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Method of synthesis of *O*-methyl-*N*-alkylcarbamate from amines and dialkylcarbonate

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Abstract

A carbamates (urethanes) are an organic compounds with the general formula R'R''NCOOR are esters of carbamic acid and its derivatives. Due to their biological activity, carbamates are common as pesticides, insecticides, herbicides, and are used as drugs. Polyurethanes are widely used in industry. The main method of synthesis is the interaction of isocyanates with the corresponding alcohols or phenols, it is also possible to use urea, isocyanic acid or other methods, including the use of *in-situ* formed isocyanate.

In the literature, *N*-alkyl-*O*-methylcarbamate is synthesized by reacting amines with dimethylcarbonates with various catalysts. In view of the economic feasibility and difficulty of isolating the target product the overwhelming number of the described methods are hardly applicable for scaling and industrial synthesis.

A study was conducted to develop a method of synthesis of *O*-methyl-*N*-alkylcarbamate, which will be able to scale and be introduced into production. The most promising synthesis methods described in the literature have been tested, and a new method for producing various carbamates has been developed. The model amines for the experiment were selected industrially important – *n*-butylamine and cyclohexylamine. The structure of the product was confirmed by ^{1}H NMR spectra. A number of the described methods had a way out in practice several times below the literature data presented, and some target products could not be received. The best way to react with *n*-butylamine is to use water as a catalyst. The yield obtained according to this procedure for *O*-methyl-*N*-cyclohexylcarbamate was 53%, for *O*-methyl-*N*-*n*-butylcarbamate – 68%, so the method was expanded to obtain several *O*-methyl-*N*-alkylcarbamate.

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