STUDY OF GENETIC PARAMETERS OF THE ESTERIFICATION REACTION

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Abstract

This article, based on a reliable analysis of theoretical and practical ideas from domestic and international scientists and specialists, examines the differentiation of genetic parameters in the esterification reaction. The importance of developing a method for determining the genetic parameters of the esterification process of citric and acetic acids with alcohols for widespread use is demonstrated. Given the deteriorating environmental situation in the world, the expansion of radiation pollution and the increasing number of cases of mass food poisoning of people and animals, it was proposed to take into account the genetic parameters of acids, fats, water, alcohols, etc., involved in the esterification process.

Keywords: Esterification reaction, genetic parameters, carboxylic acids, alcohols, esters

Introduction. The esterification reaction, which is accompanied by the interaction of organic and inorganic oxygenated acids with alcohols, results in the production of esters suitable for production and non-production-based needs.The study of the nature of esters formed by monobasic carboxylic acids with monoatomic alcohols based on the criteria of organic and inorganic chemistry, the differentiation of methods for obtaining esters and, in particular, the genetic parameters of esterification reactions, as well as the analysis of the physical and chemical properties of esters are clarified in the research of Azerbaijani and foreign scientists and specialists, and scientifically and practically important information is highlighted by electronic resources. The issues of differentiating the physical and chemical properties of the process of obtaining esters have been investigated in the books of R.A. Gasimov, N.Y. Zeynalov, and in the articles of D.S. Chicheva, E.L. Krasnykh, S.V. Levanova, S.V. Sushkova, Ju-Youl Kim, and A. Vartolomein.

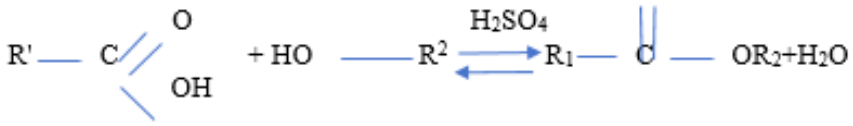
Researched problem

The process of obtaining complex esters is studied on Internet sites, dissertations, monographs, textbooks, and articles, the genetic parameters of this process are determined, but the controversial issues of organic chemistry related to esterification remain beyond the attention of scientists and specialists. While investigating the causes of mass poisoning of people consuming food products, alcoholic beverages, and water, the complications of low-quality drugs in treated patients, and the death of livestock, there has been a need to conduct research into the scientific aspects of determining the genetic basis parameters of acids that are reprocessed in the esterification process.

Discussions

R.A. Gasimov considers esters of carboxylic acids as volatile, poorly soluble in water (esters with a small molecular mass are soluble in water), pleasantly fragrant substances. Most of them have a fruity and berry aroma, and at the same time, the hydrolysis of esters is carried out in acidic and alkaline environments [4, p. 24].

In electronic resources, esters are described as organic compounds formed by the interaction of carboxylic acids and alcohols, and the process of obtaining esters is called the esterification reaction.



The role of kinetic modeling in solving the problems of estimating the genetic parameters of the esterification reaction is of particular importance. N.Y. Zeynalov, a researcher of the problems of modeling the kinetics of chemical technology processes, considering the reaction mechanism in the development of a kinetic model, notes that in the course of chemical-technological processes, in the range of technological conditions that ensure the transformation in the intended direction (temperature, pressure, composition in which the reaction takes place), the reaction rate varies as a function of the concentrations of the participating components.

$$D_A=F\ (C_{A2}\ C_{B2}.....C_z)\ k$$

From the comparative analysis of the results of the distribution of the rate concentration over time and the reaction rate expressions, the general form of the kinetic equation is formulated as follows:

$$\frac{al_n}{d_r} = F\ (C_A;\ C_B..... C_Z)\ k\ [8]$$

The study of the kinetic parameters of the esterification reaction involves the elucidation of the process of obtaining polyethers, biologically active substances, pharmaceuticals, and numerous additives as stabilizers and inhibitors for polymeric materials and oils from the petrochemical synthesis of carboxylic acid esters.

Based on the study of the kinetic parameters of esters, D.S. Chicheva and E.L. Krasnykh put forward a proposal to obtain raw materials for the synthesis of complex esters from natural gas in the framework of the development of gas chemistry in the direction of the development of oxosynthesis processes [5].

The study of the kinetic parameters of the esterification reaction by S.V. Sushkova allows obtaining practically important results for determining the kinetic parameters.Some kinetic parameters were determined in the process of C2 C5 esterification of citric acid with linear alcohol when sulfuric acid was used as a catalyst, and the time to 96% conversion was estimated.According to the authors, it is possible to process samples with 96-98 yields, such as triprapyl - , tributie - and tripentiecitrate, in optimal modes, taking into account the 1.3-1.5 times lower activation parameters and the induction effect of C2 C5 alcohols, and at the same time determine density, temperature gloss, and color in Khazen units (ill. 30) for these samples in accordance with state standards [6, p. 30].

Ju-Youl Kim propose a more efficient method to determine the kinetics of the esterification reaction for a specific object using a genetic algorithm. According to them, the parameters of the reaction pattern can be successfully determined using a genetic algorithm and plant data. For this purpose, the effect of variables (temperature, pressure, monomer feed and residence time) on the conversion process should be evaluated. The reactor performance should be analyzed taking into account the degree of solubility of individual acid species in the reaction mixtures [3].

A. Vartolomei et al. reported that the maximum ester concentration can be achieved for the esterification of acetic acid with isomeric alcohols catalyzed by the commercial enzyme Lipozyme 435 at a temperature of 50 C and a flow rate of 0.16 ml/min under ultrasound assistance. The study confirms the favorable prospect of increasing the efficiency of esterification and reducing the reaction time using ultrasound in a short period of time [7].

Author's position

The substantiated provisions on the evaluation of the genetic parameters of the esterification reaction in the sources cited above are of great importance for a more detailed study of the theoretical and practical understanding of the science of organic chemistry about esters.

The structural models created by S.V. Sushkova, A. Vartolomei, etc. for determining the genetic parameters of the esterification processes of citric acid and acetic acid with alcohol can be used to determine the parameters of the process of obtaining esters of any origin. It should be noted that the studies conducted, as a rule, are limited to considering the influence of the genetic parameters of the esterification reaction on the conversion process of variables (temperature, pressure, monomer feed ratio, residence time, etc.).

Scientific studies confirm the necessity of considering the genetic basis parameters (degree of exposure to radioactive radiation and other environmental pollution) of acids used for the production of complex esters in the organic-chemical evaluation of the esterification process [1; 2].

Results

It is appropriate to summarize the analysis of the provisions substantiated by local and foreign scientists and experts, as well as the information covered by internet resources, with the following conclusions and suggestions:

First, the main parameters of the esterification reaction should include:

- increasing the temperature (accelerates the conversion, ensuring maximum total concentration);

- AI Moholol catalysts allow the esterification reaction to occur at alcohol/acid ratios (6:1 and 12:1), and the reaction can be completed in 1-2 hours.

Secondly, modeling and optimization are performed to specify the parameters of the esterification reaction rate (temperature, pressure and monomer mixing ratios). A kinetic modeling model is applied to analyze the results of enzymatic esterification. Ultrasound should be considered an important factor in ensuring the sustainability of the esterification process.

Thirdly, it is appropriate to recognize the exposure to radioactive effects of oils used to obtain complex esters, plants and fruits processed for the production of acids, and the ecological purity of water as genetic basis parameters of the transformation process.

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