5-BUTYL-1,3-DIOXANE AND ITS DERIVATIVES SYNTHESIS

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At present, the possibility of rational use of dioxane is very high. 1,3-dioxane and its derivatives are used as regulators of plant growth. The development of technology for the production of 1,3-dioxane derivatives used as flotation agents and plant growth regulators will allow them to be used in agricultural and mining industries in accordance with Kazakhstan's innovative development requirements.

In 1,3-dioxanes, compounds with anti-inflammatory, anti-inflammatory and antiviral properties have been studied. Diseases that are due to various environmental factors are now being resolved and treated as a result of the search and synthesis of effective drugs. They are used as the agent of action and fumigant as a substance in the synthesis of substances such as antibiotics and insecticides.

Our work is based on Prince reaction on synthesis of 5-butyl-1,3-dioxane and its new derivatives by condensation. 5-butyl-1,3-dioxane was obtained as a result of condensation of Hexen-1 and formaldehyde in the ratio 1:2 in the presence of the acidified catalyst. When the optimal temperature exceeded 70 °C, the additional product was formed of 1,3-dihydroxygenate.

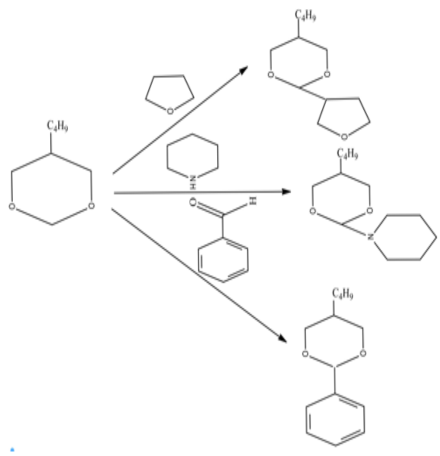

Fig. 1. *General scheme of synthesis of new 5-butyl-1,3-dioxane derivatives*

5-butyl-1,3-as a result of the condensation reaction of dioxane in an acidic medium in a ratio of 1 : 1 with tetrahydrofuryl-5-butyl-1,3-dioxane, 2-piperidine-5-butyl-1,3-dioxane and 2-phenyl-5-butyl-1,3-dioxane. The optimum temperature of the formed product is 65 °C, 61 °C and 80 °C.

STUDYING THE INFLUENCE OF CATALYST DEACTIVATION ON THE PROCESS OF DIESEL FUEL CATALYTIC DEWAXING

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The process of catalytic dewaxing is aimed to produce diesel fuel, having low freezing temperature from –18 °C to –60 °C. The fuel in this case is called winter diesel fuel and arctic diesel fuel [1].

The freezing temperature is mainly determined by the content of long straight-chain paraffins [2]. These normal paraffins undergo the reaction hydrocracking in the process of catalytic dewaxing to form short-chain normal paraffins and iso-paraffins, which have much lower freezing points [3].

The aim of this work is to study the influence of catalyst deactivation on the process of catalytic dewaxing.

To perform calculations, computer modeling system of the catalytic dewaxing process was applied. This system is based on the mathematical model of the process.

As the initial data, two different feedstock compositions were used. The feedstock differs by the content of long-chain normal paraffins. The content of n-paraffins in the first feedstock is 14 wt. %. The content of n-paraffins in the second feedstock is 21 wt. %. For each of these feedstock compositions the study of catalyst deactivation influence on the process of catalytic dewaxing was studied. Technological parameters for the calculations were taken as: feedstock flow rate was 310 m^3/h, flow rate of hydrogen-containing gas was 30000 m^3/h, temperature

Table 1. Composition and density of the feedstock

	Boiling temperature, °C	
	Feedstock-1	Feedstock-3
10%	244	253
50%	282	299
90%	344	354
Density at 20 °C	840	853
Content of long-chain normal paraffins, % mas.	18.99	15.81

Table 2. Results of optimal temperature depending on feedstock composition and catalyst deactivation

Catalyst deactivation	Temperature of de-waxing process. °C	CFPP of product. °C	Feedstock-1	Feedstock-3
			Temperature. °C	Temperature. °C
1.0	Optimal T –5 °C	–31	369.8	345.4
	Optimal T	**–26**	**356.3**	**331.9**
	Optimal T +5 °C	–21	344.2	319.8
0.7	Optimal T –5 °C	–31	377.5	352.1
	Optimal T	**–26**	**363**	**337.7**
	Optimal T +5 °C	–21	348.6	319.8
0.4	Optimal T –5 °C	–31	390.1	362.7
	Optimal T	**–26**	**374.1**	**343.9**
	Optimal T +5 °C	–21	357.7	320.3

was 75 °C, pressure was 7,5 MPa.

As a result, the following tables were obtained:

According to the obtained results, the following conclusions were made:

1. Boiling temperature depends on the content of long-chain normal paraffins, so temperature of the feedstock-3 is higher, then the feedstock-1.
2. Computer modelling helps to predict the composition and properties of the product at different operating conditions. Moreover, using mathematical models allows determining optimal operating parameters depending on the feedstock composition and requirements to the final product.

References

1. *Kapustin V.M., Rudin M.G.. Chemistry and technology of oil refining. Learning book.– M.: Kolos, 2007.*
2. *Belinskaya N.S., Ivanchina E.D., Ivashkina E.N., Sejtenova G. Studying Patterns of Synthesis of Low Freezing Distillates from Atmospheric Gasoil by Means of Mathematical Modelling // Current organic Synthesis, 2017.– Vol.14(3).– P.365–371.*
3. *Belinskaya N.S. Mathematical modelling and optimization of catalytic dewaxing of diesel oil cuts and atmospheric gas oil // Petroleum and Coal, 2016.– Vol.58.– №1.– P.126–134.*