanoidines) and oligosaccharidic material, among which di-D-fructose dianhydrides (DFAs) and glycosylated DFA derivatives of different degree of polymerization (DP) have been identified. This study reports a methodology to produce caramel-like products with a high content of DFAs and oligosaccharides thereof from commercial D-fructose based on the use of acid ion-exchange resins as **caramelization** promoters. The rate of formation of these compounds as a function of D-fructose concentration, catalyst proportion, temperature, catalyst nature and particle size has been investigated. The use of sulfonic acid resins allows conducting **caramelization** at remarkable low temperatures (70-90 degrees C) to reach conversions into DFA derivatives up to 70-80% in 1-2 h, with relative proportions of HMF < 2%. The relative abundance of individual DFA structures can be modulated by acting on the catalyst nature and reaction conditions, which offers a unique opportunity for nutritional studies of DFA-enriched products with well-defined compositions.

~0 Citings

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829. Subcritical water extraction and characterization of bioactive compounds from *Haematococcus pluvialis* microalga

By Rodriguez-Meizoso I; Jaime L; Santoyo S; Senorans F J; Cifuentes A; Ibanez E
From *Journal of pharmaceutical and biomedical analysis* (2010), 51(2), 456-63, Language: English, Database: MEDLINE

In this work, extraction and characterization of compounds with antioxidant and antimicrobial activity from *Haematococcus pluvialis* microalga in red phase have been carried out. To do this, subcritical water extraction (SWE) has been combined with analytical techniques such as HPLC-DAD, HPLC-QqQ-MS and GC-MS and in vitro assays (i.e., for antioxidant and antimicrobial activity). The effect of the extraction temperature (50, 100, 150 and 200 degrees C) and solvent polarity has been studied in terms of yield and activity of the extracts. Results demonstrate that the extraction temperature has a positive influence in the extraction yield and antioxidant activity. Thus, the extraction yield achieved with this process was higher than 30% of dry weight at 200 degrees C as extraction temperature. Moreover, the extract obtained at 200 degrees C presented the highest antioxidant activity by far, while temperature does not seem to significantly affect the antimicrobial activity. Chemical composition was determined by HPLC-DAD, HPLC-QqQ-MS and GC-MS. Short chain fatty acids turned out to be responsible of the antimicrobial activity, whereas the antioxidant activity was correlated to vitamin E (present exclusively in the 200 degrees C extract), together with simple phenols, **caramelization** products and possible Maillard reaction products obtained during the extraction at high temperatures.

~2 Citings

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830. Hydrolysis of macromolecular components of primary and secondary wastewater sludge by thermal hydrolytic pretreatment

By Wilson Christopher A; Novak John T
From *Water research* (2009), 43(18), 4489-98, Language: English, Database: MEDLINE

A laboratory simulation of the thermal hydrolytic pretreatment (THP) process was performed on wastewater sludge, as well as key macromolecular components: proteins, lipids, and polysaccharides. Hydrolysis temperatures from 130 to 220 degrees C were investigated. The objectives of this study were to determine how and over which temperature range THP specifically affects sludge components, and whether hydrolysis temperature can be used to minimize the previously reported drawbacks of THP such as high total ammonia nitrogen (TAN) loads and the production of highly-colored recalcitrant organics. In addition, the applicability of THP to primary sludge (PS) was investigated. The breakdown of proteins, lipids, and polysaccharides was determined to be temperature dependent, and both waste activated sludge (WAS) and PS responded similarly to THP apart from intrinsic differences in lipid and protein content. Pure carbohydrate solutions were not largely converted to mono- or dimeric reducing sugar units at temperatures below 220 degrees C, however significant **caramelization** of starch and production of dextrose and maltose was observed to occur at 220 degrees C. Volatile fatty acid production during thermal hydrolysis was largely attributed to the breakdown of unsaturated lipids, and long-chain fatty acid production was not significant in terms of previous reports of methanogenic inhibition. Ammonia was produced from protein during thermal hydrolysis, however solids loading rather than thermal hydrolysis temperature appeared to be a more meaningful control for ammonia levels in downstream anaerobic digestion.

~0 Citings

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831. Determination of aflatoxins and ochratoxin A in high-sugar-content traditional Turkish foods by affinity column cleanup and LC fluorescence detection

By Senyuva Hamide Z; Cimen Dilek; Gilbert John

From *Journal of AOAC International* (2009), 92(4), 1128-35, Language: English, Database: MEDLINE

The effectiveness of an affinity column cleanup procedure followed by LC with fluorescence detection was established for the determination of aflatoxins and ochratoxin A in high-sugar-content traditional Turkish foods. Traditional foods, such as baklava (finely layered pastry filled with nuts and steeped in syrup), halvah (containing sesame paste and pistachios), cevizli sucuk (a confection made of grape juice boiled and dried on strings of nuts), Turkish delight (containing hazelnuts, pistachios, or walnuts), and pismaniye (candy made of sugar, butter, and flour), were tested, and the performance of the method was established with spiked samples. To examine the robustness of the methodology, baklava was prepared from raw materials and spiked at the initial stage of dry ingredients and through subsequent stages of preparation of dough, after cooking, and after addition of syrup and nuts. For all products, the analytical method required grinding the composite foodstuff under liquid nitrogen to form a fine powder, which was then thoroughly mixed before subsampling. After vortex extraction into methanol-water (aflatoxins) and aqueous sodium bicarbonate (ochratoxin A), the sample was filtered, diluted with phosphate-buffered saline, and then passed through either an aflatoxin or ochratoxin A affinity column before HPLC analysis with fluorescence detection (using post-column bromination for the aflatoxins). In all the traditional Turkish products, the recovery of aflatoxin B1 ranged from 77 to 98%, and LODs were <0.1 microg/kg. For ochratoxin A, the recoveries were from 88 to 93% and LODs were similarly <0.1 microLg/kg. Despite the complex nature of these traditional Turkish foods, which frequently contain products from sugar **caramelization**, there was no evidence of any interfering co-extractives, and the method has proved to be robust enough to be used for food control purposes.

~1 Citing

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832. Chemical and enzymatic approaches to carbohydrate-derived spiroketals: di-D-fructose dianhydrides (DFAs)

By Garcia-Moreno M Isabel; Benito Juan M; Mellet Carmen Ortiz; Fernandez Jose M Garcia

From *Molecules (Basel, Switzerland)* (2008), 13(8), 1640-70, Language: English, Database: MEDLINE

Di-D-fructose dianhydrides (DFAs) comprise a unique family of stereoisomeric spiro-tricyclic disaccharides formed upon thermal and/or acidic activation of sucrose- and/ or D-fructose-rich materials. The recent discovery of the presence of DFAs in food products and their remarkable nutritional features has attracted considerable interest from the food industry. DFAs behave as low-caloric sweeteners and have proven to exert beneficial prebiotic nutritional functions, favouring the growth of *Bifidobacterium* spp. In the era of functional foods, investigation of the beneficial properties of DFAs has become an important issue. However, the complexity of the DFA mixtures formed during **caramelization** or roasting of carbohydrates by traditional procedures (up to 14 diastereomeric spiroketal cores) makes evaluation of their individual properties a difficult challenge. Great effort has gone into the development of efficient procedures to obtain DFAs in pure form at laboratory and industrial scale. This paper is devoted to review the recent advances in the stereoselective synthesis of DFAs by means of chemical and enzymatic approaches, their scope, limitations, and complementarities.

~1 Citing

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833. Impact of **caramelization** on the glass transition temperature of several caramelized sugars. Part I: Chemical analyses

By Jiang Bin; Liu Yeting; Bhandari Bhesh; Zhou Weibiao

From *Journal of agricultural and food chemistry* (2008), 56(13), 5138-47, Language: English, Database: MEDLINE

This study aims to investigate the relationship between **caramelization** of several sugars including fructose, glucose, and sucrose and their glass transition temperature (T_g). Differential scanning calorimetry (DSC) was used for creating caramelized sugar samples as well as determining their glass transition temperature, which was found to decrease first and then increase as the holding time at the highest temperature increased. The extent of **caramelization** was quantified by UV-vis absorbance measurement and high-performance liquid chromatography analysis. Results showed that the amount of small molecules from the degradation of sugar increased very fast at the beginning of heating, and this increase slowed down in the later stage of **caramelization**. On the other hand, there was a lag phase in the formation of large molecules from the degradation of sugar at the beginning of heating, followed by a fast increase in the later stage of **caramelization**. The obtained results clearly indicate the impact of melting condition on the T_g of sugars through formation of intermediates and end products of **caramelization**. Generally, when the heating condition is relatively mild, small molecules are formed first by decomposition of the sugar, which leads to a decrease of the overall T_g, and as the heating time becomes longer and/or the heating condition becomes more severe, polymerization takes over and more large molecules are formed, which results in an increase of the overall T_g. Mathematical modeling of the relationship will be presented as part II of the study in a separate paper.

~1 Citings

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834. Impact of **caramelization** on the glass transition temperature of several caramelized sugars. Part II: Mathematical modeling

By Jiang Bin; Liu Yeting; Bhandari Bhesh; Zhou Weibiao

From *Journal of agricultural and food chemistry* (2008), 56(13), 5148-52, Language: English, Database: MEDLINE

Further to part I of this study, this paper discusses mathematical modeling of the relationship between **caramelization** of several sugars including fructose, glucose, and sucrose and their glass transition temperatures (T_g). Differential scanning calorimetry (DSC) was used for creating caramelized sugar samples and determining their glass transition temperatures (T_g). UV-vis absorbance measurement and high-performance liquid chromatography (HPLC) analysis were used for quantifying the extent of **caramelization**. Specifically, absorbances at 284 and 420 nm were obtained from UV-vis measurement, and the contents of sucrose, glucose, fructose, and 5-hydroxymethyl-furfural (HMF) in the caramelized sugars were obtained from HPLC measurements. Results from the UV and HPLC measurements were correlated with the T_g values measured by DSC. By using both linear and nonlinear regressions, two sets of mathematical models were developed for the prediction of T_g values of sugar caramels. The first set utilized information obtained from both UV-vis measurement and HPLC analysis, while the second set utilized only information from the UV-vis measurement, which is much easier to perform in practice. As a **caramelization** process is typically characterized by two stages, separate models were developed for each of the stages within a set. Furthermore, a third set of nonlinear equations were developed, serving as criteria to decide at which stage a caramelized sample is. The models were evaluated through a validation process.

~0 Citings

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835. Nonenzymatic browning of lactose and caseinate during dry heating at different relative humidities

By Pan Geoffrey Ge; Melton Laurence D

From *Journal of agricultural and food chemistry* (2007), 55(24), 10036-42, Language: English, Database: MEDLINE

Dry mixtures of lactose and caseinate were heated at 60 degrees C for up to 96 h at different relative humidities (RHs) ranging from 29 to 95%. The resulting nonenzymatic browning was studied by determining lactulosyl lysine formation in the caseinate (as measured by the conversion to furosine), amount of reacted lactose, loss of lysine, color formation, and fluorescent intensity. For each measurement, the maximum reaction occurred at intermediate RHs. While there is general agreement between the results obtained by different methods, discrepancies are understandable given the complex nature of nonenzymatic browning. It was shown that the degradation of the Amadori product, lactulosyl lysine, increased with RH. Moreover, the Maillard reaction, as opposed to **caramelization** of lactose, was the major pathway at all RHs. Visible browning occurred when the destruction of Amadori product became dominant, and interactions between sugar fragments and caseinate were not the rate-limiting steps in the nonenzymatic browning.

~0 Citings

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836. Chemistry and genotoxicity of caramelized sucrose

By Kitts David D; Wu C H; Kopec A; Nagasawa T

From [Molecular nutrition & food research](#) (2006), 50(12), 1180-90, Language: English, Database: MEDLINE

Caramelization of a 1% sucrose solution at 180 degrees C accompanied characteristic changes in pH, Mr, UV-absorbance, and fluorescence values as well as increased reducing power activity after 40-60 min. Similar changes occurred to sucrose heated at 150 degrees C, after 150-240 min. Bioactivity of caramelized sucrose samples was tested for mutagenic activity, using *Salmonella typhimurium* strains TA-98 and TA-100, respectively, as well as the *Saccharomyces* D7 yeast strain for mitotic recombination and Chinese hamster ovary cells (CHO) to assess clastogenicity. Caramelized sucrose expressed no mutagenicity in the TA-98 strain, but gave positive ($p < 0.05$) results with the TA-100, base-pair substitution strain. Similarly, mitotic recombination in the *Saccharomyces* D7 yeast strain and clastogenic activity in CHO cells were induced when exposed to caramelized sucrose. In the all cases, preincubation with S-9 reduced ($p < 0.05$) the mutagenic activities of caramelized sucrose. Fractionation of the caramelized sucrose into volatile and nonvolatile compounds was performed and tested for clastogenicity using CHO cells. Volatile components contributed approximately 10% to total clastogenicity, which was enhanced by the presence of S-9. Nonvolatile components recovered, consisting of relatively lower Mr, gave highest ($p < 0.05$) clastogenic activity, denoting that higher Mr caramel colors are relatively free of this property.

~0 Citings

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837. **alpha-Dicarbonyl compounds formed by nonenzymatic browning during the dry heating of caseinate and lactose**

By Ge Pan Geoffrey; Oliver Christine M; Melton Laurence D

From [Journal of agricultural and food chemistry](#) (2006), 54(18), 6852-7, Language: English, Database: MEDLINE

A method using high-performance liquid chromatography with UV and electrospray ionization mass spectrometry detection was developed for monitoring the alpha-dicarbonyl compound profiles generated from nonenzymatic browning using o-phenylenediamine (OPD) as a trapping agent. The alpha-dicarbonyl compounds were generated by the "dry" reaction of sodium caseinate and lactose heated at various relative humidities (RHs). The proportions of alpha-dicarbonyls formed were different for samples heated at low, intermediate, and high RHs. This study shows that relatively large amounts of 3-deoxypentosulose and galactosyl 2-pentosulose are produced under high RHs, while galactosyl hexosulose and 1,4-dideoxyhexosulose are elevated under low RH conditions. Both **caramelization** and Maillard reaction pathways contributed to the generation of alpha-dicarbonyls.

~0 Citings

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838. **Characterization of galactomannan derivatives in roasted coffee beverages**

By Nunes Fernando M; Reis Ana; Domingues M Rosario M; Coimbra Manuel A

From [Journal of agricultural and food chemistry](#) (2006), 54(9), 3428-39, Language: English, Database: MEDLINE

In this work, the galactomannans from roasted coffee infusions were purified by 50% ethanol precipitation, anion exchange chromatography, and phenylboronic acid-immobilized Sepharose chromatography. Specific enzymatic hydrolysis of the beta-(1-->4)-D-mannan backbone allowed us to conclude that the galactomannans of roasted coffee infusions are high molecular weight supports of low molecular weight brown compounds. Also, the molecular weight of the brown compounds linked to the galactomannan increases with the increase of the coffee degree of roast. The reaction pathways of galactomannans during the coffee roasting process were inferred from the detection of specific chemical markers by gas chromatography-electron impact mass spectrometry and/or electrospray ionization tandem mass spectrometry. Maillard reaction, **caramelization**, isomerization, oxidation, and decarboxylation pathways were identified by detection of Amadori compounds, 1,6-beta-anhydromannose, fructose, glucose, mannonic acid, 2-ketogluconic acid, and arabinonic acid in the reducing end of the obtained oligosaccharides. The implication of the several competitive reaction pathways is discussed and related to the structural changes of the galactomannans present in the roasted coffee infusions.

~2 Citings

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839. **Antioxidant properties of kilned and roasted malts**

By Samaras Thomas S; Camburn Philip A; Chandra Sachin X; Gordon Michael H; Ames Jennifer M

From [Journal of agricultural and food chemistry](#) (2005), 53(20), 8068-74, Language: English, Database: MEDLINE

Compounds possessing antioxidant activity play a crucial role in delaying or preventing lipid oxidation in foods and beverages during processing and storage. Such reactions lead to loss of product quality, especially as a consequence of off-flavor formation. The aim of this study was to determine the antioxidant activity of kilned (standard) and roasted (speciality) malts in relation to phenolic compounds, sugars, amino acids, and color [assessed as European Brewing Convention units (degrees EBC) and absorbance at 420 nm]. The concentrations of sugars and amino acids decreased with the intensity of the applied heat treatment, and this was attributed to the extent of the Maillard reaction, as well as sugar **caramelization**, in the highly roasted malts. Proline, followed by glutamine, was the most abundant free amino/imino acid in the malt samples, except those that were highly roasted, and maltose was the most abundant sugar in all malts. Levels of total phenolic compounds decreased with heat treatment. Catechin and ferulic acid were the most abundant phenolic compounds in the majority of the malts, and amounts were highest in the kilned samples. In highly roasted malts, degradation products of ferulic acid were identified. Antioxidant activity increased with the intensity of heating, in parallel with color formation, and was significantly higher for roasted malts compared to kilned malts. In kilned malts, phenolic compounds were the main identified contributors to antioxidant activity, with Maillard reaction products also playing a role. In roasted malts, Maillard reaction products were responsible for the majority of the antioxidant activity.

~1 Citing

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840. Hydrolysis of lactose in whey permeate for subsequent fermentation to ethanol

By Cote A; Brown W A; Cameron D; van Walsum G P

From *Journal of dairy science* (2004), 87(6), 1608-20, Language: English, Database: MEDLINE

Fermentation of lactose in whey permeate directly into ethanol has had only limited commercial success, as the yields and alcohol tolerances of the organisms capable of directly fermenting lactose are low. This study proposes an alternative strategy: treat the permeate with acid to liberate monomeric sugars that are readily fermented into ethanol. We identified optimum hydrolysis conditions that yield mostly monomeric sugars and limit formation of fermentation inhibitors such as hydroxymethyl furfural by **caramelization** reactions. Both lactose solutions and commercial whey permeates were hydrolyzed using inorganic acids and carbonic acid. In all cases, more glucose was consumed by secondary reactions than galactose. Galactose was recovered in approximately stoichiometric proportions. Whey permeate has substantial buffering capacity-even at high partial pressures (>5500 kPa[g]), carbon dioxide had little effect on the pH in whey permeate solutions. The elevated temperatures required for hydrolysis with CO₂-generated inhibitory compounds through **caramelization** reactions. For these reasons, carbon dioxide was not a feasible acidulant. With mineral acids reversion reactions dominated, resulting in a stable amount of glucose released. However, the Maillard browning reactions also appeared to be involved. By applying Hammett's acidity function, kinetic data from all experiments were described by a single line. With concentrated inorganic acids, low reaction temperatures allowed lactose hydrolysis with minimal by-product formation and generated a hexose-rich solution amenable to fermentation.

~0 Citings

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841. **Caramelization** of maltose solution in presence of alanine

By Fadel H H M; Farouk A

From *Amino acids* (2002), 22(2), 199-213, Language: English, Database: MEDLINE

Two solutions of maltose in water were used to prepare caramels. Alanine as a catalyst was added to one of these solutions. The **caramelization** was conducted at 130 degrees C for total time period 90 minutes. Convenient samples were taken of each caramel solution every 30 min and subjected to sensory analysis and isolation of volatile components. The odour and colour sensory tests were evaluated according to the international standard methods (ISO). The results showed that, the presence of alanine gave rise to a high significant ($P < 0.01$) decrease in acid attributes and remarkable increase in the sweet and caramel attributes, which are the most important caramel notes. On the other hand the increase in heating time in presence of alanine as a catalyst resulted in a high significant ($P < 0.01$) increase in the browning rate of caramel solution. The new technique Solid Phase Micro Extraction (SPME) was used for trapping the volatile components in the headspace of each caramel samples followed by thermal desorption and GC and GC - MS analysis. The 5-hydroxymethyl-2-furfural (HMF), the main characteristic caramel product, showed its highest value in sample containing alanine after heating for 60 minutes. The best sensory results of the sample contains alanine were confirmed by the presence of high concentrations of the most potent odorants of caramel besides to the formation of some volatile compounds have caramel like flavours such as 2-acetyl pyrrole, 2-furanones and 1-(2-furanyl)1,2-propandione.

~1 Citing

842. 3-deoxypentosulose: an alpha-dicarbonyl compound predominating in nonenzymatic browning of oligosaccharides in aqueous solution

By Hollnagel Anke; Kroh Lothar W

From *Journal of agricultural and food chemistry* (2002), 50(6), 1659-64, Language: English, Database: MEDLINE

The thermal degradation of D-glucose, maltose, and maltotriose in aqueous solution was investigated under **caramelization** (no glycine) and Maillard (with glycine) conditions. Degradation of the sugar and alpha-dicarbonyl product was monitored. Under both **caramelization** and Maillard reaction conditions, 3-deoxypentosulose was the predominating alpha-dicarbonyl compound formed from maltose and maltotriose. In the absence of an amino compound, however, 3-deoxypentosulose is formed in much lower concentration. It was concluded that 3-deoxypentosulose is formed by a pathway specific for oligo- and polysaccharides since this alpha-dicarbonyl is formed from the alpha-1-->4 glucans such as maltose and maltotriose but not from glucose. For its formation, a retro Claisen reaction of an enolization product of 1-amino-1,4-dideoxyhexosulose is proposed as the route to its formation. 1-Amino-1,4-dideoxyhexosulose could be formed by vinylogous alpha-elimination from the 2,3-enediol structure after Amadori rearrangement, favored by planar alignment of the bonds between C1 and C4. Subsequent rearrangement by keto-enol tautomerization leads to a 1-imino-3-keto structure. In this structure, attack of a hydroxyl anion, provided by water at neutral pH, could cause a splitting off of the C1. This reaction gives rise to formic acid or formamide and a pentose derivative, which reacts further to give 3-deoxypentosulose.

~0 Citings**843. Degradation of oligosaccharides in nonenzymatic browning by formation of alpha-dicarbonyl compounds via a "peeling off" mechanism**

By Hollnagel A; Kroh L W

From *Journal of agricultural and food chemistry* (2000), 48(12), 6219-26, Language: English, Database: MEDLINE

The formation of alpha-dicarbonyl-containing substances and Amadori rearrangement products was studied in the glycine-catalyzed (Maillard reaction) and uncatalyzed thermal degradation of glucose, maltose, and maltotriose using o-phenylenediamine as trapping agent. Various degradation products, especially alpha-dicarbonyl compounds, are formed from carbohydrates with differing degrees of polymerization during nonenzymatic browning. The different Amadori rearrangement products, isomerization products, and alpha-dicarbonyls produced by the used carbohydrates were quantified throughout the observed reaction time, and the relevance of the different degradation pathways is discussed. In the Maillard reaction (MR) the amino-catalyzed rearrangement with subsequent elimination of water predominated, giving rise to hexosuloses with alpha-dicarbonyl structure, whereas under **caramelization** conditions more sugar fragments with an alpha-dicarbonyl moiety were formed. For the MR of oligosaccharides a mechanism is proposed in which 1,4-dideoxyosone is formed as the predominating alpha-dicarbonyl in the quasi-water-free thermolysis of di- and trisaccharides in the presence of glycine.

~0 Citings**844. Nonenzymatic browning reaction of essential amino acids: effect of pH on **caramelization** and Maillard reaction kinetics**

By Ajandouz E H; Puigserver A

From *Journal of agricultural and food chemistry* (1999), 47(5), 1786-93, Language: English, Database: MEDLINE

The interaction between glucose and essential amino acids at 100 degrees C at pH values ranging from 4.0 to 12.0 was investigated by monitoring the disappearance of glucose and amino acids as well as the appearance of brown color. Lysine was the most strongly destroyed amino acid, followed by threonine which induced very little additional browning as compared with that undergone by glucose. Around neutrality, the nonenzymatic browning followed pseudo-zero-order kinetics after a lag time, while the glucose and amino acid losses did not follow first-order kinetics at any of the pH values tested. Glucose was more strongly destroyed than all of the essential amino acids, the losses of which are really small at pH values lower than 9.0. However, glucose was less susceptible to thermal degradation in the presence of amino acids, especially at pH 8.0 with threonine and at pH 10.0 with lysine. The contribution of the **caramelization** reaction to the overall nonenzymatic browning above neutrality should lead to an overestimation of the Maillard reaction in foods.

~1 Citing

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845. Change in the carotenoid and antioxidant content of spice red pepper (paprika) as a function of ripening and some technological factors

By Markus F; Daoood H G; Kapitany J; Biacs P A

From *Journal of agricultural and food chemistry* (1999), 47(1), 100-7, Language: English, Database: MEDLINE

A study was conducted to investigate the change in quality attributes of red pepper (paprika) (*Capsicum annuum* L. var. Km-622) as a function of ripening and some technological factors. Of quality attributes, carotenoids and bioantioxidants (ascorbic acid and tocopherols) have been studied. It was found that the dynamics of fruit ripening with regard to carotenoids and bioantioxidants was influenced to a considerable extent by weather conditions of the production season. A rainy and cool season yielded fruits with more beta-carotene but less diesters of red xanthophylls as compared to those produced in a relatively dry and warm season. The ripening stage at harvest was found to affect the quality of paprika. Harvest at unripe stages (color break or faint red) resulted in a high accumulation of dehydroascorbic acid in the overripe fruits, whereas de novo biosynthesis of carotenoids and tocopherols was partially retarded. Application of pre-drying centrifugation resulted in a marked loss of ascorbic acid, and as a consequence, carotenoid stability was impaired during the storage of ground paprika. Sugar caramelization caused dry pods and ground paprika to retain more pigments and tocopherol as compared to those from control or centrifuged red pepper samples. During the storage of ground paprika, color stability was improved by grinding the seeds with the pericarp.

~4 Citings

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846. Relationship between glycosyl hydrolase inventory and growth physiology of the hyperthermophile *Pyrococcus furiosus* on carbohydrate-based media

By Driskill L E; Kusy K; Bauer M W; Kelly R M

From *Applied and environmental microbiology* (1999), 65(3), 893-7, Language: English, Database: MEDLINE

Utilization of a range of carbohydrates for growth by the hyperthermophile *Pyrococcus furiosus* was investigated by examining the spectrum of glycosyl hydrolases produced by this microorganism and the thermal labilities of various saccharides. Previously, *P. furiosus* had been found to grow in batch cultures on several alpha-linked carbohydrates and cellobiose but not on glucose or other beta-linked sugars. Although *P. furiosus* was not able to grow on any nonglucan carbohydrate or any form of cellulose in this study (growth on oat spelt arabinoxylan was attributed to glucan contamination of this substrate), significant growth at 98 degrees C occurred on beta-1,3- and beta-1,3-beta-1,4-linked glucans. Oligosaccharides generated by digestion with a recombinant laminarinase derived from *P. furiosus* were the compounds that were most effective in stimulating growth of the microorganism. In several cases, periodic addition of beta-glucan substrates to fed-batch cultures limited adverse thermochemical modifications of the carbohydrates (i.e., Maillard reactions and caramelization) and led to significant increases (as much as two- to threefold) in the cell yields. While glucose had only a marginally positive effect on growth in batch culture, the final cell densities nearly tripled when glucose was added by the fed-batch procedure. Nonenzymatic browning reactions were found to be significant at 98 degrees C for saccharides with degrees of polymerization (DP) ranging from 1 to 6; glucose was the most labile compound on a mass basis and the least labile compound on a molar basis. This suggests that for DP of 2 or greater protection of the nonreducing monosaccharide component may be a factor in substrate availability. For *P. furiosus*, carbohydrate utilization patterns were found to reflect the distribution of the glycosyl hydrolases which are known to be produced by this microorganism.

~10 Citings

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847. Control of microwave heating of peritoneal dialysis solutions

By Deutschendorf A F; Wenk R E; Lustgarten J; Mason P

From *Peritoneal dialysis international : journal of the International Society for Peritoneal Dialysis* (1994), 14(2), 163-7, Language: English, Database: MEDLINE

OBJECTIVE: To determine if microwave heating of dialysis solutions to 37 degrees C produced focal overheating (hot spots) and **caramelization** of dextrose. **DESIGN:** In vitro determination of conditions for controlling time, temperature, and procedures. Bags had been stored at ambient room temperature. **MAIN OUTCOME MEASURES:** Solution and external bag surface temperature determinations. Dextrose degradation products determined spectrophotometrically. Microscopy for potential caramel precipitates. **RESULTS:** A microwave oven with no rotation tray produced uneven heating of bags of two commercially available concentrations of dialysis solutions. The greatest hot spots were evident in spike ports. External bag surface temperatures were within 0.20 degrees C of reservoir temperatures. Initial solution temperatures correlated with temperatures of the solutions after microwave heating ($r = 0.895$). No statistically significant differences were found between dextrose degradation product concentrations of unheated and heated solutions, including hot spots. No precipitates were observed microscopically. **CONCLUSIONS:** Despite the presence of solution hot spots in bag infusion ports, 37 degrees C temperatures were achievable in the bag reservoirs with no evidence of increased glucose degradation. This outcome is assured if the initial temperature and the microwave conditions (procedure, time, mixing of solution) are held constant, and the external bag temperatures are measured after heating.

~0 Citings

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848. CO2 laser nerve welding: optimal laser parameters and the use of solders in vitro

By Menovsky T; Beek J F; van Gemert M J

From *Microsurgery* (1994), 15(1), 44-51, Language: English, Database: MEDLINE

To improve the welding strength, an in vitro study was performed to investigate the bonding strength of CO2 laser nerve welding (LNW), with and without the use of human albumin solution, dried albumin solution, egg white, fibrinogen solution, fibrin glue, and red blood cells as a solder. Fifteen different combinations of laser power (50, 100, and 150 mW) and pulse duration (0.1 to 3 s) were used with a spot size of 320 microns. The results have been compared to suture, fibrin glue, and laser-assisted nerve repair (LANR). The strongest welds (associated with whitening and **caramelization** of tissue) were produced at 100 mW with pulses of 1.0 s and at 50 mW with pulses of 3 s. The use of a dried albumin solution as a solder at 100 mW with pulses of 1 s increased the bonding strength 9-fold as compared to LNW (bonding strength 21.0 +/- 8.6 g and 2.4 +/- 0.9 g, respectively). However, positioning the nerves between cottons soaked in saline for 20 minutes resulted in a decrease of the bonding strength (9.8 +/- 4.5 g). The use of a 20% albumin solution and egg white, both at 50 mW with pulses of 3 s, resulted in a bonding strength of, respectively, 5.7 +/- 2.1 g and 7.7 +/- 2.4 g. Other solders did not increase the bonding strength in comparison to LNW. The substantial increase in bonding strength for some solders suggests that it is worthwhile to investigate the dehiscence rate and nerve regeneration of solder enhanced LNW in an in vivo study.

~0 Citings

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849. Plasma-depleted platelet concentrates prepared with a new washing solution

By Shimizu T; Shibata K; Kora S

From *Vox sanguinis* (1993), 64(1), 19-23, Language: English, Database: MEDLINE

In certain clinical situations, complete removal of the plasma proteins from the platelet concentrates (PCs) is necessary by washing prior to transfusion. A simple electrolyte solution with a pH of 6.5 was developed for washing PCs. The platelet-rich plasma collected with acid-citrate-dextrose solution by apheresis in a 0.6-liter polyolefin bag was centrifuged. After removal of the supernatant plasma from pelleted platelet buttons, 200 ml of a washing solution consisting of 90 mM NaCl, 5 mM KCl, 3 mM MgCl₂, 17 mM NaH₂PO₄, 8 mM Na₂HPO₄, 23 mM Na acetate, 17 mM Na₃ citrate, 23.5 mM glucose, 2 mM adenine, 0.1% dextran, and 28.8 mM maltose (pH 6.5) was added to the pelleted platelet button. Steam sterilization of the solution was carried out under nitrogen to avoid **caramelization** of glucose. After resuspension of the pelleted platelet button with a washing solution and a second centrifugation, Seto additive solution (Seto sol, pH 7.4) was introduced into the bag to resuspend the platelet buttons for storage for 3 days at 22 degrees C. All of these procedures were completed within 3 h using a sterile docking device. In washed PCs, 99.1% of the plasma was removed and platelet recovery was 96%. The washed PCs were compared for 3 days with plasma-poor PCs consisting of 11% plasma and 89% Seto solution. There were no significant differences in percent hypotonic shock response, aggregation, energy metabolism, and morphology of platelets between the two groups during 3 days, except for significant swelling of 3-day-old platelets in washed PCs.(ABSTRACT TRUNCATED AT 250 WORDS)

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850. First autoclave-sterilized platelet-additive solution containing glucose with a physiological pH for the preparation of plasma-poor platelet concentrates

By Shimizu T; Shibata K; Kora S

From *Vox sanguinis* (1992), 62(2), 87-93, Language: English, Database: MEDLINE

The glucose-free platelet-additive solution (termed AR solution), developed by Adams and Rock [Transfusion 1988;28:217-220], was modified by adding glucose as an energy substrate for platelets and maltose to prevent platelet lysis and by replacing sodium gluconate with sodium phosphate for better pH maintenance. The new platelet-additive solution (termed Seto solution) contained 90 mM NaCl, 5 mM KCl, 3 mM MgCl₂, 17 mM tri-sodium citrate, 4.9 mM NaH₂PO₄, 20.1 mM Na₂HPO₄, 23 mM sodium acetate, 28.8 mM maltose, and 23.5 mM glucose with a pH of 7.4. The solution was sterilized by autoclaving in plastic bags in nitrogen to prevent glucose **caramelization** at high pH. Plasma-poor platelet concentrates prepared by adding Seto solution to the pelleted platelet buttons were stored in a LE-2 polyolefin bag at 22 degrees C with constant agitation for 5 days. The platelets suspended in Seto solution maintained oxygen consumption at a rate of 1.1 nmol/min/10(9) platelets after 5-day storage, with glucose consumption and lactate production rates of 0.5 +/- 0.2 and 1.2 +/- 0.2 nmol/min/10(9) platelets, respectively. This resulted in a final mean pH of 7.0. Those suspended in AR solution ceased glycolysis within 3 days because residual plasma glucose had been consumed. This was associated with decreases in percent hypotonic shock response and aggregation induced by adenosine diphosphate and collagen. Lactate dehydrogenase discharge in AR solution was 5 and 8 times higher at day 3 and day 5, respectively, than that of Seto solution. Morphologically, there were no ballooned platelets after storage in Seto solution.(ABSTRACT TRUNCATED AT 250 WORDS)

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851. Determination of sulfur dioxide in grapes: comparison of the Monier-Williams method and two ion exclusion chromatographic methods

By Kim H J; Conca K R; Richardson M J

From *Journal - Association of Official Analytical Chemists* (1990), 73(6), 983-9, Language: English, Database: MEDLINE

Results for determination of sulfur dioxide in grapes were compared by 3 methods: the modified Monier-Williams method, acid distillation/ion exclusion chromatography with electrochemical detection (AD/IEC-EC), and alkali extraction/ion exclusion chromatography with electrochemical detection (AE/IEC-EC). An unusual positive response was observed during the later stage of the Monier-Williams distillation of both control grapes and sulfited grapes. Development of volatile acidic compounds in parallel with this Monier-Williams response and darkening of sample was also observed by collection in an alkali trap and analysis using anion exclusion chromatography and photodiode array detection. No parallel increase in sulfite was observed by the more selective AD/IEC-EC method, which clearly demonstrated that the response observed during the later stage of the Monier-Williams method is a false positive, probably due to **caramelization** reaction products. Monier-Williams results for grapes containing ca 10 ppm sulfite were in reasonably good agreement with those by either the AD/IEC-EC or AE/IEC-EC methods, presumably because the false positive response in the Monier-Williams analysis compensated for the somewhat incomplete recovery of sulfite. The AE/IEC-EC method is recommended because it is rapid, sensitive, straightforward, and free from interference. Accurate results by Monier-Williams analysis could be obtained by limiting distillation to 60 min and correcting for recovery.

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852. Comparison of the ion exclusion chromatographic method with the Monier-Williams method for determination of total sulfite in foods

By Kim H J

From *Journal - Association of Official Analytical Chemists* (1989), 72(2), 266-72, Language: English, Database: MEDLINE

Experimental data comparing the alkali extraction/ion exclusion chromatographic method with the Monier-Williams method for determination of total sulfite are presented in (a) enzymatic and nonenzymatic browning systems, (b) vegetables containing naturally occurring sulfite, and (c) a carbohydrate-type food additive, erythorbic acid. Excellent agreement, with a linear correlation coefficient of 0.99, was observed in fresh potato samples homogenized with sulfite and allowed to react for different time intervals (enzymatic browning system). A good overall correlation was observed in dehydrated, sulfited apple samples heated for different times (nonenzymatic browning system); however, as heating time increased, higher results were obtained by the Monier-Williams method than by the alkali extraction/ion exclusion chromatographic method. The results of determining sulfite in the alkali trapping solution following acid distillation or acid treatment without heat suggested that this deviation was due to a fraction of sulfite bound to the browning reaction products in such a way that it was released by acid distillation but not by alkali extraction or acid treatment without heat. Similar behavior was demonstrated in cabbage with naturally occurring sulfite, which was released by acid distillation but not by alkali extraction or acid treatment without heat. The ion exclusion chromatographic method could overcome interference by the volatile **caramelization** reaction products in the Monier-Williams determination of erythorbic acid.

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853. Suppression of neutrophil superoxide production by conventional peritoneal dialysis solution

By Ing B L; Gupta D K; Nawab Z M; Zhou F Q; Rahman M A; Daugirdas J T

From *The International journal of artificial organs* (1988), 11(5), 351-4, Language: English, Database: MEDLINE

The pH of conventional peritoneal dialysis solution is normally in the range of 5.0 to 5.5, because acid has been added during the manufacturing process to prevent **caramelization** of dextrose during sterilization. We studied the effects of normalizing the pH of conventional peritoneal dialysis solution on superoxide production by normal human neutrophils. At a pH of 6.0, superoxide generation was 4.07 +/- 2.56 (SD) nanomoles per million cells. With normalization of pH to 7.4, superoxide production was 19.3 +/- 7.3 (p less than 0.001). The results suggest that the unphysiologic acidity of conventional peritoneal dialysis solution has deleterious consequences on neutrophil superoxide formation.

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854. Browning reaction systems as sources of mutagens and antimutagens

By Powrie W D; Wu C H; Molund V P

From *Environmental health perspectives* (1986), 6747-54, Language: English, Database: MEDLINE

Heated food systems contain hundreds of chemical compounds, some being mutagenic and others being antimutagenic. Studies have indicated that foods exposed to drying, frying, roasting, baking, and broiling conditions possess net mutagenic activity as assessed by the Ames/Salmonella/microsome mutagenicity test and the chromosome aberration assay with Chinese hamster ovary (CHO) cells. With the above-mentioned heat treatment of food, nonenzymic browning reactions are generally proceeding at rapid rates and are involved in the development of mutagens. **Caramelization** and Maillard reactions are two important pathways in the nonenzymic browning of food and are responsible for the formation of volatile aromatic compounds, intermediate nonvolatile compounds, and brown pigments called melanoidins. Heated sugar-amino acid mixtures possessed mutagenic activities which have been assessed by short-term bioassays. Purified Maillard and **caramelization** reaction products such as reductones, dicarbonyls, pyrazines, and furan derivatives have exhibited mutagenicity and clastogenicity. The water-insoluble fraction (WIF) of instant coffee and a model-system melanoidin (MSM) have been shown to inhibit the mutagenicity of known carcinogens--aflatoxin B1 (AFB1), N-methyl-N'-nitro-N-nitrosoguanidine (MNNG), and benzo(a)pyrene (BP)--in aqueous dispersion. WIF and MSM were found to be effective binding agents for the carcinogens.

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855. Genotoxic activity of caramel on Salmonella and cultured mammalian cells

By Yu Y N; Chen X R; Ding C; Cai Z N; Li Q G

From *Mutation research* (1984), 139(4), 161-5, Language: English, Database: MEDLINE

The genetic activity of 2 commercial caramel preparations, manufactured either by heating the malt sugar solution directly (non-ammoniated caramel) or by heating it with ammonia (ammoniated caramel) was studied in the Salmonella mutagenicity test and UDS assay in cultured mammalian cells. The non-ammoniated caramel was found to be mutagenic to *S. typhimurium* TA100, while the ammoniated one was genetically active in all the tester strains used, namely TA100, TA97 and TA98. It was also demonstrated that non-ammoniated caramel was capable of inducing UDS in cultured human amnion FL cells, but for the ammoniated one, no such activity was observed. Furthermore, based on the results obtained in the DNA synthesis inhibition assay, it was suggested that the DNA synthesis inhibition seen in our experiments with the ammoniated caramel was probably not of DNA damage in origin. These data indicate that the mutagenic fractions formed during ammoniated and non-ammoniated **caramelization** were quite different.

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856. Induction of mitotic gene conversion by browning reaction products and its modulation by naturally occurring agents

By Rosin M P; Stich H F; Powrie W D; Wu C H

From *Mutation research* (1982), 101(3), 189-97, Language: English, Database: MEDLINE

Mitotic gene conversion in the D7 strain of *Saccharomyces cerevisiae* was significantly enhanced by exposure to non-enzymatic browning reaction products. These products were formed during the heating of sugar (**caramelization** reaction) or sugar-amino acid mixtures (Maillard reaction) at temperatures normally used during the cooking of food. Several modulating factors of this convertogenic activity were identified. These factors included two main groups: (1) trace metals which are widely distributed in the environment; and (2) several cellular enzymatic systems. The convertogenic activities of a heated glucose-lysine mixture and a commercial caramel powder were completely suppressed when yeast were concurrently exposed to these products and to either FeII or CuII. Equimolar concentrations of MnII or sodium selenite had no effect on the convertogenic activity of the products of either model system. Horse-radish peroxidase, beef liver catalase and rat liver S9 preparations each decreased the frequency of gene conversion induced by the caramel powder and the heated glucose-lysine products. This modulating activity of the enzymes was lost if they were heat-inactivated. These studies indicate the presence of a variety of protective mechanisms which can modify genotoxic components in complex food mixtures.

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857. Nonenzyme browning and its effect on protein nutrition

By Dworschak E

From *Critical reviews in food science and nutrition* (1980), 13(1), 1-40, Language: English, Database: MEDLINE

The nonenzyme browning involves the thermal decomposition of sugars, the **caramelization**, the decomposition of oxo-acids, the so called "Maillard reaction" between amino acids and carbohydrates, the reaction between oxidized fats and proteins, and those alterations which take place by the alkaline treatment of proteins. The Maillard reaction is of secondary importance in the case of foodstuffs and fodders with low carbohydrate contents (meats, meat meal, fish meal). By the heat treatment, the sulphur-containing amino acids of proteins (cystine, methionine) are damaged primarily because of oxidation, but the decrease in the amount of threonine, serine, tryptophan, and lysine is observable too. According to the formation of enzyme resistant cross-links, the in vitro and in vivo digestibility of protein decreases after the heat treatment and the communication with oxidized fats. Besides the amino acids mentioned, the possibility of enzymatic break-off of leucine and isoleucine is reduced too. In the course of the heating of proteins the occurrence of racemization has to be considered too (formation of alloisoleucine). The basic mechanism of the reaction between sugars and simple amino acids is already essentially explained: amino-acids break off after the formation glycosilamines and Amadori products but they are linked irreversibly to some, partly unsaturated decomposition products of sugars, types of 6 and 3 carbon atoms. The decrease in the biological usability of amino acids starts already with the Amadori products. The reactivity of the single amino acids depends on the number of carbon atoms, on the basicity, and on the polarity of the amino acid molecule. The especially highly reactive amino acids of proteins are (1) the essential lysine (because of its 6-HN₂ group), (2) other types of basic amino acids, and (3) tryptophan (because of the lability of the indole ring), methionine, cystine and threonine. In the Maillard reaction of tryptophan the --NH--group of the indole ring is involved too. The Maillard reaction is highly influenced by the pH of foodstuffs or other agents. The reduction of pH which may be performed by the increase of fermentation in the baking industry, lessens the decomposition of lysine and tryptophan in proteins. The raise of pH in basic domain enhances the Maillard reaction up to a maximal value but a decrease may be observed when the pH is raised further on. In foodstuffs and in other solid protein-carbohydrate systems the increase of the moisture content generally enhances the Maillard reaction, the sensibility of the single amino acids to the changes in the moisture content is different. In the case of the alkaline treatment of proteins, we must reckon not only with the decomposition of single amino acids, first of all that of cystine by beta-elimination, but with the formation of some amino acid derivatives as lysinoalanine, lanthionine, and in ornithinoalanine too. Presently lysinoalanine is of toxicological importance as proved by experiences on rats...

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858. Anaphylactic sensitivity of guinea-pigs drinking different preparations of cows' milk and infant formulae

By Anderson K J; McLaughlan P; Devey M E; Coombs R R

From *Clinical and experimental immunology* (1979), 35(3), 454-61, Language: English, Database: MEDLINE

Guinea-pigs have been given various preparations of cows' milk or infant formulae to drink in an investigation of the capacity of these milk preparations to stimulate per os anaphylactic sensitivity. The treatment, presumably heat, used to concentrate the 'Evaporated' whole cows' milks (three brands were tested) almost abolished their sensitizing capacity to beta lactoglobulin. The brand presumed to be most heated as judged by the degree of **caramelization** had also lost most of its sensitizing capacity to casein. Injected parenterally, the 'Evaporated' milk adequately sensitized to anaphylaxis. An infant formula, which in its spray dried form was only moderately sensitizing to both beta lactoglobulin and casein, lost most of this sensitizing capacity when processed to a liquid concentrate state. The manufacturing process for the liquid concentrate involved greater and more prolonged heating than required for the spray-dried form. The relevance of these findings in the guinea-pig to cows' milk protein intolerance in the infant and possibly also to cot death is discussed.

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859. Retardants to the growth of tubercle bacilli; the effect of **caramelization** of growth

By CORPER H J; CLARK C

From *American review of tuberculosis* (1946), 54179-82, Language: English, Database: MEDLINE

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