NEW CARBONYL COMPOUND FROM CINNAMALDEHYDE

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Keywords: *cinnamaldehyde, pyruvic acid, 2-oxo-6-phenylhexa-3,5-dienoic acid, biological activity*

Introduction. Cancer, bacterial, and viral diseases stand as some of the most pressing challenges in modern society. Addressing these issues necessitates the development of new drugs. Promising substances in this context include Schiff bases and their derivatives, such as thiosemicarbazones. The scientific literature indicates that these compounds exhibit various biological properties, including antimicrobial, anticancer, antitumor, antiviral, and antifungal activities. However, the toxicity and efficacy of these compounds are closely tied to their chemical structures. Of particular interest is the functionalization of natural compounds with established biological activities and low toxicity to humans. Cinnamaldehyde, derived from cinnamon tree bark through steam distillation, is one such substance. It finds use in the food and perfume industry owing to its low toxicity and characteristic cinnamon aroma. Notably, the specialty literature points out that Schiff bases derived from cinnamaldehyde are virtually insoluble in water, which presents a significant drawback. This limitation can potentially be addressed through the functionalization of cinnamaldehyde with a substance containing polar groups. In this abstract, pyruvic acid, a ketoacid involved in the Krebs cycle, is considered. It readily undergoes a condensation reaction, specifically a Claisen-Schmidt condensation, with cinnamaldehyde to yield a new ketoacid-containing product. This product is expected to be water-soluble and possess certain biological properties. This opens up the possibility of using the compound as a carbonyl compound in condensation reactions with primary amines (drugs) to form Schiff bases.

The aim. Claisen-Schmidt condensation of cinnamaldehyde with pyruvic acid and confirmation of the product structure with modern physicochemical methods, by nuclear magnetic resonance (NMR) and Fourier transform infrared (FTIR) spectroscopy, for further biological research.

Material and methods. *Synthesis of 2-oxo-6-phenylhexa-3,5-dienoic acid.* In an Erlenmeyer flask, an equimolar mixture of cinnamaldehyde and pyruvic acid was added in the presence of methanol as a solvent. While continuously stirring, two equivalents of sodium hydroxide in methanol were added dropwise to form a yellow precipitate. The reaction mixture was stirred for an additional 90 minutes. The resulting solid was then filtered, washed with water and cold methanol, and dried at room temperature, yielding a yellow solid with a 72-80% yield. Structural analysis of the newly synthesized compound was carried out using nuclear magnetic resonance (NMR) and Fourier-transform infrared (FTIR) spectroscopy. All initial chemical reagents were sourced from specialized companies.

Results. The 2-oxo-6-phenylhexa-3,5-dienoic acid was synthetized with good yield. NMR spectroscopy was used to confirm its structure and functional groups were analyzed by FTIR.

Conclusions. The 2-oxo-6-phenylhexa-3,5-dienoic acid was synthetized in a form of a yellow precipitate, with a good yield. Its structure was confirmed through NMR and FTIR spectroscopy. The newly synthesized compound in the form of sodium salt exhibits good solubility in water. This observation leads us to anticipate that thiosemicarbazones derived from this carbonyl compound will also be water-soluble.