

1. Anti-tuberculous activity of treponemycin produced by a *Streptomyces* strain MS-6-6 isolated from Saudi Arabia

By Yassien, Mahmoud A.; Abdallah, Hossam M.; El-Halawany, Ali M.; Jiman-Fatani, Asif A. M.
From [Molecules](#) (2015), 20(2), 2576-2590, 15 pp.. Language: English, Database: CAPLUS,
DOI:10.3390/molecules20022576

A *Streptomyces* strain MS-6-6 with promising anti-tuberculous activity was isolated from soil samples in Saudi Arabia. The nucleotide sequence of its 16S rRNA gene (1426 bp) evidenced a 100% similarity to *Streptomyces mutabilis*. Through an anti-tuberculous activity-guided approach, a polyketide macrolide was isolated and identified as treponemycin (TP). The structure of the isolated compd. was detd. by comprehensive analyses of its 1D and 2D NMR as well as HRESI-MS. In addn. to the promising anti-tuberculous activity (MIC = 13.3 µg/mL), TP showed broad spectrum of activity against the Gram pos., Gram neg. strains, and *Candida albicans*. Improvement of TP productivity (150%) was achieved through modification in liq. starch nitrate medium by replacing KNO₃ with corn steep liquor and yeast ext. or tryptone, and removing CaCO₃ and K₂HPO₄. The follow up of TP percentage as well as its metabolites profile for each media was assessed by LC/DAD/MS.

~0 Citings

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2. Isolation and identification of antimicrobial Actinomycetes strains from Saudi environment

By Al-Garni, Saleh Mohamed; Sabir, Jamal Sabir M.; El Hanafy, Amr Abd El Mooti; Kabli, Saleh Abdulla; Al-Twiley, Dina Awad; Ahmed, Mohamed Morsi
From [Journal of Food, Agriculture & Environment](#) (2014), 12(2), 1073-1079, 8. Language: English, Database: CAPLUS

Actinomycetes are highly economic and biotechnol. valuable prokaryotes able to produce wide range of bioactive secondary metabolites such as antibiotics, antitumor agents, immunosuppressive agents and enzymes. Almost 80% of the world's antibiotics are known to come from Actinomycetes, mostly from the genera *Streptomyces* and *Micromonospora*. Around 100 antibiotics have been com. used to treat human, animal and plant diseases. The genus, *Streptomyces* is responsible for the formation of more than 60% of known antibiotics. Actinomycetes from different environments of Jeddah and Al-Madinah Al-Munawwrah have been isolated and screened against some pathogenic bacteria and fungi. Factors affecting growth and antimicrobial prodn. by the selected Actinomycetes isolates were studied and the effect of the culture filtrate on morphol. of the cell, and cell growth and cell wall compn. of the tested microbes were also studied. Results showed that the most active antimicrobial isolate was D8 from Madinah location. This isolate was molecularly identified using 16srRNA as *Streptomyces flavogriseus* (KF235416).

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3. Fundamentals on new capillaries inspired by photonic crystal fibers as optofluidic separation systems in CE

By Calcerrada, Matias; Fernandez de la Ossa, M. Angeles; Roy, Philippe; Gonzalez-Herraez, Miguel; Garcia-Ruiz, Carmen
From [Electrophoresis](#) (2015), 36(3), 433-440. Language: English, Database: CAPLUS, DOI:10.1002/elps.201400239

Two prototypes of microstructured capillaries (MSCs) were designed, manufd., and used to carry out different expts. MSC-1 consisted of six holes of ≈28 µm id whereas MSC-2 consisted of 85 holes of ≈7.7 µm id. A fundamental study on the hydrodynamic injection through a com. capillary electrophoresis (CE) equipment was conducted. Exptl. times to flush sp. vol.s were approx. three times larger than the theor. values. Then, the detection of starch was carried out by using the MSCs and conventional capillaries, and the electropherograms were compared on the basis of anal. parameters employed in CE. An improvement in peak asymmetry was obtained for the MSC-1 compared to the conventional capillaries. S/N was one order of magnitude increased with the MSC, improving ten times the sensitivity. Considering this advantage, the sepn. and detection of nitrostarch was performed as a first application of the MSC-1. Minimal sample amts. of nitrostarch (1.7 µg) were detected. Results present a real interest in forensics since this substance had not been previously detected through CE, leading to new investigations in the design of new capillaries capable of enhancing CE performance.

~3 Citings

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4. Antibiotic production from local *Streptomyces* isolates from Egyptian soil at Wady El Natron: isolation, identification and optimization

By Osman, Mohamed E.; Ahmed, Fath Allah H.; Abd El All, Walla S. M.
From [Australian Journal of Basic and Applied Sciences](#) (2011), 5(9), 782-792. Language: English, Database: CAPLUS

Thirty five soil samples were collected from soil surrounding lakes named (El Gaar, El Hamra and El Bidaa) which are located at Wady El-Natron. The phys. anal. of soils showed great difference in texture and belongs to saline and alk. types. Fifty-three *Streptomyces* isolates were tested for their antagonistic effect against one or more of the test organisms. Four *Streptomyces* isolates no. 7, 9, 11 and 41 were the most potent for antibiotic prodn. on starch nitrate and fish meal ext. media. The isolates were identified to be *Streptomyces coelicolor* (No 7), *Streptomyces flaveous* (No 9), *Streptomyces plicatus* (No 11), and *Streptomyces griseoruber yamaguchi* (No 41). Data revealed that the max. yield of antibiotic can be obtained from these isolates by growing them on fish meal ext. in the presence of trace elements at 28 °C for 4 days.

~3 Citings

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5. Selection of pigment (melanin) production in *Streptomyces* and their application in printing and dyeing of wool fabrics

By Amal, Ali M.; Abeer, Keera A.; Samia, Helmy M.; Nadia, Abd El-Nasser H.; Ahmed, K. A.; El-Hennawi, H. M.
From [Research Journal of Chemical Sciences \(2011\), 1\(5\), 22-28](#). Language: English, Database: CAPLUS

Four strains among 30 *Streptomyces* were isolated producing a diffusible different pigment in eight different media. *Streptomyces virginiae* was the most producer of a diffusible dark brown pigment on both peptone-yeast ext. and tyrosine liq. medium. Some factors affecting on the pigment prodn. were studied. The optimum pH was obsd. at 6 with 10 days of the *Streptomyces* age and five days of incubation on a rotary shaker (180 rpm) at 30 °C. The intensity of the pigment was affected by addn. of carbon, nitrogen and phosphorus sources. Co, Mg and pb SO₄ were increased the intensity of the pigment prodn. The pigment produced at optimum condition had been used to dye and print the wool fabrics, the color strength values and fastness properties of samples were investigated. At the optimum conditions the dyed and printed wool fabrics posses color strength values 12, 10.5 resp. and very good fastness properties of washing, perspiration and light fastness. The antimicrobial activity of the extd. pigment has been investigated.

~3 Citings

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6. Optimization of conditions of nitrohydrocarbon determination in air

By Korenman, Yakov I.; Niftaliev, Sabukhi I.; Kalach, Andrei V.; Mikhalev, Aleksei P.
From [Hemijaska Industrija \(2000\), 54\(7-8\), 324-326](#). Language: English, Database: CAPLUS

Piezoquartz micro-weighing was used to study the properties of piezo-sensors modified with nitrocellulose, nitrostarch, Triton X-100, Carbowax 20M, and triethanolamine; aliph. and arom. nitrohydrocarbons were used as adsorbates. Piezo-sensor selectivity relative to adsorbates was studied. Change of piezo-sensor electrode output anal. signals was examd. as a function of the nature of the modifiers, gas flow rate, and detection temp. The most sensitive surface modified relative to nitrohydrocarbons were chosen for piezo-sensors.

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7. Performance-oriented packaging standards; changes to classification, hazard communication, packaging and handling requirements based on UN standards and agency initiative

No Author and Editor data available
From [Federal Register \(1990\), 55\(246\), 52402-729](#). Language: English, Database: CAPLUS

The hazardous materials regulations under the Federal Hazardous Materials Transportation Act are revised based on the United Nations recommendations on the transport of dangerous goods. The regulations cover the classification of materials, packaging requirements, and package marking, labeling, and shipping documentation, as well as transportation modes and handling, and incident reporting. Performance-oriented stds. are adopted for packaging for bulk and nonbulk transportation, and SI units of measurement generally replace US customary units. Hazardous material descriptions and proper shipping names are tabulated together with hazard class, identification nos., packing group, label required, special provisions, packaging authorizations, quantity limitations, and vessel stowage requirements.

~0 Citings

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8. Deuterium heterogeneity in starch and cellulose nitrate of CAM and C3 plants

By Luo, Yaohua; Sternberg, L.

From [Phytochemistry](#) (1991), 30(4), 1095-8. Language: English, Database: CAPLUS, DOI:10.1016/S0031-9422(00)95179-3

Starch and cellulose were extd. and nitrated from well-illuminated photosynthetic tissues of 7 C₃ species and 9 CAM species. Results show that (1) δD values of cellulose nitrate from CAM species are on av. 73‰ higher than cellulose nitrate of C₃ plants; (2) δD values of nitrated cellulose from C₃ and CAM species are significantly higher than their resp. nitrated starch and (3) the lower the δD value of starch, the higher the difference between δD of nitrated cellulose and starch, with CAM plants showing a greater enrichment. These results confirm the model that deuterium enrichment occurs during carbohydrate metab. in the cytoplasm, and are consistent with the hypothesis that deuterium enrichment of the cytoplasmic pool occurs to a greater extent in CAM plants.

~17 Citings

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9. Phosphorylated starches and miscellaneous inorganic esters

By Solarek, Daniel B.

Edited By: Wurzburg, Otto B

From [Modif. Starches: Prop. Uses](#) (1987), 97-112. Language: English, Database: CAPLUS

A review with 193 refs. on starch mono- and diphosphates and their properties and uses. Starch sulfates and nitrates and their analyses were also discussed.

~2 Citings

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10. Identification of explosives containing alkylammonium nitrates by thin-layer chromatography

By Peterson, George F.; Dietz, William R.; Stewart, LeRoy E.

From [Journal of Forensic Sciences](#) (1983), 28(3), 638-43. Language: English, Database: CAPLUS

The alkylammonium nitrate sensitizers contained in Du Pont and Hercules water gel explosives can be uniquely identified by utilizing thin-layer chromatog. (TLC) systems. These TLC methods also identify the presence of other explosive ingredients and contaminants commonly found in debris from bombings.

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11. Characterization of explosives' traces after an explosion

By Elie-Calmet, J.; Forestier, H.

From [International Criminal Police Review](#) (1979), 325, 38-47. Language: English, Database: CAPLUS

Thin-layer chromatog. solvent systems are described for characterizing the explosive traces. Trichloroethylene satd. with water was used for sepn. of nitroglycols. Petroleum ether: EtOAc (90:10) satd. nitroglycerols and those explosives characterized by reactions with Gniess reagent also included are the systems for sepn. of nitroglycerin and pentaerythritol hydrolysis products.

~0 Citings

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12. High-energy flexible explosive: III. The nitric ester-plasticized nitrostarch binder system

By Wells, Franklin B.

From [Tech. Rep. ARLCD-TR \(U. S. Army Armament Res. Dev. Command\)](#) (1977), (ARLCD-TR-77043), 53 pp..

Language: English, Database: CAPLUS

A flexible explosive of high power and brisance which is resistant to friction and impact [and to water when plasticized with TMETN (trimethylolethane trinitrate) [3032-55-1]] and which remains flexible at $\geq -40^\circ$ when plasticized with TEGDN (triethylene glycol dinitrate) [111-22-8] is provided by compns. contg. a fine-grained high explosive, e.g., HMX [2691-41-0], RDX, PETN, or mixts. therof ~76, nitrostarch (I) [9056-38-6] (~12.9-13.1% N) 10-14, TMETN or TEGDN in amts. providing a I/plasticizer ratio 0.6-1.8:1, and Ph₂NH [122-39-4] stabilizer 0-5% (based on I). Thus, a compn. contg. HMX 68, I 14, TMETN 18, Ph₂NH 0.7%, and EtOAc ~70 mL/100 g of mix was rolled into EtOAc-free sheets 6.2 mm thick which were elastic, smooth, and tough having detonation velocity 8219 m/s, d. 1. 59 g/cm³, ballistic pendulum value (TNT = 1.0) 1.316, bullet impact no fire or explosion, friction pendulum (steel shoe) no crackle, fire, or explosion; cap sensitivity no. 8 cap, and cold temp. 10°.

~0 Citings

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13. Analysis of explosives and explosives residues. 3. Monomethylamine nitrate

By Parker, R. G.

From [Journal of Forensic Sciences \(1975\), 20\(2\), 257-60](#). Language: English, Database: CAPLUS

Monomethylamine nitrate (I) [22113-87-7] was distinguished from other explosives by chem. spot test, and thin-layer chromatog. (TLC), which showed a detection limit of $>0.5 \mu\text{g}$. In the chem. spot test of an explosive contg. I and NH₄NO₃ [6484-52-2], the white precipitate for I was obscured by the brown precipitate for ammonia. Hence, TLC was the method of choice for I detection.

~2 Citings

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14. Analysis of explosives and explosive residues. 2. Thin-layer chromatography

By Parker, R. G.; McOwen, J. M.; Cherolis, J. A.

From [Journal of Forensic Sciences \(1975\), 20\(2\), 254-6](#). Language: English, Database: CAPLUS

Org. explosive residues, e.g. 2,4,6-trinitrotoluene (I) [118-96-7], were detected by thin-layer chromatog., utilizing a combination of R_f values and color development.

~4 Citings

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15. Characterization of explosives traces after an explosion

By Forestier, H.

From [International Criminal Police Review \(1974\), 277, 99-106](#). Language: English, Database: CAPLUS

An anal. scheme is outlined for the identification of trace quantities of explosive materials formed on the debris resulting from the explosion to identify the original explosive or detonator. The debris is washed with acetone, then with water. Wash solns. are concd. by evapn. and the solutes are characterized by chromatog. on silica gel plates. Identifying colors resulting from spraying the plates with alc. KOH and Griess reagent are tabulated for most com. explosives.

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16. Infrared study of various nitrated polysaccharides and their structural characterization

By Dawoud, Abdel Fattah; Marawan, Ashraf

From [Carbohydrate Research \(1973\), 26\(1\), 65-70](#). Language: English, Database: CAPLUS, DOI:10.1016/S0008-6215(00)85022-3

Ir spectra for a number of polysaccharides and their nitrated derivs. were obtained. The frequency range 730-960 cm⁻¹ is useful for identification of the polysaccharides, and the region 900-1350 cm⁻¹ is more suitable for distinguishing the nitrated materials. The strong intensity of the nitrate bands limits the interpretation of spectra below 960 cm⁻¹, but above this frequency the absorption bands of nitrated polysaccharides are generally sharper and more clearly defined than the corresponding bands of the parent polysaccharides. Data on the C-O-C bridge, C-C ring, C-O, and C-OH frequencies and on the C-H deformation and stretching frequencies were obtained. The use of ir spectroscopy for the quantitative detn. of nitrate groups in nitrated polysaccharides is discussed.

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17. Characterization of starch and its derivatives

By Monzon Bano, Enrique

From [Ion \(Madrid\) \(1972\)](#), [32\(367\)](#), 90-4, 97-9. Language: Spanish, Database: CAPLUS

The purification of starch samples, and various methods for elemental anal., microscopic anal., chem. identification of reactive groups, ir spectral anal., and tests of coloration by dyes are described for use in characterization of starch and its derivs.

~0 Citings

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18. The ignition of condensed substances in a heated gas

By Grigor'ev, Yu. M.; Lisitskii, V. I.; Merzhanov, A. G.

From [Fizika Goreniya i Vzryva \(1967\)](#), [3\(4\)](#), 512-26. Language: Russian, Database: CAPLUS

The ignition of nitrocellulose, poly(vinyl nitrate), Ba azide, and nitrostarch by a hot gas stream was studied. Air, Ar, and O-enriched air, heated to 200-600°, were used. The ignition delay was detd. directly by photoelec. measurements and ranged from 0.1 to 100 sec. The flow of hot gas was adjusted to low values of the Reynolds and Grashof nos. so that the heat transfer would be essentially by cond. For nitrocellulose, poly(vinyl nitrate), and Ba azide, the crit. explosion temp., T_0 , depends upon α , the coeff. of heat transfer, and is independent of the gas compn. With nitro-starch, increasing the O content of the gas decreases T_0 . The crit. parameters for thermal explosion are also treated theoretically.

~2 Citings

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19. Stabilization of polymeric carbohydrate nitrates of starch, amylose, amylopectin and glycogen

By Mustafa, Ahmed; Dawoud, Abdel F.; El-Shorbani, Salah

From [Staerke \(1968\)](#), [20\(2\)](#), 55-9. Language: English, Database: CAPLUS, DOI:10.1002/star.19680200206

Whole starch, amylose, amylopectin, and glycogen were nitrated by mixed acids (procedure A), HNO₃ (procedure B) and HNO₃ in the presence of P₂O₅ (procedure C, used for starch only). Cold EtOH stabilization was effected by suspending crude nitrated products, as well as those that had already been stabilized by boiling in H₂O for 150 hrs., in EtOH for 8 hrs., followed by washing and refluxing with distd. H₂O under reflux for 16 hrs. Hot EtOH stabilization of the samples prepd. as above was effected by continuously extg. them with hot EtOH for 8 hrs., followed by boiling with H₂O for 16 hrs. Some of the samples obtained above were given a further treatment with boiling aq. Na₂CO₃ (0.075%). The total sulfate content of the samples prepd. by procedure A has been detd. and appreciable lowering of these values accompanied by improvement in stability has been observed in samples subjected to hot EtOH treatment. Further alk. carbonate treatment of samples which have had hot EtOH treatment resulted in further improvement of stability. It is concluded that the stabilizing action of hot EtOH and carbonate could be attributed to removal of free acidity as well as some of the nitrated oxidn. impurities, carbonate being much more effective in this respect. Glycogen nitrate behaved similarly in this respect as compared with whole starch nitrate and fractionated starch nitrates.

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20. Stabilization of polymeric carbohydrate nitrates. Stability of dextrin nitrates

By Mustafa, Ahmed; Dawoud, Abdel F.; Marawan, Ashraf

From [Staerke \(1967\)](#), [19\(11\)](#), 358-62. Language: English, Database: CAPLUS, DOI:10.1002/star.19670191103

Dextrin (I) and starch (II) were nitrated with HNO₃, 9:1 HNO₃-Ac₂O, or 38:62 HNO₃-H₂SO₄, and the stabilities of the nitrates obtained were compared. I nitrate (III) prepd. using HNO₃ or HNO₃-Ac₂O was less stable than II nitrate (IV) prepd. by the same method, while for nitration with HNO₃-H₂SO₄, the order was reversed. For nitrates prepd. by the latter method, I showed a lower total S content than II. Similarly, boiling with water or Na₂CO₃ soln. tended to stabilize III and IV prepd. with HNO₃ or HNO₃-Ac₂O, but decreased the stability of those prepd. with HNO₃-H₂SO₄. III prepd. with HNO₃ were completely sol. in EtOH, while those prepd. with HNO₃-H₂SO₄ were only partially sol. IV were only partially sol. in both cases.

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21. Stability of the nitrates of starch, amylose, and amylopectin

By Mustafa, Ahmed; Dawoud, Abdel F.; El-Shorbani, Salah

From [Staerke \(1967\)](#), 19(7), 212-18. Language: English, Database: CAPLUS, DOI:10.1002/star.19670190704

cf. CA 58: 654d. Whole starch, amylose, and amylopectin were nitrated by HNO₃/H₂SO₄ and by HNO₃ alone. The stabilities of the products were compared. The total sulfate impurities of amylopectin nitrate were similar to whole starch nitrate, while those of amylose nitrate were lower. The best stabilization, as measured by the Bergmann-Junk test, of the mixed acid products was obtained by boiling for 2 hrs. with H₂O at 130° followed by boiling with 0.075% Na₂CO₃ for 24 hrs. Bergmann-Junk values (mg. N/g. sample) in the order of nitration products of starch, amylopectin, and amylose were 1.7, 1.75, and 1.7. Direct boiling with Na₂CO₃ was less effective: 2.5, 2.6, 2.5. For the HNO₃ products, boiling for 2 hrs. with H₂O at 135° gave 2.8, 3.1, and 2.6; and followed by 12 hrs. reflux with Na₂CO₃ gave 1.5, 1.5, and 1.4, resp. Direct boiling with Na₂CO₃ for 96 hrs. gave 1.6, 1.6, and 1.5, resp., and thus approached the stability of cellulose nitrate (1-1.25).

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22. Stabilization of starch and cellulose nitrates

By Mustafa, Ahmed; Dawoud, Abdel Fattah

From [Explosivstoffe \(1966\)](#), 14(11), 241-7. Language: English, Database: CAPLUS

The stabilities of crude starch and cellulose, nitrated with com. mixed acids, and stabilized by long-boiling or by kier-boiling, were compared. Boiling for 60 hrs. with water, followed by boiling for 24 hrs. with 0.02% Na₂CO₃ soln. is more effective for starch nitrate; but boiling at 120° with water under pressure for 3 hrs. followed by boiling for 24 hrs. with 0.02% Na₂CO₃ soln. is equivalent. Such treatments produce starch nitrate with a stability of 2.7 mg. N/g. of sample; cellulose nitrate, similarly treated, is much more stable, 1.1 mg. N/g. of sample. However, cellulose nitrated with HNO₃-Ac₂O is inherently stable; kier-boiling does not improve the stability. Perhaps the difference in stability between cellulose nitrate and starch nitrate is related to their different glycoside linkages.

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23. Starch, amylose, and amylopectin nitrates

By Mustafa, Ahmed; Dawoud, Abdel Fattah

From [Explosivstoffe \(1964\)](#), 12(10), 227-33. Language: English, Database: CAPLUS

Starch, amylose and amylopectin nitrates were prepd. by nitrating the carbohydrates with a mixt. of HNO₃ and Ac₂O. Stability tests of the nitrates were carried out by the Bergmann-Junk method (cf. M., et al., CA 58, 654d; M. and D., CA 60, 359h). Amylopectin nitrate (I) was the least stable. Boiling the nitrates with water under pressure increased their stability. The I was degraded much more in the boiling treatment than the other 2 nitrates.

~0 Citings

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24. Carbanilates. Reaction of starch with aryl isocyanates

By Wolff, Ivan A.

From [Methods in Carbohydrate Chemistry \(1964\)](#), 4, 301-3. Language: Unavailable, Database: CAPLUS

7 references.

~0 Citings

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25. p-Toluenesulfonylation. Starch and amylose p-toluenesulfonates

By Roberts, Hugh J.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 299-301](#). Language: Unavailable, Database: CAPLUS

5 references.

~2 Citings

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26. Sulfation. Triethylamine-sulfur trioxide complex

By Whistler, Roy L.; Spencer, W. W.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 297-8](#). Language: Unavailable, Database: CAPLUS

11 references.

~4 Citings

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27. Phosphation with inorganic phosphate salts

By Paschall, Eugene F.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 294-6](#). Language: Unavailable, Database: CAPLUS

8 references.

~14 Citings

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28. Nitration

By Goldfrank, Max

From [Methods in Carbohydrate Chemistry \(1964\), 4, 291-4](#). Language: Unavailable, Database: CAPLUS

13 references.

~0 Citings

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29. Starch formate

By Roberts, Hugh J.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 289-90](#). Language: Unavailable, Database: CAPLUS

5 references.

~0 Citings

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30. Acetylation

By Wurzburg, O. B.

From [Methods in Carbohydrate Chemistry \(1964\), 4, 286-8](#). Language: Unavailable, Database: CAPLUS

4 references.

~48 Citings

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31. Starch nitrates

By Reinhardt, L.; Sieper, G. A.; Zimmermann, W.

From [Staerke \(1964\)](#), **16(4)**, 107-12. Language: Unavailable, Database: CAPLUS

A review is given of the properties, production, possible applications, and stabilization of nitrostarch. Lacquer produced from it is not of a sufficiently high quality, it has been used for production of explosives, but remains without technical significance.

~0 Citings

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32. Stabilization of starch nitrates with boiling water under pressure

By Mustafa, Ahmed; Dawoud, Abdel F.

From [Explosivstoffe \(1963\)](#), **11(8)**, 168-74. Language: Unavailable, Database: CAPLUS

Nitrostarch (I) has found little practical application as an explosive principally because of its instability. An attempt was made to obtain stable products by treating the I with boiling water under pressure (kier-boiling process). A suspension of 10 g. I in 150 ml. distd. H₂O was placed in the reactor of the autoclave. The samples were then heated with H₂O under pressure at different temps. (115-135°) for about 1 hr. The Abel heat test and the Bergmann-Junk test were used to determine the storage stability of the treated samples. The results show the efficiency of this treatment in removal of unstable impurities contaminating the I. They have also proved the importance of the kier-boiling process as a satisfactory method for stabilizing I.

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33. Stabilization of polymeric carbohydrate nitrates from studies on starch, amylose, amylopectin, and glycogen

By Mustafa, Ahmed; Dawoud, Abdel Fattah; El-Shourbani, Salah

From [Canadian Journal of Chemistry \(1962\)](#), **40**, 2072-7. Language: Unavailable, Database: CAPLUS, DOI:10.1139/v62-318

Whole starch, amylose, amylopectin, and glycogen (polymeric carbohydrates of the α -D-glycosidic linkage type) were nitrated by HNO₃ in the presence of P₂O₅, and stability properties of the nitrated products were studied. Crude amylose nitrate is more stable than amylopectin nitrate, and the latter is less stable than the whole-starch nitrate, as judged by the Bergmann-Junk test. The stability of glycogen nitrate is closely similar to that of amylopectin nitrate. Appreciable stabilization of the crude nitrates was brought about by boiling with slightly alk. water for long periods (60-70 hrs.). All stabilized samples possessed closely similar stability properties. The Bergmann-Junk values of all nitrates examined ranged from 2.2 to 1.7 mg. of N per g. sample; the latter value seems to represent the maximum stabilization which could be attained for the polymeric carbohydrate nitrates of the α -D-glycosidic linkage type. In the case of cellulose nitrate (β -D-glycosidic linkage type), Bergmann-Junk values of 1 to 1.25 mg. of N were obtained.

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34. Hydrolysis and analysis of nitric acid esters ("nitro compounds")

By Schulek, E.; Burger, K.; Feher, M.

From [Fresenius' Zeitschrift fuer Analytische Chemie \(1960\)](#), **177**, 81-6. Language: Unavailable, Database: CAPLUS

cf. CA 53, 19672i. The N-contg. products of the alk. hydrolysis of glycerol trinitrate (I), pentaerythritol tetranitrate (II), nitrocellulose (III), and nitrostarch (IV) were NH₃, CN⁻, NO₂⁻, and NO₃⁻. Quant. amts. of the hydrolysis products of II produced under different conditions and of all of the esters hydrolyzed under identical conditions are given. The ratios of the 4 products formed under identical conditions are characteristic of the individual compounds: NO₂⁻/NO₃⁻ = 0.83 for II; 1.46, III; and 2.14, I and IV. Only II formed no CN⁻. Reducing compounds, formed during the hydrolysis, account in part for reduction of NO₃⁻.

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35. Infrared spectrophotometric determination of nitrostarch in XC-9 initiation mixture

By Fletcher, Aaron N.

From [United States Department of Commerce, Office of Technical Services, PB Report \(1959\), 135 135, 19 pp.](#)

Language: Unavailable, Database: CAPLUS

An infrared spectrophotometric method has been developed for the detn. of nitrostarch in the supernatant liquid of XC-9 initiation mixt. The liquid sample is filtered and evapd. to dryness. Acetone is added, and the absorbance at 11.8 μ is detd. An iterative or a quadratic method is used to calc. the amt. of nitrostarch present. The precision is reflected by a percentage coeff. of variation of 0.4. The accuracy is calcd. to be within $\pm 4.5\%$ of the amt. present for a nominal compn. of 2.72 g. of nitrostarch/100 g. of solvent.

~0 Citings

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36. Nitration studies with acid mixtures. II. Use of the improved Barger method for the determination of the molecular weight of macromolecular substances. Further investigations of the degradation of starch nitrate in acid mixtures

By Kunz, Alfons; Giber, Janos; Dobis, Otto

From [Acta Chimica Academiae Scientiarum Hungaricae \(1959\), 20, 275-83.](#) Language: German, Database: CAPLUS

cf. C.A. 52, 11755d. The Barger method (Proc. Chem. Soc. 19, 121(1903)), in the form improved by Szabó and Szoke (C.A. 46,321e), was applied to the detn. of the mol. wt. of starch nitrate (I) with a relative error limit of $\pm 2\%$. The degradation of I was studied in 3 different acid mixts.: 70% HNO₃, 20% H₂SO₄, 10% H₂O; 85% HNO₃, 7.5% H₂SO₄, 7.5% H₂O; 64% HNO₃, 26% H₃PO₄, 10% P₂O₅. No degradation of I took place in the 3rd mixt. In the 1st and 2nd mixt. I degraded, in the 1st to a greater extent. The value of consts. were established, applying the Staudinger equation as modified by Mark: $\alpha = 0.52$, $K = 0.99 \times 10^{-2}$.

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37. Starch nitrate

By Caesar, George V.

From [Advances in Carbohydrate Chemistry \(Melville L. Wolfromm and R. Stuart Tipson, editors. Academic Press Inc., New York\) \(1958\), 13, 331-45.](#) Language: Unavailable, Database: CAPLUS

Reviews with references; cf. C.A. 51, 2571fa.

~2 Citings

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38. Nitration studies with mixed acid I. Nitrostarch; nitration period; degradation

By Kunz, Alfons; Toth, Istvan

From [Acta Chimica Academiae Scientiarum Hungaricae \(1957\), 13, 385-95.](#) Language: German, Database: CAPLUS

On addn. of a suspension of 1 g. starch in 5 ml. CCl₄ to a mixed acid kept in a well thermostated Dewar flask agitated with an efficient vibrator, nitration takes place practically instantaneously, i.e., within 0.0-10.0 sec. The magnitude and duration of the rise of the temp. in the mixt. was measured and the N content of the product was detd. with different HNO₃-H₂SO₄-H₂O mixts. A linear relationship was found between the activity of the HNO₃ in the mixed acid and the velocity of the nitration, as well as between the temp. of the reaction and its duration. Addnl. experiments showed that the esterification itself is not a very exothermal reaction. The degradation of the starch, evaluated by measuring the specific viscosity of the product, was rather rapid with the unnitrated starch and very much slower with the nitrated starch. The degradation velocity is very much dependent on the temp. of the reaction.

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39. Nitration studies with mixed acid I. Nitrostarch; nitration period; degradation

By Kunz, Alfons; Toth, Istvan

From [Magyar Kemiai Folyoirat \(1957\), 63, 201-6.](#) Language: Unavailable, Database: CAPLUS

On addn. of a suspension of 1 g. starch in 5 ml. CCl_4 to a mixed acid kept in a well thermostated Dewar flask agitated with an efficient vibrator, nitration takes place practically instantaneously, i.e., within 0.0-10.0 sec. The magnitude and duration of the rise of the temp. in the mixt. was measured and the N content of the product was detd. with different HNO_3 - H_2SO_4 - H_2O mixts. A linear relationship was found between the activity of the HNO_3 in the mixed acid and the velocity of the nitration, as well as between the temp. of the reaction and its duration. Addnl. experiments showed that the esterification itself is not a very exothermal reaction. The degradation of the starch, evaluated by measuring the specific viscosity of the product, was rather rapid with the unnitrated starch and very much slower with the nitrated starch. The degradation velocity is very much dependent on the temp. of the reaction.

~0 Citings

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40. Studies on nitrostarch: Stabilization and some explosive compounds

By Ahmad, Iqbal; Karimullah

From [Pakistan Journal of Scientific Research \(1954\)](#), 6, 133-5. Language: Unavailable, Database: CAPLUS

Washed and stabilized nitrostarch (13.1% N) was copptd. with 5 to 65% nitrocellulose (I), which at >37.5% I increased stability and made usable propellants.

~0 Citings

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41. Heat of formation of nitrostarch

By Smolenski, Dionizy; Strzondala, Jadwiga

From [Zeszyty Nauk. Politech. Wroclaw. \(1954\)](#), No. 4(Chem. No. 1), 49-56. Language: English, Database: CAPLUS

The heat of formation of nitro-starch (I) is a linear function of the degree of esterification. I was prepd. by treating starch either with a mixt. of HNO_3 and H_2SO_4 or by HNO_3 alone. The heat of formation of I obtained by HNO_3 is lower than the heat of formation of I obtained by $\text{HNO}_3 + \text{H}_2\text{SO}_4$, although the N content was the same. This may be due to the formation of sulfuric acid esters when HNO_3 and H_2SO_4 were used. Heats of formation in cal./g. were as follows: For I prepd. by HNO_3 alone: for 10.52% N 696.5, for 12.20% N 576.3, for 12.87% N 523.3, and for 13.34% N 504.5. For I prepd. by $\text{HNO}_3 + \text{H}_2\text{SO}_4$: for 10.52% N 702.4, for 11.02% N 668.3, for 12.65% N 560.0, for 12.87% N 555.5, and for 13.24% N 541.0.

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42. Explosive properties of the nitrate of starch

By Le Roux, Albert

From [Memorial des Poudres \(1951\)](#), 33, 211-21. Language: Unavailable, Database: CAPLUS

Exptl. detn. of explosive properties of pure compd. and in mixts. of the Grenite and Trojan types.

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43. Preparation of the nitrate of starch

By Brissaud, Louis; Ronssin, Stanislas

From [Memorial des Poudres \(1951\)](#), 33, 199-210. Language: Unavailable, Database: CAPLUS

Historical review. 23 references.

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44. The stability of penthrite

By Aubertein, Paul

From [Memorial des Poudres \(1951\)](#), 33, 175-86. Language: Unavailable, Database: CAPLUS

Vacuum stability tests on penthrite (pentaerythritol tetranitrate) are used to study effects of pptn. methods on stability.

~0 Citings

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45. Preparation of pentryl

By Desseigne, Gerard

From [Memorial des Poudres \(1951\)](#), 33, 255-64. Language: Unavailable, Database: CAPLUS

2,4-Dinitrophenylethanolamine (I) is prepd. by treating ethanolamine with 1-chloro-2,4-dinitrobenzene. Nitration of I yields pentryl. The procedure is described.

~0 Citings

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46. A process for the polymer-analogous nitration of strongly swelling carbohydrates, such as pectin and starch

By Vollmert, B.

From [Makromolekulare Chemie \(1951\)](#), 6, 78-84. Language: Unavailable, Database: CAPLUS

For polysaccharides which are unstable in bases, such as polyuronic acid esters, and therefor cannot be acetylated or methylated without degradation, nitration is the only reaction suitable for obtaining derivs. for osmotic pressure and viscosity detns. in org. solvents. Some polysaccharides, e.g. starch and pectin, swell strongly in mixts. of HNO₃ with H₂SO₄ or H₃PO₄, and therefore the products are difficult to sep. They can be nitrated with N₂O₅, but the latter is difficult to prep. and preserve. Here a method is described whereby N₂O₅ is distd. directly from a P₂O₅-HNO₃ mixt. onto the sample in a high vacuum. The app. consists of 2 flasks connected together, and distn. from one to the other is carried out by immersing one in a freezing mixt. The reaction is carried out for 12-24 hrs. at 0 to -5°. For the nitration of 0.5 g. of substance, 5 cc. of HNO₃ is used. The process can be used for cellulose if longer reaction times and more N₂O₅ are used. It is shown by osmometry and viscometry that no degradation occurs during reaction times of 12-96 hrs.

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47. The chlorine oxidation of glycosides. I. Oxidation of methyl β-glucoside

By Dyfverman, Arne; Lindberg, Bengt; Wood, Dennis

From [Acta Chemica Scandinavica \(1951\)](#), 5, 253-60. Language: English, Database: CAPLUS, DOI:10.3891/acta.chem.scand.05-0253

The action of Cl water on Me β-glucoside (I) was studied. The chief product was D-gluconic acid (II), which was slowly oxidized to 5-ketogluconic acid (III). A similar reaction for Me α-glucoside (IV) was much slower. A slow stream of Cl gas was passed through a 0.5 M soln. of I at room temp. with exclusion of light, samples withdrawn at various times, the Cl removed from the samples by aeration for 10-15 min., and the optical rotation, total acid, HCl, and HIO₄ values obtained. After 14 days, a larger sample was removed, the Cl removed by aeration, 10 cc. of the soln. (IVA) neutralized with Ag₂CO₃, filtered, satd. with H₂S, the Ag₂S filtered off, the excess H₂S removed by aeration, the soln. neutralized warm with CaCO₃, filtered, concd. in vacuo to 5 cc., and the residue stirred into 100 cc. EtOH. The amorphous Ca salts (0.87 g.), [α]_D²⁰ 7.5° (H₂O, c 1) (the value for pure Ca gluconate is 8.5°), contained no OMe. A 10-cc. sample of IVA was freed from HCl, the filtrate concd. to 10 cc., 1.5 cc. glacial HOAc and 1 cc. PhNHNH₂ added, and the mixt. heated 1 hr., filtered, and let stand overnight at 0° to yield yellow crystals which were sepd., washed with Et₂O, dissolved in 350 cc. boiling EtOH, filtered, and kept at 0° 3 hrs.; the product (0.39 g.), recrystd. from EtOH, [α]_D²⁰ 13° (H₂O, c 1), m. 196° (decompn.), did not depress the m.p. of authentic II phenylhydrazide. The Ca salt of II (2 g.) with H₂O₂-Fe₂(SO₄)₃ (C.A. 28, 5047.1), yielded 0.1 g. D-arabinose. After chlorination had continued 40 days, 50 cc. soln. was withdrawn, freed from HCl, treated 2 hrs. with excess BaCO₃ at 40-5°, filtered, concd. in vacuo to 5 cc., 40 cc. EtOH added, and the Ba salts (1.70 g.) removed after several hrs., washed with EtOH and Et₂O, and dried; 1.0 g. of the Ba salts was dissolved in 2-3 cc. H₂O, the Ba removed with N H₂SO₄, 12 cc. EtOH and 38 cc. of a 10% alc. brucine soln. added, and the mixt. let stand overnight at 0° to yield 0.8 g. of the brucine salt of III, m. 172-3° (from H₂O), [α]_D²⁰ -26 ± 2°. A 0.5 N soln. of I was unaffected by 2 N HCl at room temp. Chromatographic expts. were carried out with BuOH-HOAc-H₂O (4:1:5) solvent, the chromatograms left in the vapor of the aq. phase 1 hr., the app. charged with the BuOH-HOAc phase, and the chromatogram run 16-18 hrs., dried at 100°, and developed with ammoniacal AgNO₃ (V) (5%), resorcinol (VI) (3% in 5% alc. HC), and methyl orange indicator soln. (VII).

~0 Citings

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48. Mechanism of the nitration of starch

By Israelashvili, Shalom

From [Nature \(London, United Kingdom\) \(1950\), 165, 686](#). Language: Unavailable, Database: CAPLUS, DOI:10.1038/165686a0

Conditions which favor the formation of the nitronium ion (NO_2^+) lead to starch nitrates of high N content. The formation of starch nitrates may be due to an attack of the nitronium ion on a lone electron pair of the hydroxyl O, followed by elimination of a proton from the intermediate product.

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49. Studies on reactions relating to carbohydrates and polysaccharides. LXII. Effect of hot alkali on the nitrates of starch, amylose, and amylopectin

By Ashford, W. R.; Hibbert, Harold

From [Canadian Journal of Research, Section B: Chemical Sciences \(1947\), 25B, 151-4](#). Language: Unavailable, Database: CAPLUS

cf. C.A. 40, 7630.6. The nitrates of whole starch, amylose, and amylopectin were heated with standard NaOH and the relative consumptions of alkali detd. by titration. No denitration of these substances occurred in 15 min. with 0.3928 N NaOH. Amylose nitrate (I) consumed 3.65 milliequivs. and amylopectin nitrate (II) 2.79 milliequivs. of NaOH whereas, amylose and amylopectin did not consume appreciable amts. of alkali. Therefore, the nitration of amylose formed more terminal aldehyde groups than the nitration of amylopectin. I was more stable (explosive) than II as shown by the Bergmann-Junk test. Cellulose nitrate is more stable than I but was as readily attacked by alkali as I and more so than II. The instability of the nitrates from starch can not, then, be assocd. with the presence of free aldehyde groups. Alkali treatment did not produce a usefully stable nitrate.

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50. Molecular weight and intrinsic viscosity of nitric triesters of corn starches and dextrans

By Caesar, G. V.; Gruenhut, N. S.; Cushing, M. L.

From [Journal of the American Chemical Society \(1947\), 69, 617-21](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ja01195a045

The no.-av. mol. wt. (\bar{M}) and intrinsic viscosity (η) of unfractionated nitric triesters of corn starches and corn dextrans were detd. in ethyl acetate solns. The nitric triesters were prepd. under anhyd. conditions and at relatively low temp. The mol. wts. were detd. by a microisopiestic method. The results yielded three linear graphs of $\log \bar{M}$ vs. $\log \eta$, depending on three processes of prep. the starch. These three lines have a common intersection coincident with the point for maltose octanitate. The N content could not be made to exceed then triester value; this fact suggests a cyclic structure or an inner anhydride. Data were also obtained for the nitric esters of cellulose, potato amylose, and corn amylose.

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51. Reactions relating to carbohydrates and polysaccharides. LX. Stabilizing action of ethanol on starch nitrates

By Ashford, W. R.; Cooke, L. M.; Hibbert, Harold

From [Canadian Journal of Research, Section B: Chemical Sciences \(1946\), 24B, 238-45](#). Language: Unavailable, Database: CAPLUS

Corn starch nitrate (20 g.) (I) prepd. by Will and Lenze's method (Ber. 31, 68(1898)) was subjected to successive treatments with cold alc., boiling alc., Me_2CO followed by the addn. of alc. and evapn. of the Me_2CO , and finally ether. The wt. of the residue (II) after such treatments was about 15.5 g. The alc.-sol. fractions, which were of low mol. wt. and low in N, were not stabilized by alc. However II showed a much higher Abel stability than did I. II also possessed good explosive properties and contained 13.43 to 13.96% N. Detailed data regarding fractionation, and N content, η_{sp} , Abel stability, and explosive characteristics of the various fractions are included.

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52. Nitration of starches with nitrogen pentoxide in presence of sodium fluoride

By Caesar, G. V.; Goldfrank, Max

From [Journal of the American Chemical Society \(1946\), 68, 372-5](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ja01207a007

A lab. app. is described and a detailed method is given for the prepn. of N_2O_5 (mixed with N_2O_4). A simple and effective means of removal of HNO_3 (a by-product in nitrating with N_2O_5) is the use of NaF (which probably forms a H-bonded complex, $NaF \cdot sbd \cdot HONO_2$), by which the efficiency of the nitration reaction is greatly increased. Powd. starch (50 g., previously dried at 105° for 4-5 hrs.) was added to 150-300 g. N_2O_5 in 1500 ml. $CHCl_3$ (previously cooled to about 0°) and the reaction temp. was maintained below $16-18^\circ$. The nitration of corn starch was allowed to proceed for 20 min. and of potato starch for 30-60 min. for complete nitration. The filtered starch trinitrate was washed with 400 ml. $CHCl_3$ and then with hot H_2O , after which it was stabilized in 1 l. hot H_2O by boiling 3 hrs. (with intermediate neutralization in very dil. NH_4OH). The concn. of N_2O_5 had no appreciable effect on the time or degree of nitration; complete nitration was obtained at a ratio of N_2O_5 : starch of 2.5 or higher under a wide variation of time or temp. The degree of nitration can be varied at will, being dependent primarily upon the N_2O_5 :starch ratio. Data are given for the nitration of corn and potato amyloses and amylopectins, heavy-boiling corn and potato starches, thin-boiling corn starch, and dextrans. Because of the completely anhyd. character of the nitration and the relatively low temp. involved, the nitric esters are considered to reflect the degree of polymerization of the original materials and they may offer a new method of structural study of polysaccharide polymers.

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53. Nitrostarch as a lacquer raw material

By Kraus, Alfred

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1943\), 38, 170-1](#). Language: Unavailable, Database: CAPLUS

cf. C. A. 38, 2224.6. Nitrostarch can play the part of a filler addn. agent in lacquers, because it has a certain resinous property. Patents are reviewed.

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54. Nitrostarch as a lacquer raw material

By Kraus, Alfred

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1943\), 38, 152-3](#). Language: Unavailable, Database: CAPLUS

A patent review.

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55. The preparation and properties of nitrated starch

By Urbanski, T.; Hackel, J.

From [Congr. intern. tech. chim. ind. agr., Compt. rend., Vle congr., Budapest \(1939\), 2, 766-73](#). Language: Unavailable, Database: CAPLUS

Earlier work (cf. C. A. 29, 5657.7; 31, 8927.6) is summarized and new expts. are reported. Starch preps. having different viscosities gave nitrostarches having almost the same viscosities. By fractionating nitrostarch from an acetone-water mixt. fractions were obtained which had somewhat different N contents but almost the same viscosities.

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56. Nitrostarch demolition explosive

By Young, J. M.

From [Military Engr. \(1939\), 31, 11-14](#). Language: Unavailable, Database: CAPLUS

T. N. T. (I) is the ideal military explosive but, because it is used so extensively for munitions, there is need for a substitute which is suitable for purely demolition purposes. Y. discusses various proposed substitutes (dynamite, NH_4NO_3 -dynamite, tetryl, ammonal, gun cotton, NH_4 picrate ("Explosive D"), blasting gelatin, picric acid (II) and nitrostarch (III)), and indicates the disadvantages of each. Blocks of II were tested in comparison with I, but the former were brittle, crumbly and porous. II stains everything with which it comes in contact, making it unsuited for com. purposes. The investigation was then limited to comparative tests between blocks of I and III. The following data were obtained, resp.: hygroscopicity negligible, 1.9%; explosion temp. 870°F ., 410°F .; sensitivity to impact (min. height of fall of 2 kg. ball to detonate) 16 in., 8 in.; power 100%, 88%; d. in block form 1.46, 1.78. Accelerated tests indicated that I is more stable than III in long storage although the latter can be stored satisfactorily for a few yrs. About 1900 lb. of III was employed in this investigation and the War Dept. has formally approved its adoption as a substitute standard explosive for use in an emergency. Standard com. packages of I and III are described and illustrated.

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57. Starch nitrate and acetate

By Dejarne, Noel

From [Revue Generale des Matieres Plastiques \(1938\)](#), 14, 107-8. Language: Unavailable, Database: CAPLUS

A brief patent review.

~1 Citing

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58. Nitration of cellulose and starch by means of nitric anhydride

By Urbanski, T.; Janiszewski, Z.

From [Roczniki Chemii \(1937\)](#), 17, 349-52(in French 352). Language: Unavailable, Database: CAPLUS

The authors have examd. the nitrating action of N_2O_5 on cellulose and starch. By the action of N_2O_5 , it is possible to obtain nitrocellulose contg. about 14% of N. The same result is obtained when liquid N_2O_5 mixed with HNO_3 acts on cellulose. Starch nitrated with gaseous or liquid N_2O_5 contains up to 13.85% of N.

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59. Use of safety dynamites in atmospheres containing methane

By Audibert, Etienne; Cheradame, Raymond

From [Revue de l'Industrie Minerale \(1937\)](#), No. 399, 403-35. Language: Unavailable, Database: CAPLUS

cf. C. A. 30, 8619.9. The conditions for the safe use of explosives in air contg. CH_4 are formulated. Although mixts. of nitroglycerin, NH_4NO_3 and NaCl are safe but inefficient explosives, mixts. of nitroglycerin, NH_4NO_3 , cellulose and a solid which liberates inert gases on heating ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$, NH_4Cl) are both safe and efficient.

~0 Citings

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60. Nitrostarch

By Centola, Germano

From [Gazzetta Chimica Italiana \(1936\)](#), 66, 8-15. Language: Unavailable, Database: CAPLUS

Rice starch, nitrated with HNO_3 of various concns., gave a series of products contg. 8.5-12.4% N. X-ray examn. showed that the nitro starch with 12.4% N had a fairly regular structure, and both the positions and intensities of the interference lines resembled those of unstable nitrocellulose contg. 12% N, so that the 2 substances probably have the same structure. With diminution in the N content, the diffraction lines become more uncertain, so that the degree of crystn. becomes more imperfect with decrease in the NO_2 groups. These esters are constituted of starch mols. with their OH groups incompletely esterified, not of mixts. of unaltered starch mols. and completely esterified mols. This was confirmed by inability to fractionate the mixts. with any solvents. Eight samples of rice starch were immersed in a $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$ (41:56:3) mixt. at 20° for differing times (3-200 min.). After washing with water and 70% EtOH, the products contained 11.0-13.3% N. They all gave diffraction spectra of nitro starch, even those of the shortest times, where unaltered starch was recovered. A comparison of the results with analogous expts. with cellulose (cf. Hess and Trogus, C. A. 26, 1772) shows that starch reacts more rapidly, and the lattice of nitro starch is evident immediately by x-rays. Since the velocity of the esterification reaction may be assumed to be the same for the OH groups of starch and of cellulose, the difference in behavior is attributable to the fact that the velocity of penetration of the nitrating mixts. into the starch micelles is much greater. The x-ray spectrum of nitro starch by this method is identical with that of the product from HNO_3 , and for the same N content is a little sharper. Though nitro starch prepd. from HNO_3 gives clear solns. in MeOH, that prepd. from $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$ mixts. was found to be only partially sol., and filtration of the insol. portion and pptn. of the sol. portion with water gave 2 fractions with the same x-ray diagram. That sol. in MeOH is termed nitroamylose, because sapon. by the method of Damansky (C. A. 29, 2381.8) yields amylose; that insol. in MeOH is termed nitroamylopectin, because sapon. gives amylopectin. Nitro starch contg. 12.45% N gave a nitroamylose contg. 12.50% N and a nitroamylopectin contg. 12.34% N. This behavior is in harmony with the fact that nitration of amylose gives nitroamylose identical to that obtained from the MeOH-sol. portion of the nitro starch and from nitro starch prepd. from HNO_3 alone. This explains why nitro starch prepd. from HNO_3 is sol. in MeOH, and gives a less sharp x-ray diagram than does that prepd. from $\text{HNO}_3\text{-H}_2\text{SO}_4\text{-H}_2\text{O}$. The differences between the 2 fractions of nitro starch are the same as those between amylose and amylopectin, i. e., a different degree of polymerization and crystn. (cf. Meyer, Hopff and Mark, C. A. 23, 4451). Potato starch and bean starch gave nitro starch with the same properties as that from rice, so that structural differences in various types of starch (cf. Samec and Katz, Z. ges. Schiess-Sprengstoffw. 163, 291(1933)) disappear in the transformation into nitro starch. This is in contrast with the structural differences in the products from natural cellulose and mercerized cellulose. The polymorphism of starch is therefore different from that of cellulose. Probably the polymorphism of starch can be explained by the manner in which the H_2O of crystn. is bound; that of starch by differing arrangements of the chain mols. in the micelle. This represents a fundamental difference between starch and cellulose.

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61. Acetoneglyceraldehyde. III. Synthesis of d-fructose and d-sorbose from d-glyceraldehyde or from d-glyceraldehyde and dihydroxyacetone

By Fischer, Hermann O. L.; Baer, Erich

From [Helvetica Chimica Acta \(1936\)](#), 19, 519-32. Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 4702.4. d-Glyceraldehyde (I), prepd. from 1,2,5,6-diacetonemannitol treated with $\text{Ba}(\text{OH})_2$ and then H_2SO_4 , gave a mixt. of hexoses from which d-fructose (II) and d-sorbose (III) were isolated. The sepn. of the 2 isomers is described. A mixt. of I and dihydroxyacetone (IV) treated as above gave II and III. It would appear that I is converted to IV and then I and IV react to give II and III. The crystal structures of synthetic II and III are given.

~4 Citings

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62. Highly polymerized compounds. CXXXVI. The structure of starch

By Staudinger, H.; Eilers, H.

From [Berichte der Deutschen Chemischen Gesellschaft \[Abteilung\] B: Abhandlungen \(1936\)](#), 69B, 819-48. Language: Unavailable, Database: CAPLUS

cf. C. A. 4068.7. A pure, ash-free hemicolloidal starch can be obtained by treating potato starch with acids, and the mol. wt. can be varied between 10,000 and 100,000 by varying the conditions. These polymeric homologs can be pptd. fractionally by adding MeOH, which first ppts. a glutinous, high-ash material, then a much purer product. Viscosities in HCOOH, water, HCONH₂ and NaOH at 20°, 60° and after cooling again to 20° were detd. on hemicolloidal starches produced with 2 N HCl and with concd. HCOOH; viscosities were also detd. in the same solvents at 20° on hemicolloidal starch produced by diastase. The viscosities before and after acetylation and before and after sapon. with MeOH show that chem. change can take place without changing the size or structure of the particles, which can be explained only on the basis of a macromol. structure. Starch acetate has a higher viscosity than starch in HCOOH, because it is more highly solvated. The viscosity of starch acetate was detd. in CHCl₃, dioxane, C₂H₄Br₂, HCOOH and Me₂CO at different temps. and concns. Mol. wts. of starch and starch acetates were detd. cryoscopically in C₂H₄Br₂ and in dioxane and were much lower than those calcd. from the viscosity measurements. Some starch fractions were nitrated and the viscosities, detd. in Me₂CO soln., were much less than solns. of the same concn. of the same starches in HCOOH. The nitrates of the starches of high mol. wt. had a lower mol. wt. than the nitrates of the starches of low mol. wt., and increasing the duration of nitration did not affect the viscosity; the destruction of the glucoside linkage of the starch mol. must therefore take place before nitration. The α -glucosidal linkage of starch is broken down more easily than the β -linkage of cellulose. Viscosity measurements on starch nitrate at different temps. showed that it is similar to cellulose nitrate.

~0 Citings

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63. Starch nitrates (so-called nitrostarch)

By Matla, W. P. M.

From [Chemisch Weekblad \(1936\)](#), 33, 120-5. Language: Unavailable, Database: CAPLUS

A review with 76 references.

~1 Citing

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64. Starch nitrate

By Berl, E.; Kunze, W. C.

From [Justus Liebig's Annalen der Chemie \(1935\)](#), 520, 270-89. Language: Unavailable, Database: CAPLUS

Starch (I) is nitrated with HNO₃/H₃PO₄ mixts. giving a starch nitrate (II) with a max. N content of 13.0% as against 14.14% for trinitrate. The viscosity of II shows a flat max. after 12 hrs. of nitration. Decreasing the H₂O content of the mixed acids decreases the stability of II without increasing its percentage of N. With 6% or more H₂O in the acid, the product does not deflagrate below 180°; H₂O, MeOH and particularly AcOH act as stabilizers. The potato starch used shows by x-rays about 9 interference rings. This no. is reduced to 3 by nitration, and raised again but not quite up to the original no., when II is converted into sol. I by sapon. Under the microscope, II shows a transparent shell, surrounding an opaque center. By freezing the moistened II, suspending in water and fractionating by settling, 2 products are obtained contg. 11.6 and 12.1% N, resp. Treated with Me₂CO, the outer shell swells, while the inner material gives a clear soln. This proves the presence of 2 different materials, amylose nitrate and amylopectin nitrate. As with cellulose nitrate, the use of H₃PO₄ gives a product which is less broken down, and thus shows a higher viscosity (about 10 fold) than when H₂SO₄ is used. The viscosity is also a function of the origin of I, of the strength of acid used in nitration and of the time and temp. of nitration. Sep. nitration of amylose and amylopectin show higher N content and much lower viscosity in the case of the latter. Preheating of I in autoclave up to 180° progressively decreases the viscosity of II.

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65. Net density of starch

By Takei, Bunsuke

From [Memoirs of the College of Science, Kyoto Imperial University \(1935\)](#), A18, 169-72. Language: Unavailable, Database: CAPLUS

cf. Yoshida and Takei, C. A. 26, 3916. Purified starch reaches a const. compn. and d. after 5 hrs. pumping with an oil pump at 70-90°. The net ds. of rice and potato starches after this treatment are 1.646 and 1.650, resp., considerably higher than previous values.

~0 Citings

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66. X-ray studies of nitrated starches. I

By Kolaczowska, Marja; Urbanski, Tadeusz

From [Roczniki Chemii \(1935\), 15, 339-42](#). Language: Unavailable, Database: CAPLUS

The authors obtained x-ray spectrograms of nitrated potato and sol. starch by the Debye-Scherrer method. Both show a marked resemblance and give the same principal interference rings. Natural starch is more cryst. before the introduction of .sbd.ONO₂ groups, while the structure of sol. starch changes regularly during nitration.

~0 Citings

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67. Microscopy of starches and their modifications

By Sjostrom, Otto A.

From [Industrial and Engineering Chemistry \(1936\), 28, 63-74](#). Language: Unavailable, Database: CAPLUS, DOI:10.1021/ie50313a018

A series of photomicrographs shows the appearance of the more important starches and their modifications, also the thin-boiling starches and dextrans, in their gelatinized and disintegrated forms. These pictures support the recent theory of "growth structure."

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68. The use of nitrostarch in the production of powder and explosives

By Fishbein, M. S.

From [Voennaya Khim. \(1933\), \(No. 4\), 12-14](#). Language: Unavailable, Database: CAPLUS

A review of patents.

~0 Citings

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69. Preparation and properties of the nitric acid ester of starch. III. Explosive properties

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1935\), 30, 98-101](#). Language: Unavailable, Database: CAPLUS

cf. C. A. 28, 1865.5. Twelve samples of nitro- starch varying in percentage of N from 13.43 to 6.49 were prepd. from potato starch (C. A. 28, 1865.5,) and tests made to det. the rate of detonation, Pb block expansion, Cu cylinder compression and sensitiveness. These were in direct relation to N content. Samples with less than 9% N were too weak to be classed as explosives; those with mean to high N content rank with explosives such as TNT and picric acid as regards explosive properties.

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70. The nitration of starch

By Grard, Jean

From [Compt. rend. \(1935\), 200, 410-11](#). Language: Unavailable, Database: CAPLUS

Starch moistened with 35% its wt. of H₂O and heated in an autoclave at 150° for 15 min. gave a plastic mass which could be squeezed through a die with a 0.2-mm. opening into long fine threads. These threads of starch hardened on exposure to the air or washing with EtOH. After drying, these threads were easily powd. and nitrated with 25 parts HNO₃, 65 parts H₂SO₄ and 10 parts H₂O.

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71. Preparation and properties of the nitric acid ester of starch. II

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1934\)](#), 29, 16-17. Language: Unavailable, Database: CAPLUS

See C. A. 27, 3334.

~0 Citings

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72. Preparation and properties of the nitric acid ester of starch. I

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1934\)](#), 29, 14-16. Language: Unavailable, Database: CAPLUS

See C. A. 27, 2302.

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73. Preparation and properties of the nitric acid ester of starch. I

By Hackel, J.; Urbanski, T.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1933\)](#), 28, 306-10,350-4,378-82. Language: Unavailable, Database: CAPLUS

See C. A. 27, 2302.

~1 Citing

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74. The effect of the crimped-paper ends on cartridges of permissible explosives in propagating detonation

By Gawthrop, D. B.

From [Rept. of Investigation \(1932\)](#), 3191, 7 pp.. Language: Unavailable, Database: CAPLUS

The av. distance which detonation is propagated over an air gap between cartridges of a permissible explosive is 31% less when a crimped end faces a crimped end than when a cut end faces a cut end. A crimped-end initiator of permissible explosive propagates detonation to a cut-end receiver of 40% straight dynamite over an av. distance 3% < a similar cut-end initiator. A crimped-end receiver of permissible explosive is sensitive to detonation brought about by a cut-end initiator of 40% straight dynamite over an av. distance 24% < a similar cut-end receiver. An initiator of 40% straight dynamite propagates detonation to a cut-end cartridge of permissible explosive over an av. distance 90% > a cut-end initiator of permissible explosive. A cut-end receiver of 40% straight dynamite is sensitive to detonation brought about by a cut-end initiator of permissible explosive over a distance 160% > a cut-end receiver of permissible explosive. The distance over which detonation is propagated in the halved-cartridge gap test is decreased to a greater extent by the use of a crimped-end receiver than by the use of a crimped-end initiator. There is no apparent relation to the chem. compn. or to the phys. properties of the explosive.

~0 Citings

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75. Oxidation of carbonyl sulfide

By Thompson, H. W.; Hovde, F. L.; Cairns, A. C. H.

From [Journal of the Chemical Society \(1933\)](#), 208-16. Language: Unavailable, Database: CAPLUS, DOI:10.1039/jr9330000208

cf. preceding abstr. The critical explosion limits were studied. No slow reaction was observed. An induction period of variable length precedes the explosion of mixts. of O and COS. The lower pressure limit for explosion decreases with increasing temp. Decrease in the dimensions of the reaction vessel raises the lower limit. The lower limit is depressed by addn. of inert gases, except SO₂ and CO₂ which raise the limit. The upper limit is somewhat indefinite. The possible reaction chains are discussed.

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76. Nitrostarch

By Schrimppff, August

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1930\)](#), 25, 273-8. Language: Unavailable, Database: CAPLUS

S. gives a partial review of the literature of nitrostarch, chiefly with reference to its use in com. and military explosives in the U. S. He calls attention to the fact that German transportation regulations class explosives of this type with chlorate explosives in reference to safety in handling. Nitrostarch explosives are not manufd. in Germany.

~0 Citings

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77. A modification of the molecular weight method of Barger

By Berl, E.; Hefter, O.; Rau, F.; Djang, G. S.; Umstatter

From [Justus Liebigs Annalen der Chemie \(1930\)](#), 478, 235-46. Language: Unavailable, Database: CAPLUS

The method used by Barger for detg. mol. wts. was modified by using a capillary U-tube with a tube sealed into it at the bend. This side arm allows air to escape when the app. is being filled. After the solns. to be used are placed in the tubes, they are sealed off. Readings of the menisci are taken over a period of about 3 weeks. It is possible to interpolate the concn. at which no distn. takes place by using solns. of different concns. With acetone-azobenzene solns. the av. error was about 2%. Results are given for several org. compds. such as bromocamphor, dinitrophenylamine and benzoic acid. A discussion of the mol. wts. of several carbohydrate nitrates is given. Cellobiose and maltose nitrates give normal mol. wts. Raffinose nitrate shows a partial, and sucrose nitrate an almost complete inversion to monosaccharide. Nitrated starch gives a value corresponding to 6-7 C₆H₁₀O₅. Values are given for oils such as paraffin oil, machine oil, etc.

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78. Sensitization of ammonium nitrates by nitrostarch

By Perrott, G. St. J.; Gawthrop, D. B.; Taylor, C. W.

From [Bur. Mines Repts. Investigations \(1930\)](#), No. 2987, 7 pp.. Language: Unavailable, Database: CAPLUS

The addn. of nitrostarch to NH₄NO₃ in quantities of 1% and higher increases the sensitivity to explosion at elevated temps. under confinement and increases the completeness and speed of detonation when the mixt. is detonated by a tetryl booster.

~0 Citings

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79. Nitrostarch

By Okada, Hajime

From [Seniso Kogyo \(1927\)](#), 3, 3-14. Language: Unavailable, Database: CAPLUS

The methods of nitration of starch, the stabilization, the denitration, the swelling of nitrostarch and sulfuric acid ester contained in nitrostarch have been investigated. By either the direct nitration of starch with mixed acid or the indirect method newly discovered by O., which consists of preliminary treatment of starch with a certain medium before bringing to the ordinary nitration, nitrostarch contg. 13% of the NO_2 group can be obtained, and during both nitrations the starch undergoes no more damage caused by the action of hydrolysis or oxidation of mixed acid than cotton cellulose undergoes. The stabilization of nitrostarch is easily made by means of washing with hot alc. contg. a little water or acetone, and the denitration also may be carried out with a very dil. soln. of NH_4HS ; the denitrated starch is freed from S by treatment with H_2O_2 , hot alc. and hot acetone. Alc., acetone-water mixt. and acetone-alc. mixt. swell the nitrostarch; of these the acetone-water mixt. is the best. The amt. of sulfuric acid ester in nitrostarch is not more than that in nitrocotton.

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80. The determination of nitrogen in nitric acid esters

By Kessler, H.; Rohm, R.; Lutz, G.

From [Angewandte Chemie \(1922\)](#), 35, 145. Language: Unavailable, Database: CAPLUS

In substances such as nitro-starch, the N content may be detd. by sapon. and reduction in an alk. soln., distg. off the NH_3 and catching the distillate in a known quantity of acid. To 0.25 g. of substance in a 50 cc. beaker, add a few drops of alc. and 5 cc. of warm, 50% KOH soln. If the alkali is too hot the reaction may become too violent. Allow the mixt. to stand a few hrs. until the substance has dissolved; hereby KNO_2 and KNO_3 are formed. Transfer the soln. to a 500 cc. round-bottomed flask, add about 500 cc. of water, 50 cc. of 33% KOH soln. and 1.5 g. of powd. Devarda's alloy. Heat gently to start the reduction, stopping when the evolution of H_2 begins. After about 90 min. the reduction will be complete. Distil off the NH_3 , catching the distillate in a measured vol. of 0.1 N H_2SO_4 and finally titrating the excess acid with standard NaOH soln. using methyl red as indicator. The procedure has been tested with nitrocellulose, nitroglycerin, nitroglycol and ethyl nitrate. In some case the initial sapon. requires 30 min. on the water bath.

~0 Citings

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81. The determination of free acid in aluminium sulfate solutions

By Zschokke, H.; Hauselmann, L.

From [Chemiker-Zeitung \(1922\)](#), 46, 302. Language: Unavailable, Database: CAPLUS

By adding BaCl_2 , $\text{K}_4\text{Fe}(\text{CN})_6$ and gelatin to an aq. alum soln., the Al is pptd. and, after filtration the free acid can be detd. by direct titration with NaOH. Into a 100 cc. calibrated flask, introduce 10 cc. of the alum soln., 10 cc. of 10% BaCl_2 soln., 5 cc. of 10% $\text{K}_4\text{Fe}(\text{CN})_6$ soln. which is not over 6 days old and 60 cc. of boiling water. While shaking, add warm, 2% gelatin soln. (1 to 1.5 cc.) until the Al ppt. is flocculent and settles well. Dilute to exactly 100 cc., filter, and take 50 cc. of the filtrate for titration with 0.1 N, NaOH, using methyl orange as indicator. The gelatin soln. can be preserved by adding a little nitrobenzene and is suitable as long as it is a jelly in the cold.

~0 Citings

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82. The nitric acid esters of starch

By Kessler, H.; Rohm, R.

From [Angewandte Chemie \(1922\)](#), 35, 125-8. Language: Unavailable, Database: CAPLUS

A review of their chemistry.

~1 Citing

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83. Nitrostarch and its use in the manufacture of propellants and blasting explosives

By Oelker, A.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1921\)](#), 16, 97-8,107-9. Language: Unavailable, Database: CAPLUS

A review of patents covering the period from about 1899 to 1917.

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84. A nitrostarch stumping powder for land clearing

By Swenehart, John

From [Stencil Bull. \(1920\)](#), 33, 9 pp.. Language: Unavailable, Database: CAPLUS

Results are given of tests of a nitrostarch mixt. submitted by the Trojan Powder Co. for detonation, sensitiveness to impact of rifle balls, explosion by sympathy, inflammability, resistance to moisture, effect of moisture on detonation and efficiency in use, effect of temp. and toxic effect. Tables of data from the use of this explosive, and that of 20% ammonia dynamite are given with the statement that "no definite inference should be made other than that the nitrostarch explosive gives comparatively effective results. More data would be necessary to justify a statement of comparative strengths."

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85. Nitrostarch as an explosive

By Sadtler, S. S.

From [Chemical and Metallurgical Engineering \(1917\)](#), 16, 361-4. Language: Unavailable, Database: CAPLUS

The author claims by his process to produce nitrostarch containing 12-13.3% N which is stable. It is cheap, as powerful as nitroglycerin, and as the price of glycerol is continually increasing this is offered as a substitute for the nitroglycerin in commercial operations especially. Nitrostarch is insensitive and cannot be exploded except by a detonator. It does not yield injurious fumes. It is non-hygroscopic. It is insol. in water but dissolves in acetone and amyl acetate. It is denser than nitrocellulose, may form a gelatin with nitroglycerin but where 5-6% of nitrocellulose is required for this purpose 80-85% of nitrostarch is required. One lb. of dry starch produces 1.5 lb. nitrostarch; d. 1.57, Abel test 175°F. 30 min., Sy, stability test at 165° C. 1 min., 35 sec., combustion test 182° C., at 135° not exploded in 30 min., KI and starch test at 70° C., 65 min.

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86. Nitrate of Starch

By Berl, E.; Butler, R.

From [Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen \(1910\)](#), 5, 82. Language: Unavailable, Database: CAPLUS

The authors experimented with the method of A. Hough (Ger. Pat. 172,549; *Ibid.*, 2, 295) for prep. of nitrostarch. Hough claimed to prepare a product of 16.38% N, using oleum to maintain about 2% free SO₃ in the acid mixture during nitration. This would correspond to 16 nitric radicals in the mol. C₂₄H₄₀O₂₀, whereas other investigators have shown not more than 12 (14.14% N). Hough's method was followed exactly, using starch from various sources. His results as to N content were not confirmed, but interesting values were found for viscosity of the products. The most important of the tabulated results are noted below: The following comparison was made under the same conditions of nitrating, as regards acid mixture, time, temp., etc.: This remarkable difference in viscosity is explained by the hypothesis that there is a difference between cellulose and starch in the mol. size and weight. Similarly may be explained the relative rate of hydrolysis of these two substances. The starch nitrates were pure white, soluble in conc. H₂SO₄, and more hygroscopic than cellulose nitrates of equal N content. Combined H₂SO₄ (about 0.5%) was found, due probably to imperfect purification.

~0 Citings

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87. The Manufacture and Properties of Some Starch Esters

By Traquair, John

From [Journal of the Society of Chemical Industry, London \(1909\)](#), 38, 288-91. Language: Unavailable, Database: CAPLUS

The author holds the view that starch is a coagulated substance solidified in the plant from an apparently dissolved state. He discusses the formation and properties of starch nitrate, formate and acetate. The manufacture, properties and uses of "feculose," an AcOH ester of starch, are given.

~0 Citings

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88. The Quantity of Non-sugars that Enter the Lime Cake from the Raw Juice

By Weisberg, J.

From [Westnik. Sacch. Prom. \(1909\), 2, 36](#). Language: Unavailable, Database: CAPLUS

Commenting on the work of Claassen (C. A., 2, 2739-3164) and Heinze (C. A., 2, 3165) on this subject, he takes exceptions to some of their views, proving by an example wherein they are wrong. He summarizes his views. (1) The indirect estimation of the quantity of non-sugars from the apparent purity of the raw juice and that of the thick juice gives admissible figures. (2) Only very small insignificant losses of sugar by breaking up are experienced in good work in passing from raw juice to thick juice. In a study of this kind great care has to be exercised in the collection of samples and analysis, taking the results of average analyses.

~0 Citings

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89. A proposed method for examining bleached flour

By Shaw, Roscoe H.

From [Journal of the American Chemical Society \(1906\), 28\(6\), 687-8](#). Language: English, Database: CAPLUS, DOI:10.1021/ja01972a002

A method is proposed for identifying the presence of nitrates or other oxidizing agents in bleached flour. The procedure for using the method is discussed.

~0 Citings

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