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# INVESTIGATION OF THE POSSIBILITY OF IMPROVING THE TECHNOLOGY OF PRODUCTION OF FATTY ACIDS FROM COTTON SOAPS

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**Abstract**

More than 20 enterprises for the production of oil and fat products operate in Uzbekistan, where they mainly produce and process cottonseed oil. During alkaline refining, soap stock is formed, which is saponified with alkali and then decomposed into fatty acids using sulfuric acid.

**Keywords**

cotton soapstock, fatty acid, refining, soapstock, resaponification, neutral fat, decomposition.

The aim of our study was to develop an improved method for processing cotton soaps to produce crude fatty acids. Co-stocks of cottonseed and other oils are secondary products of production, which are formed during the refining of oils.

Cotton coapstocks, unlike other vegetable oil coapstocks, are characterized by their specific features-the presence of gossypol and its derivatives in their composition, as well as products of their interaction with phosphatides, proteins, carbohydrates and other substances of a non-lipid nature.

The processing of cotton soapstock is currently carried out according to two schemes:

Scheme 1 shows the processes of saponification of neutral fat contained in soapstock, salting, separation of the soap core from the soap liquor, decomposition of the core with sulfuric acid and the production of crude fatty acids. Next, these crude fatty acids are distilled to produce light fatty acids. In this method, up to 150 kg of caustic soda, 220-290 kg of sulfuric acid and about 170 kg of table salt are consumed to produce 1 ton of crude fatty acids (1).

Scheme 2 - co–stocks are recycled using the so-called adhesive method. This method is used in those enterprises where there are no sewage treatment plants and there are difficulties associated with wastewater treatment. In addition, when

working with this method, enterprises consume slightly large amounts of caustic soda, table salt, sulfuric acid, etc.

Laboratory studies have shown the complexity of the process of obtaining crude fatty acids from soapstock, especially cotton, without carrying out the process of additional saponification, due to the content of a large amount of neutral fat. Therefore, while improving the technology for obtaining fatty acids from cotton soaps, a number of new approaches and methods for processing such complex mixtures have been undertaken.

Numerous works have been devoted to the processing of co-stocks of various oils. For example, the ways of rational use of cotton soaps obtained by refining vegetable oils are considered.

A method of processing cotton soapstock has been studied, including direct decomposition of soapstock followed by splitting of soapstock fat to obtain fatty acids. The process of cleavage of bone fat is carried out using lipase at 34-40 C and pH 6.5-7.5. Fatty acids are obtained of satisfactory quality, but the use of expensive lipase as a reagent for cleaving bone fat to fatty acids increases the cost of using this method in industry (1).

There is a known method for producing pure and discolored fatty acids without distillation. However, the use of sulfuric acid, temperature and constant stirring during the decomposition of soapstock contributes to the deterioration of the quality of fatty acids. At the same time, another paper proposed a method for obtaining discolored fatty acids that uses neither sulfuric acid, nor elevated temperature, nor constant stirring. But on the other hand, the removal of all impurities from the soapstock before its decomposition is an indispensable condition. The fatty acids obtained by this method are lighter and of better quality than the acids obtained by the old decomposition methods (2).

Studies by a number of authors have shown the possibility of obtaining fatty acids from cotton coapstock by additional saponification of coapstock with calcium hydroxide. The optimal conditions for the process are the addition of 40-50% of an excess of 10% calcium hydroxide solution to saponification. The technology eliminates the formation and discharge of soap-based liquors and, with them, the loss of fats.

However, each of the known methods has certain disadvantages, which is why they have not been widely used in industry.

Based on the above review, it follows that although a number of works have been devoted to the issue of fatty acids from soapstock, there is limited information specifically on the production of fatty acids from cotton soapstock.

**THE EXPERIMENTAL PART**

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In order to develop an improved technology for processing cotton soapstock, we selected several samples of soapstock to establish characteristic indicators of their quality. The quality of co-stocks was studied using special methods (4). Experiments on the processing of refining coapstocks and the production of fatty acids were carried out on a specially designed camera unit. The results of analyses of coapstocks and grades 2-3 obtained during the processing of black oils are shown in the table.

The results of analyses of soapstock and obtained during the processing of black oils of 2-3 grades.

| № | Total % | Neutral. % | Low-fat edients, % | Humidity, | Of the ent. soap, | Freedom. lkali, % | Note |
|---|---|---|---|---|---|---|---|
| 1 | 46,85 | 19,51 | 10,34 | 42,14 | 30,51 | 1,88 | Brownish-colors |
| 2 | 47,26 | 20,44 | 10,63 | 40,25 | 29,84 | 1,11 | Brownish |

As can be seen from table 1, in the samples of cotton soaps obtained by refining cotton oils of grades 2-3, the neutral fat content ranges from 19.51-20.44%, low-fat substances 10.34-10.63%, soap-29.84-30.51%, which must be paid attention to during decomposition and cleavage processes.

To further improve the method of obtaining crude fatty acids, taking into account the specifics of cotton coapstock, it is necessary to continue the research that has begun.

To conduct the experiments, the cotton soapstock is heated in a reaction vessel, while stirring, with the calculated amount of water for its dilution. When the mass reaches this temperature, the required amount (depending on the soap content in the soap stock) of concentrated sulfuric acid is introduced while stirring for 35-40 minutes.

Further, the mass is continued to be mixed until the required depth of decomposition is reached. Then the sludge is given to the mass, after that the corresponding layers are separated. Acidic waters, neutralizing, drain into the sewer, and the layer of the fatty mixture is treated with sulfuric acid. The process of pouring sulfuric acid to the split fat is carried out gradually in small portions. At the end of the cycle, the process of stratification of the formed phases proceeds differently depending on the quality of the initial coapstock. Therefore, it is advisable to subject the formed co-bone fat to two-stage cleavage with the separation of acidic waters after each stage of cleavage. The resulting fatty acids are thoroughly washed, dried and then analyzed for the depth of cleavage of the acid

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number and moisture content. Thus, the decomposition and splitting of more than five batches of various cotton stocks was carried out and the following results were obtained:

The depth of fatty acid breakdown ---94,8-95,6%

Acid number --- 168,3-175,0 mg KOH

Moisture content ---0,35-0,51%

The obtained fatty acids with a cleavage depth of 95.6% and an acid number of 175 mg KOH meet the requirements of the standard.

## LIST OF LITERATURE: