



Research on the process of obtaining pure sesame oil using microwave processing

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Keywords

Sesame seeds
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Drying
Oil content
Degree of extraction

Abstract

The article provides information about the countries where grape seeds are most grown, about the healing substances contained in the seed oil kislots, vitamins, macro and microelements, as well as about their healing for various diseases. In addition, the article presents the results of research on the division of khoraki grapes into parts. Also listed are methods for producing oil from grape seeds. The results of studies of the effect of microwave treatment of sesame seeds on the yield of oil, cake is presented. The significant influence of the power and duration of the radiation process on the oil production indicators is shown. Optimal technological parameters have been established, at which the degree of oil extraction is 32.79%, cake 66.71%. The main parameters affecting the degree of oil release are the oil content of seeds, the power of microwave radiation and the duration of the process.

Introduction

Today, due to the lack of fresh water and the reduction in sown areas, the problem of providing the population with food is sharply exacerbated. In this regard, the intensification of technological processes, an increase in the yield of products obtained and an improvement in quality, including the processing of raw materials for medical purposes and healthy nutrition, the production of oils rich in polyunsaturated fatty acids, will become relevant.

In the world, with population growth, reduction of acreage and lack of fresh water, the problem of providing the population with food is sharply aggravated. In this regard, the intensification of technological processes, increasing the yield of products and improving quality are an urgent task of food production. In this aspect, the development of new, improvement of existing processing technologies, especially various non-traditional oil-containing seeds, is no less relevant. In the world, special attention is paid to obtaining oil from the seeds of stone fruits, crushed melon seeds, wheat germ, and pine nuts. At the same time, research work to determine the impact of the use of microelements and vitamins, the production of essential polyunsaturated fatty acids, increasing thermal stability using ultra-high frequencies and electromagnetic fields on human health are important [1-4].

Methods

Studies were carried out using Central Asian sesame with an oil content of 38.10%. Chemical analysis of the initial, intermediate and final products was carried out by known methods [5-8].

The acid number of oils was determined by O'zDSt 1203, and a 1% alcohol solution of phenolphthalein was used as an indicator [9-13]. The method is based on the titration of an oil sample with an alkali solution in the presence of the phenolphthalein indicator.

A neutralized mixture of alcohol and diethyl ether was used as a solvent for the oil.

Results and Discussion

Studies of the effect of microwave radiation on weight loss, the yield of oil and cake from sesame seeds were studied on an installation, the main node of which is a microwave oven. The radiation power varied from 100 to 300 watts at a frequency of 2450 MHz and the duration of the treatment process was 15 minutes. Studies have shown that at a radiation power of 120 W and above, the seeds are roasted.

To establish the effect of the duration of the microwave radiation process on the sesame oil yield, the seeds were kept in a microwave oven at a study power of 105 watts, a frequency of 2450 MHz and a study duration of 1 to 20 minutes. The results obtained are shown in Table 1.

Preliminary grinding of sesame seeds did not give a positive result. Therefore, further studies were carried out without grinding, by pretreating the seeds with steam at 250 ° C, for 30 minutes.

It can be seen from the table that with an increase in the duration of the sesame seed treatment process for 1-5 minutes, weight loss is not observed. With an increase in the duration of the microwave radiation treatment process from 10 minutes to 20 minutes, the mass loss increases from 0.25% to 1.00%.

Table 1. The effect of microwave radiation on oil extraction and cake yield

Nº	Time (Min)	Mass Loss (%)	Cake output (%)	Oil output (%)
1	-	-	81,39	18,61
2	1	-	77,84	22,16
3	3	-	72,90	27,10
4	5	-	68,86	31,14
5	10	0,25	68,20	31,55
6	15	0,50	66,71	32,79
7	20	1,00	74,92	24,08

Increasing the duration of the sesame seed treatment process increases the oil yield from the first minutes. So, when processed for 3 minutes, the oil yield increases by 8.49% and increases from 18.61% to 27.10%. The maximum degree of oil extraction is observed during processing for 10-15 minutes and is 31.55-32.79%. A further increase in the processing time to 20 minutes leads to a decrease in oil yield up to 24.08%.

Under optimal conditions of processing duration of 10-15 minutes, the yield of cake is the smallest and amounts to 68.20-66.71%.

Conclusion

Thus, the maximum degree of oil extraction is observed during processing for 10-15 minutes and is 31.55-32.79%. A further increase in the processing time to 20 minutes leads to a decrease in oil yield up to 24.08%.

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