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Experimental Results to Improve the Qualitative and Operational Indicators of Basic Oils by Involving the Additive in the Type of Flax Oil

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ABSTRACT: This article presents the development of the composition of composite base oils from local raw materials (Asaka oil field) involving vegetable additives in the form of linseed oil.

KEY WORDS: fraction, raffinate, viscosity, additive, viscosity index, base oil, linseed oil.

I.INTRODUCTION

Since the growing threat of the global environmental crisis requires a fundamentally new approach to solving the problems of preventing environmental pollution and import-substituting alternative fuels – lubricating materials.

An alternative in this case can serve as non-toxic oils of vegetable origin and products of their processing, which have high biodegradability (up to 100%). The use of these products is possible for the production of all types of lubricants - oils, greases and additives.

This increases rational use of surrounding environment, as it makes it possible to completely abandon the use of some chemically active additives. Vegetable oils provide a certain level of corrosion protection without additives, therefore, the need for them often disappears altogether [1]. Alcohols, esters and free fatty acids which are part of vegetable and animal oils form a strong lubricating film on the friction surface. The main disadvantages of fats include low stability and, in most cases, poor low-temperature characteristics. These disadvantages are partially eliminated by mixing fats with petroleum oils [2].

Objects and research methods: In this direction, studies and the creation of new composite base oils based on local raw materials were carried out at the Ferghana Oil Refinery Plant (FORP). We at FORP to improve the compositional performance indicators of quality have carried out work to create and expand new types of competitive base oils, adding to the high-quality base oils an additive of plant origin in the form of linseed oil.

For research work, the oil components were selected from installation 57/1. After purification of the oil fractions with selective solvents, the qualitative indicators were determined, which are listed in table No. 1.

Quality indicators of the components of distillate oils

Table No. 1

No	Name of indicators raffinate	II fraction of raffinate	III fractions of raffinate (127 reserves.)	Residual. raffinate (130 reserves.)
1	Viscosity, cCt: at 100 ^{0}C	4,52	7,8	17,76
2	Color on the calorimeter, unit CNT	1,5	2,0	6,0
3	Viscosity index	113	96	99
4	Density 20 ^{0} C da, g / cm3	0,94	0,8	1,07
5	Flash point, 0C	184	210	230
6	Pour point, ^{0}C	+35	-17	-17
7	Refractive index, at 50 ^{0}C	1,4730	1,4800	1,4970

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Studies have also been conducted on the possibility of using cotton, soybean, linseed and other oils, as well as their derivatives as components of lubricants. It was shown that the physicochemical properties of oil samples with the addition of linseed oil changing a number of quality indicators of the oil itself. Table 2 below shows the properties of linseed oil.

Table No. 2

Composition and physico-chemical properties of linseed oil

Name of fatty acids	Fatty acid content% by weight	Refractive index at 15 ° C	Saponification Number	Iodine number	The content of unsaponifiable mass %	Density at 15 ° C, kg / m^3	Nutritional value
Saturated	9 – 11	1,4858 – 1,4872	191 – 196	175 – 204	0,5 – 1,1	934 – 935	499 kcal / 100 gr
Oleic	13 – 29						
Linoleic	15 – 30						
Linolenic	44 – 61						

The composition of the base oil was selected by mixing the components of the oils and additives of plant origin in different proportions.

In order to improve the quality of the base oil, the ratio of the components was selected based on the need ensure the viscosity of the oil in the range of 10.5-11.5 or 13.5-14.5 mm^2 / s at a kinematic viscosity of 100 ^{0}C.

Based on the obtained data, the optimal oil composition was selected. The composition and quality of the prepared mixtures are shown in table No. 3 and No. 4

The ratio of the component composition in percent

Table No. 3

No.	Oil components	The ratio of new mixtures,%					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
1	Component of the finished oil of III fraction	90	-	22,5	15	15	5
2	Component of the finished oil of residual. oils	-	90	75	75	70	75
3	Linseed oil	10	10	2,5	10	15	20

Compounding oil: the estimated amount of oil components and additives is mixed and heated to 80 ° C with a glass rod for 20-30 minutes, then analyzed by quality indicators.

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The result of a qualitative analysis of new composite oils

Table number 4

№	The name of indicators	Samples of prepared oil					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
1	viscosity, cCt: at 100 ° C, at 40 0C	10,6 32,32	15,7 153,84	14,38 47,38	13,99 127,37	12,72 109,59	12,9 105,50
2	Viscosity index	163	104	95	105	107	113

Vegetable oils can, serves as a replacement, as well as an additive to diesel fuels and base oils. [3, 4, 5].

Conclusion: Indeed, experimental results have shown the production of high-quality base oils from local oil with the addition of local herbal additives in the form of linseed oil.

One of the technological advantages of vegetable oils from petroleum oils is its good viscosity and tribological properties. The obtained experimental results showed the production of high-quality base oils with improved indicators such as kinematic viscosity, high viscosity index, and ecologically safe and performance properties. In the oil, in order to achieve the same viscosity index, it would be necessary to introduce about 10% of the viscosity additive.

In order to improve the quality of the base oil, research was carried out as a result of which a new compositional oil was developed on the basis of local oil raw materials, which also allowed to increase economic efficiency. Research work and pilot-industrial tests of such lubricants are ongoing.

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