LUBRICANTS OF IMPROVED QUALITY BASED ON MODIFIED FATTY ACID RAW MATERIALS

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To reduce the use of imported raw materials in the manufacture of greases, this paper proposes introducing poultry fat, which is a by-product of poultry farms.

Poultry fat is obtained by heating the internal and intestinal fat accumulated during the processing of poultry carcasses, i.e., waste that, for sanitary reasons, is not suitable for human consumption. In its composition, poultry fat contains the following fatty acids: oleic – 40.8 %, palmitic – 24.1 %, linoleic – 19.7 %, stearic – 7.5 %, palmitoleic-nova – 5.0 %, myristic – 1.0 %, etc. The acid number of poultry fat is 2.6 mg KOH/g; the saponification number is 194.2 mg KOH/g, iodine number, g I_2/100 g, is 89.30.

The developed lubricant for lubrication of friction units of equipment operated at elevated temperatures under high loads and contact with water contains petroleum oil, calcium hydroxide, and acetic acid, and as a fat-containing component of the thickener contains modified poultry fat instead of the interaction of 12-hydroxystearic acid of plant origin imported from India, Brazil or China. 12-hydroxystearic acid is obtained by hydrogenation of castor oil with its subsequent separation. The properties of the obtained grease using poultry fat (GPF) compared with the model sample of complex calcium grease (CCG) are summarized in the table.

Table. Composition and characterization of lubricants

Name of indicator, unit of measure	Greases	
	GPF	CCG
Dropping point, °C	> 250	> 250
Penetration, $m \cdot 10^{-4}$	287	300
Colloidal stability, % of extracted oil	2.8	3.3
Ultimate strength, Pa:		
at 20 °C	500	390
at 80 °C	320	240
Tribological characteristics on four ball machine at the temperature (20±5) °C:		
– welding loading (Pw), N	2450	2323
– critical load (Pc), N	1098	980
– wear scar diameter at 392 N (Dw), mm	0.52	0.55
Biodegradation, %	44.0	22.0

Lubricants have high-performance characteristics, are safe for the environment, and are made on available raw materials from renewable sources. They are characterized by excellent functional performance. In addition, they have a high dripping point and mechanical stability, as well as anti-wear and extreme pressure properties. The use of poultry fat for producing plastic lubricants, on the one hand, allows to effective utilize the by-products of poultry farms; on the other hand, it will enable to obtain of modern high-temperature lubricants and replacing expensive imported raw materials.