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MOLECULAR-MASS DISTRIBUTION OF n-PARAFFINS IN DIESEL FUEL AS A FACTOR DETERMINING THE EFFECTIVENESS OF DEPRESSANT ADDITIVES

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Studying the effectiveness of depressant additives (DA) in diesel fuels (DF) is one of the important tasks in their production. The main factor that influences the action of the additive is the interaction of the additives with n-paraffin hydrocarbons in the fuel composition. The mechanism of action of the additives is directly related to the amount of n-paraffins contained in the fuel, since additive molecules are deposited on nascent n-paraffin crystals and prevent their growth and aggregation [1].

In this work, using the Chromato-Mass-Spectrometry method, the molecular-mass distribution of n-paraffins in the composition of DF was determined, presented in the Figure.

Based on the data presented in the Figure, it can be seen that the content of lighter n-paraffins is higher in DF1 sample, and the content of heavier n-paraffins predominates in DF2 sample.

Next, various individual n-paraffin hydrocarbons were added to mixtures of the studied DF samples with a commercial DA: $C_{16}H_{34}$ (C), $C_{17}H_{36}$ (HD), $C_{21}H_{44}$ (HS) and $C_{22}H_{46}$ (D) in concentrations of 1, 3 and 5 % vol. Results of changes in the effectiveness of DA with the addition of n-paraffins at a concentration of 3 % vol. in relation to cloud point (Cp), cold filter plugging point (CFPP) and pour point (Pp) are presented in the Figure.

Based on the results of the studies, it was established:

1. With regard to Cp, the addition of heavy n-paraffins in the case of the presence of a large amount of light n-paraffins in the initial sample does not change the effectiveness of the additive; otherwise, the addition of heavy n-paraffins impairs the effectiveness of the additive.

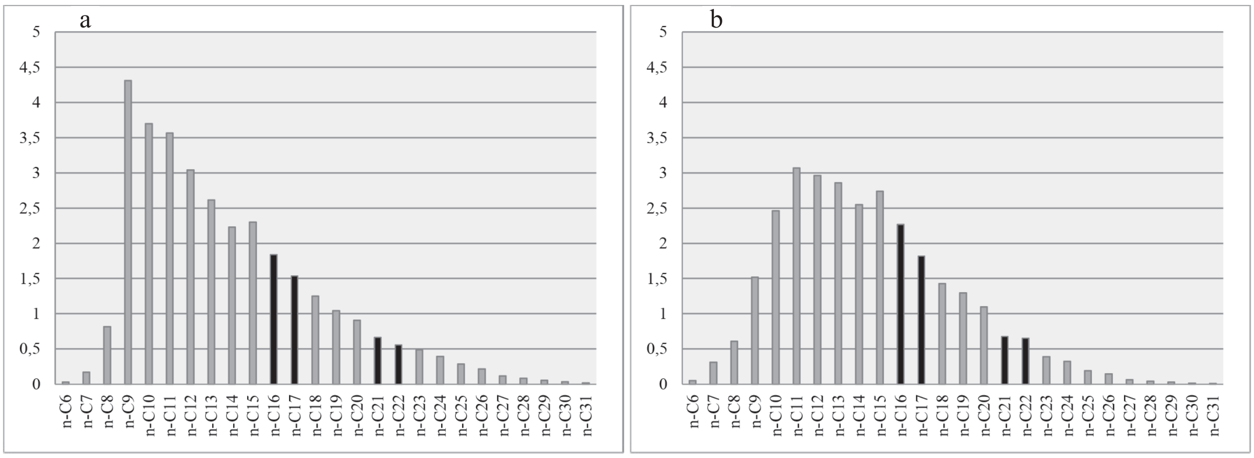

Fig. 1. *Molecular-mass distribution of n-paraffin hydrocarbons in the composition of samples: a) DF1, b) DF2*

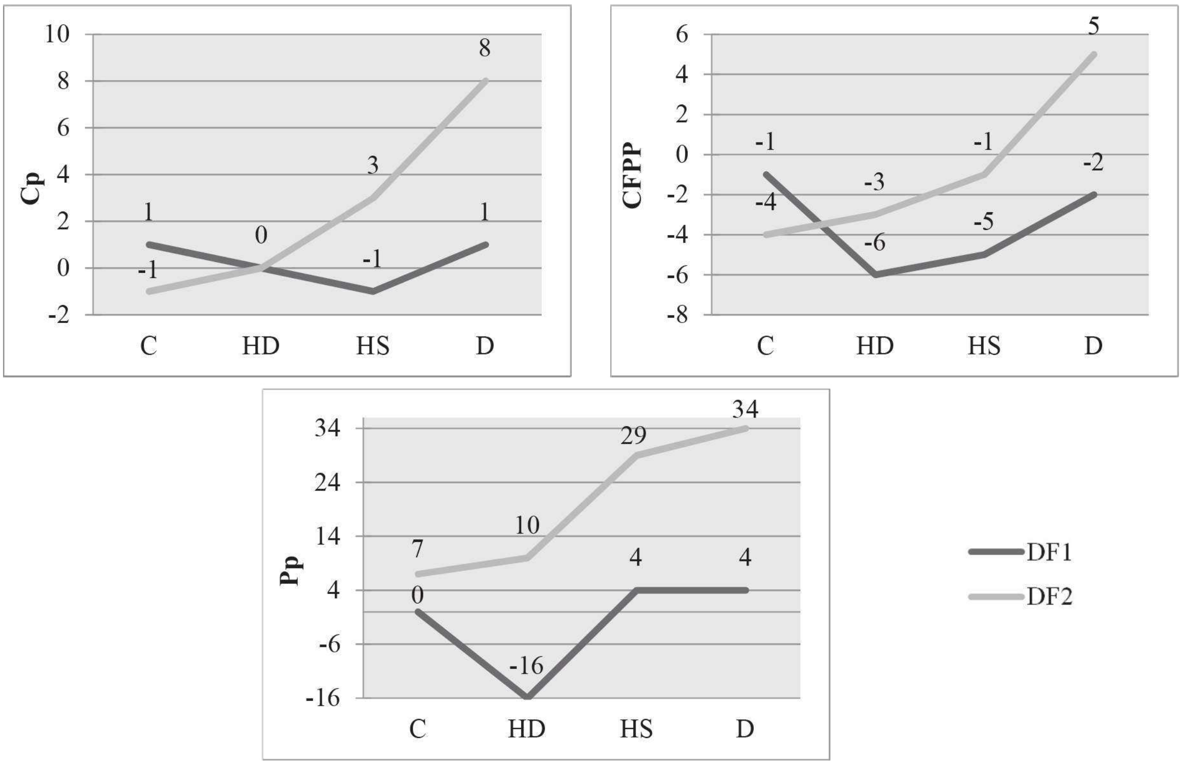

Fig. 2. *Change in the effectiveness of the additive when adding individual n-paraffins to a mixture of DF and DA*

2. To improve the effect of the additive in relation to CFPP, it is advisable to add those n-paraffins whose content in the original sample is the lowest.

3. In relation to Pp, there is an "optimal" n-paraffin, the addition of which most strongly affects the effectiveness of the additive. In the case of DF1, this n-paraffin is HD. In the case of DF2, none of the introduced n-paraffins is "optimal". Presumably, based on the molecular-mass distribution of the samples, the "optimal" n-paraffin is in the chain length range from C_{18} до C_{20}.

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POLYMER RECYCLING METHOD BY DISSOLVING IN FUEL

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Polymers are an essential part of our daily life, but their usage also has a negative impact on the environment. One of the major issues associated with polymer use is their long-lasting decomposition. Polymer products may remain in the natural environment for hundreds years, contaminating the soil, water, and air.

To address the issue of the environmental impact of plastics, a range of measures is needed, including the recycling and reuse of waste, the creation of biodegradable plastics, and reducing consumption, as well as raising public awareness about the issue.