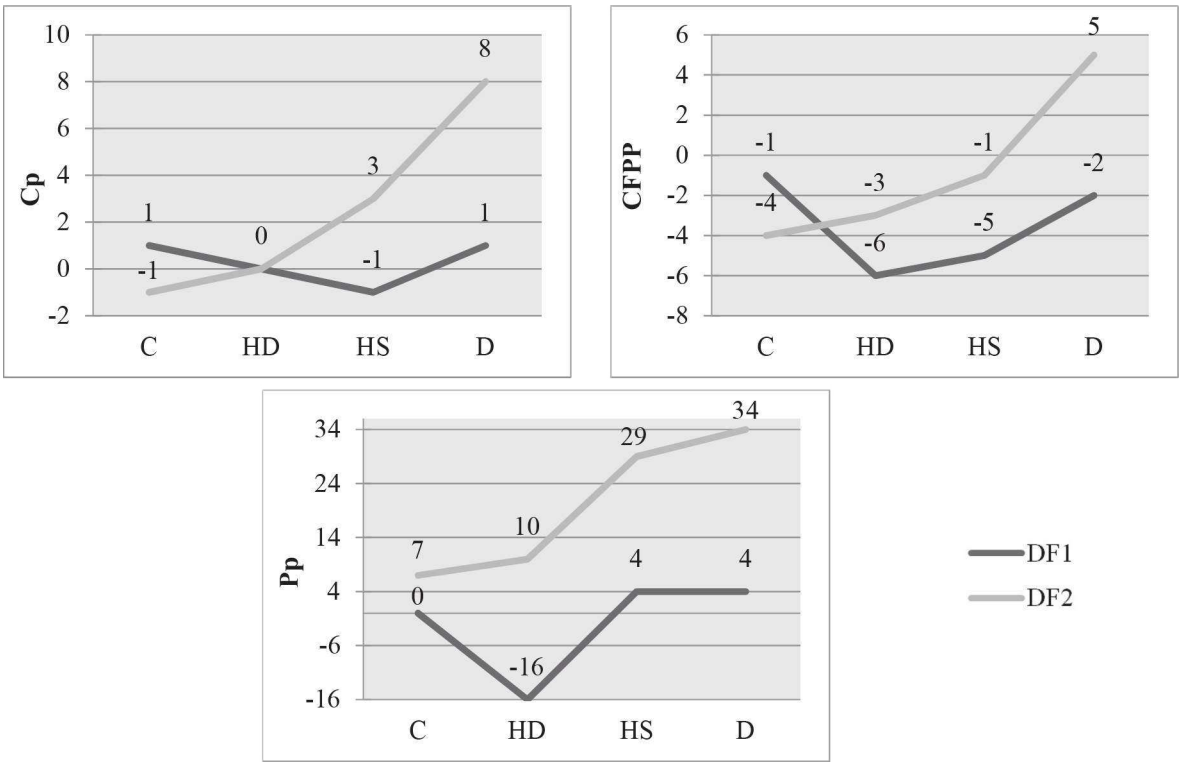

Fig. 2. *Change in the effectiveness of the additive when adding individual n-paraffins to a mixture of DF and DA*

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}.

References

1. *Chen J., Cui L., Xu B., Lin H., Han S. Influence of polymers with surfactant properties as pour point depressants on the cold flow properties of diesel fuels // Colloids and Surfaces A: Physicochemical and Engineering Aspects. – 2023. – P. 667.*

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.

Biodiesel is a good bio-solvent for dissolving polystyrene. In this study, we consider the method of recycling polystyrene by using biodiesel as a solvent and investigate the properties of commercially available fuel blends made from the resulting biodiesel and diesel fuel.

Biodiesel was synthesized from sunflower oil following the method described in [1]. Next, 1 gram of expanded polystyrene was dissolved in 100 milliliters of biodiesel after that commercial fuel blends with diesel fuel B5, B10, and B20, with a biofuel content of 5 %, 10 %, and 20 % by volume, respectively, were prepared from the resulting blend [2].

Properties such as density and viscosity have been studied for the obtained commercial fuel blends. The results of changes in these properties are presented in Table 1.

Analyzing the collected data, it can be concluded that the addition of biodiesel with dissolved polystyrene slightly alters the characteristics of diesel fuel and allows for its continued use. Furthermore, the presented results indicate that the kinematic viscosity of the B20 sample is slightly elevated, but within the acceptable range for summer and interseason commercial diesel grades [3].

Thus, the study of polymer dissolution in motor fuels has become a promising area of research with great significance for solving environmental issues.

Table 1. Fuel properties of different blends

Temperature °C	Density, g/cm^3			Viscosity, mm^2/s		
	15	20	40	15	20	40
B5	0.848	0.844	0.830	6.236	5.266	3.207
B10	0.849	0.846	0.831	5.908	5.160	3.262
B20	0.852	0.848	0.834	6.481	5.472	3.842

References

1. *Belozertseva N.E., Torchakova O.M., Bogdanov I.A., Kirgina M.V. Feasibility study of using biodiesel fuels as a blendstock of commercial diesel fuels // Izvestiya Vuzov-Prikladnaya Khimiya I Biotekhnologiya. – 2022 – M. 12 – Is. 1. – P. 130–140. doi: 10.21285/2227-2925-2022-12-1-130-140.*
2. *Jorge Calder Performance and Emissions of a Diesel Engine Fueled by Biodiesel-Diesel Blends with Recycled Expanded Polystyrene and Fuel Stabilizing Additive/ Murari Mohon Roy, Wilson Wang. 2018.*
3. *USS 305-2013. Diesel fuel. Technical specifications. – M. : Standartinform, 2014. – 12 p.*

PRODUCTION OF ENVIRONMENTALLY FRIENDLY DIESEL FUEL COMPONENTS FROM WASTE VEGETABLE OILS

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Biodiesel (BD) is an environmentally friendly, alternative fuel that can be produced from renewable sources. The synthesis of BD is based on the esterification reaction, the products of which are monoalkyl esters of fatty acids.

Producing biofuels from waste oil eliminates competition between the fuel sector and the food sector of the economy and helps solve waste management problems.

In this work, biodiesel samples were synthesised from waste oil obtained from catering restaurants in Tomsk.

The methodology of BD synthesis used in the work: the feedstock (waste oil) with a mass of 371.6 gm. was uniformly heated to 45.0 °C using a stirrer and an electric cooker.

Varying the amount of catalyst (sodium hydroxide) is an important part of the work. The mass