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FEATURES OF ALKALINE REFINING OF LOCAL CRUDE SAFFLOWER OILS UNDER PILOT-PLANT CONDITIONS

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Abstract: *This study developed a technology for refining crude safflower oils obtained from local raw materials. The regimes ensuring improved quality and yield of refined oil were established. The conditions and parameters for implementing the obtained data in the practice of oil and fat enterprises are proposed.*

Keywords: *crude safflower oils, refining technology, pilot tests, and results of obtained data.*

Introduction: Scientific research on the refining of crude vegetable oils and fats is carried out using various technological methods and regimes [1-4]. However, not all developed schemes and technologies are implemented in production conditions. The main reason for this phenomenon can be considered significant differences in the values of parameters obtained in research [5,6] and their practical implementation. Therefore, pilot-plant testing of new scientific and technological developments with their subsequent implementation in industrial practice is necessary.

Objective: To conduct pilot-plant research on the technology of refining local crude safflower oils obtained from safflower seeds grown in the soil and climatic conditions of Uzbekistan.

The research objects were crude safflower oils obtained from local raw material varieties, as well as the study of the features of refining such oils under pilot-plant conditions.

Methods: Modern physicochemical research methods used in the practice of oil and fat enterprises were used to analyze and evaluate the quality and physicochemical indicators of crude and refined oils.

Subject of the study: Analysis and evaluation of the features of refining crude safflower oils under pilot-plant conditions.

Results: Pilot-plant tests studied the technological processes of hydration of crude safflower oil with activated sodium hydroxide solution followed by alkaline refining of the obtained oils with a sodium hydroxide solution. The studies were conducted in an electromagnetic field with and without treatment with alkaline solutions.

The results of pilot-plant tests of the safflower oil hydration technology are presented in Table 1.

Analysis of the presented data shows that the hydration of crude oil under pilot-plant conditions is the same as under laboratory conditions.

Table 1

The results of hydration of crude forpress safflower oil in pilot tests

Sample, №	Physico-chemical description			Hydrated oil output, %
	Acid number, mg KOH/g	Chroma in red units at 35 yellow 1 cm layer	The amount of phospholipids, %	
1	2,1	8	0,29	97
2	2,8	11	0,42	95

During the pilot-scale trials, the technology of hydrating raw oil with pre-treated water in EMP of varying strengths was also investigated. The results obtained are presented in Table 2.

Table 2

Results of Production Trials of Raw Safflower Oil Hydration Technology Using Water Solution Pre-Activated by EMP

	Physico-chemical description	
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EMF intensity, A/m	Acid number, mg KOH/g	Chroma in red units at 35 yellow 1 cm layer	The amount of phospholipids, %	Hydrated oil output, %
Prepress oil				
0 (control)	3,0	13	0,42	95
0,4	2,8	10	0,41	95
0,8	2,5	8	0,39	96
1,2	1,0	7	0,35	96
1,6	1,5	4	0,30	97
2,0	1,4	3	0,29	97
2,4	1,3	3	0,29	98
2,8	1,2	3	0,29	98

Thus, pilot-scale trials have demonstrated the feasibility of using water treatment in the EPM (presumably Electro-Magnetic Processing) for the hydration of raw safflower oil.

Samples of hydrated safflower oil obtained from pilot-scale trials were refined using a sodium hydroxide solution.

Analysis of data presented in Table 3 indicates that hydrated safflower oil is easily amenable to alkaline refining with a sodium hydroxide solution.

Table 3

Results of alkaline refining of hydrated first-press safflower oils under experimental conditions

The initial sample of	Indicator of hydrated oil			Refined oil indicators				
	Acid number	Chroma in red		Refining conditions	Acid	Chroma in red	Exit, %	

raw materials			Concentration of NaOH solution, g/l	Excess alkali, %			
Prepress oil							
1	2,1	13	95	20	0,07	4	97
2	2,8	9	115	30	0,09	5	95

CONCLUSION

Pilot-scale trials of the alkaline refining technology for hydrated oils have confirmed the effectiveness of the developed oil refining technologies.

The implementation of the results of new scientific and technological developments will allow for the rational and efficient processing of crude oils obtained from the processing of safflower seeds of local varieties.

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