

Technical Possibilities for Production of Vegetable Oil from Grapes Seeds as Waste Product

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Abstract - The thechnical possibilities for grape-seed oil production for food use were studied. The effect of two ways for grape seeds drying on the quality and quantity of the obtained glyceride oil was investigated. It was established that there is no difference in the free fatty acid quantity by using the two temperature modes.

Keywords – Grape-seed oil, drying of seeds, dryers.

I. INTRODUCTION

In wine - making industry, a waste product called grape marc is produced, which is usually discarded and in that way it pollutes the environment or it is used for cattle and sheep feeding. The grape marc contains seeds, which in them contain vegetable oil from 11,5 to 16,8 percent [1,2,3]. According to bibliographical data, the seed contents in the grape mass are from 2 to 5 percent. According to our investigation, the seed contents in marc are about 30 – 35 percent.

In 1945 [4], extracted grape-seed oil has been produced in our country. At present, there is no organized grape-seed oil production for food use in Bulgaria, whereas, in a number of European countries this oil has been supplied to the market. Different investigations for checking the possibility for drying grape seeds and marc in various cylinder and belt dryers [5] have been carried out, for the purpose of oil extraction preparation.

Regardless of the fact that recently vineyard growing in the republic of Bulgaria has considerably decreased, the interest towards grapes seeds and the possibilities for producing of vegetable oil has increased. That could be explained by the fact that at annual grapes processing rate of 350 000 t, and at an average percent of oil extraction from seeds of 10%, 1050 t of vegetable oil could probably be produced.

The perspectives for the agricultural development envisage vineyards growing increase up to 3 - 4 times, which would

increase the possibilities for production of a greater quantity of waste products.

The purpose of this investigation is to establish the present technical possibilities for vegetable oil extraction from grape seeds for food usage, as well as to study temperature mode effect of drying upon some oil qualities.

II. MATERIALS AND METHODS

The object of our investigation was grape marc taken from different regions of our country.

1.Seed separation from the grape marc. The grape marc was first pressed and then sifted out by sieves with different mesh size. We have used consequently sieves with mesh diameters of 8 and 6 mm and the final stage of sieving have done in a rectangular cuts sieve with size of mesh 18 X 2 mm. We have established this succession of sieving in a result of many attempts and it secure more than 97 percent separation of grape seeds from the marc.

2.Seed Drying. After sieving and separation of the seeds, they should be dried. We have done series of seed drying in two different dryers, at two different temperature modes:

a) First was a high temperature mode in an air-fountain drier [6] at temperature approximately 70 °C. The drier operates by a one-time recirculation of the drying agent.

b) Second - low temperature mode at temperature about 45 – 50 °C. The seed drying was carried out on a low temperature fluidized-bed drier [7] in complete recirculation of the drying agent.

3.Grape-seed oil extraction. The dried material was extracted by diethyl ether and the free acid number of the received oil was determined by standart method [8].

III. EXPERIMENTAL RESULTS AND DATA ANALYSIS

The acid numbers - respectively 2.8 and 3.0 mg KON/ g were determined for the glycerid oils, produced after grape seeds drying, according to both temperature modes. The insignificant difference in the acid number values shows that both temperature modes used did not have significant effect upon acid number. Investigations are going to be made on these modes effect to oxidative stability of oil.

Table 1 shows the results from the drying at a high temperature mode, at temperature approximately 70 °C.

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TABLE I

Experimental Results of Higher Temperature
Air-fountain Drying

Parameters	Month. year	
	X,2001	XI,2001
Initial weight, g	3250	5000
Final weight, g	2680	3170
Chamber temperature, °C	68	70
Initial moisture, %	22,9	38,3
Final moisture, %	5,9	2,74
Duration of drying, min	120	150
Grapes variety	Merlout	White

Table 2 shows the results from the experiments carried out in a low temperature fluidized-bed drier [7], in complete recirculation mode of the drying agent.

TABLE 2

Experimental Results of Low Temperature
Fluidized Bed Drying

Parameters	Month. year		
	V,2001	X,2001	X,2001
Initial weight, g	1000	1200	1500
Final weight, g	682	792	990
Chamber temperature, °C	42	48	48
Initial moisture, %	40	38,3	38,3
Final moisture, %	12	6,5	6,5
Duration of drying, min	130	150	150
Grapes variety	Mixture	White	White

	Chirpan region		
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IV. CONCLUSIONS

1.The results obtained for acidic number of the respective oil samples show that both high temperature and low temperature modes can be used for drying the grape seeds before extraction the oil.

2.Investigations of the other physical and chemical indices of the produced grape-seed oil are going to be done.

3.Glycerid oil extraction from grape seeds can be done in the existing plants for sunflower-seed oil deriving.

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