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LETTERS TO THE EDITOR

Synthesis of Pyridinecarboxylic Acid *N*-Oxides and Their Amides under Microwave Irradiation Conditions

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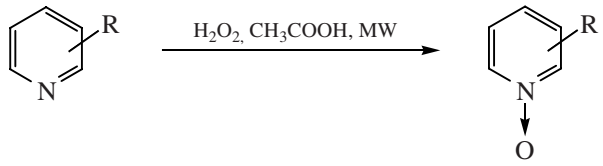
The steadily growing scientific interest in *N*-oxides is conditioned not only by their essential role in plant and animal metabolism processes [1, 2], but also by their valuable synthetic properties [3].

A standard procedure of synthesis of pyridinecarboxylic acid *N*-oxides and their derivatives involves prolonged (4–6 h) refluxing of **I–III** with hydrogen peroxide in glacial acetic acid [4]. Using isonicotinic (**I**) and nicotinic (**II**) acids and nicotinamide (**III**) as examples, we studied the possibility of obtaining *N*-oxides **IV–VI** under microwave irradiation, aimed at shortening reaction time. The physicochemical characteristics of the products are listed in the table.



I–III **IV–VI**

R = 4-COOH (**I, IV**); 3-COOH (**II, V**); 3-$CONH_2$ (**III, VI**).

Physicochemical characteristics of compounds **IV–VI** prepared under usual and MW irradiation conditions

Comp. no.	mp, °C		Yield, %		Formula	Calculated, %		Found, %	
	Usual conditions [4]	MW conditions	Usual conditions [4]	MW conditions		C	H	C	H
IV	260–262	258–259	89–92	85.5	$C_6H_5NO_3$	51.80	3.62	51.92	3.68
V	269–273	265–267	75–79	70.3	$C_6H_5NO_3$	51.80	3.62	51.87	3.72
VI	289–293	291–292	73–82	70.5	$C_6H_6N_2O_2$	52.17	4.38	52.21	4.42

Experiments with varied irradiation power and time showed that the yields of compounds **IV–VI** are higher under the following conditions. Compound **I–III,** 5 g**,** was dissolved under heating in 30 ml of glacial acetic acid in a conical flask of heat-resistant glass, and, after addition of 15 ml of 30% hydrogen peroxide, the mixture was subjected to a 70W microwave irradiation for 20 min (4×5 min). The solution was diluted with 15 ml of water which was then distilled off under a vacuum. After cooling to room temperature, the product precipitated and was recrystallized from water. The identity of compounds **IV–VI** were proved by

independent synthesis under convective heating by the procedure in [4].

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