Synthesis of 3-Substituted Arylpyrazole-4-carboxylic Acids

A. V. Lebedev, A. B. Lebedeva, V. D. Sheludyakov, E. A. Kovaleva, O. L. Ustinova, and I. B. Kozhevnikov

State Research Institute of Chemistry and Technology of Organoelement Compounds, State Research Center, Moscow, Russia

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Abstract — A method was suggested for preparing previously unknown 3-aryl-substituted pyrazole-4-carboxylic acids, involving Vilsmeier formylation of semicarbazones of 26 available mono- and disubstituted acetophenones and 2-acetylthiophene followed by oxidation of the resulting 3-aryl-substituted pyrazole-4-carboxaldehydes under the action of potassium permanganate. The mechanism of the formylation reaction is discussed. The method successfully works even with acetophenones containing alkyl substituents. In the latter case, an additional stage that involves isolation of pyrazole-4-carboxylic acids as their silyl esters is used.