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DEODORIZATION AND REFINING OF COTTONSEED OIL

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ABSTRACT

The article discusses the refining of crude cottonseed oil, which is a complex, multi-stage process carried out on the basis of physical, physicochemical and chemical methods of processing oils and fats in order to improve their quality, nutritional and biological value. Oil refining occurs due to the adsorption of coloring substances on aluminum oxide, which is formed from sodium aluminate during the technological process. In the composition of crude oil, a number of concomitant substances are effectively removed in the form of hydrophilic sodium compounds - free fatty acids, phospholipids, free and some dark-colored forms of altered gossypol.

Keywords: Fat processing, phospholipids, technological regime, clay, bentonite, cottonseed oil, alkaline neutralization.

INTRODUCTION

Refining of vegetable oils and fats is one of the most important technological processes of fat processing. The refining technology, namely, the alkaline neutralization of crude cottonseed oil, consists of a complex of complex physical, chemical and physicochemical processes, on which the physicochemical characteristics and quality indicators of refined oil mainly depend. Establishment of optimal technological modes of alkaline refining of crude cottonseed oil ensures an increase in yield, improvement of quality and nutritional value of refined cottonseed oil, establishment of efficiency and technical and economic indicators of new scientific and technological developments Cottonseed oil is traditionally bleached using activated clays, charcoal and their compositions. After such purification, refined cottonseed oil is sent for deodorization to depersonalize odor and taste, as well as remove carcinogenic fatty acids, etc.

PURPOSE OF THE STUDY

The purpose of the study is that the technological modes, yield and quality indicators of refined cottonseed oil are also determined by the nature and method of production of crude oil, the composition and quantitative content of foreign impurities in it, as well as related substances. The selection of an effective adsorbent for the refining of cottonseed salomas requires an in-depth study of its mineral and chemical composition, as well as structural properties.

METHODS AND MATERIALS

Optimal technological modes of partial neutralization of crude cottonseed oil have been determined, which ensure the maximum removal of phospholipids, gossypol and its derivatives, tocopherols from the raw material at the stage of preliminary refining [1]. Urea-modified clay adsorbent was obtained by impregnating the clay adsorbent with a 30% urea solution and drying it at a temperature of 95-1000C to a residual moisture content of 7-8%. The finished MGA is stored in a closed desiccator [7].

The acid number of oils was determined by potentiometric and indicator methods using a 1% alcohol solution of thymolphthalein as an indicator [4]:

- the color of cottonseed oil was determined on the Lovibond color meter;

RESULTS AND DISCUSSION

The establishment of optimal technological modes of alkaline refining of crude cottonseed oil ensures an increase in yield, improvement of the quality and nutritional value of refined cottonseed oil, establishment of efficiency and technical and economic indicators of new scientific and technological developments.

Moreover, all clays (except for opokiform) need acid activation, which makes it possible to increase their adsorption activity. In the laboratory, we treated the clays with a 15% solution of H2SO4 for 6 hours, then the obtained samples were washed with water to a neutral reaction, dried and ground to a powdery state. The finished adsorbents were stored in desiccators. Under laboratory conditions, cotton lard of grade-4 (K.p.=0.31 mg KOH/g), chromaticity (according to VNIIZh-12=4), peroxide value of 10.0 mmol/kg and nickel content of 0.7 mg/kg at a temperature of 90±50C for 1 hour were subjected to adsorption purification. 1 shows the results of adsorption tertiary treatment of cotton fat on selected clays.

Indicators of cotton Salomas	Askanite Bentonite (Georgia)	Bentonite Navbakhor field	Tulsokh Palygorskite	Opovid-clay Kermine
Acid number, mg KOH/g	0,26	0,21	0,25	0,26
Color according to VNIIZh-12	9,0	3	3	3
Nickel content, mg/kg	0,5	0,27	0,35	0,38

Table 1. Ennobling ability of local clays of cotton salomas As can be seen from Table 1, the greatest adsorption activity (purification) was shown by the bentonites of the Navbakhor deposit. Therefore, for further studies we used these adsorbents. When studying the fat capacity, the selected clays had the following indicators: bentonite of the Navbakhor deposit - 42.3%, Tulsokh Palygorskite - 48.1% and Kermine opokoid clay - 51.0% [2]. Refining of vegetable oils and fats is one of the most important technological processes of fat processing. The refining technology, namely, the alkaline neutralization of crude cottonseed oil, consists of a complex of complex physical, chemical and physicochemical processes, on which the physicochemical characteristics and quality indicators of refined oil mainly depend the nature and method of production of crude oil, the composition and quantitative content of foreign

impurities in it, as well as related substances. The selection of an effective adsorbent for the refining of cotton saloms requires an in-depth study of its mineral and chemical composition, as well as structural properties. Optimal technological modes of partial neutralization of crude cottonseed oil have been determined, which ensure the maximum removal of phospholipids, gossypol and its derivatives, tocopherols from the raw material at the stage of preliminary refining [1].

The establishment of optimal technological modes of alkaline refining of crude cottonseed oil ensures an increase in yield, improvement of the quality and nutritional value of refined cottonseed oil, establishment of efficiency and technical and economic indicators of new scientific and technological developments.

Moreover, all clays (except for opokiform) need acid activation, which makes it possible to increase their adsorption activity. In the laboratory, we treated the clays with a 15% solution of H2SO4 for 6 hours, then the obtained samples were washed with water to a neutral reaction, dried and ground to a powdery state. The finished adsorbents were stored in desiccators. Under laboratory conditions, cotton lard of grade-4 (K.p.=0.31 mg KOH/g), chromaticity (according to VNIIZh-12=4), peroxide value of 10.0 mmol/kg and nickel content of 0.7 mg/kg at a temperature of 90±50C for 1 hour were subjected to adsorption purification. 1 shows the results of adsorption tertiary treatment of cotton fat on selected clays.

CONCLUSIONS

The results of the study showed that, despite the identical conditions of the adsorption process, minerals show selectivity in the sorption of undesirable components of cotton saloms. For example, bentonites are good at sorbing free fatty acids, flasks are metal residues, soaps, etc.

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