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ACCELERATION OF PHOSPHOLIPIDS EXTRACTION FROM LOCAL RAW SOYA OILS

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Abstract
The technological process of extracting phospholipids from raw oils obtained from local soybean seeds has been accelerated. The effect of water temperature used in the extraction of phospholipids was analyzed.

Keywords: Raw vegetable oil, phospholipids, hydration process, effect of water used.

Introduction

Local soybean seeds are considered to contain a significant amount of phospholipids in the composition of vegetable oils [1, 2]. Phospholipids are widely used in food production and confectionery [3, 4]. Therefore, improving the technological processes of extracting phospholipids from soybean oils is of great importance. The temperature of the water used in the hydration method of phospholipid extraction has an impact on the product yield.

One of the most important conditions for the efficiency of the hydration process is the quality of the water [5]. The total hardness and alkalinity of the water, as well as the concentration of hydrogen ions (which determines the pH), are essential parameters affecting the hydration process. Organic and dissolved substances in the water also significantly influence these factors [6].

The effect of tap water and pre-prepared water on the degree of phospholipid extraction from raw soybean oil during the hydration process was studied in the laboratory under centrifugation conditions. For this, 100 g of oil was placed in a centrifuge tube, immersed in a laboratory mixer, and continuously stirred in a water bath at a temperature of 50-56°C. Water, at a rate of 2.0% of the oil weight, was slowly added to the oil, which was heated to the desired temperature, and the mixture was stirred for 15 minutes until the phospholipid emulsion, which could be easily separated from the oil and settling foam, was formed. The mixture was then centrifuged at 2500 rpm for 5 minutes. The hydrated soybean oil was decanted.

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Table 1 Effect of the quality of activated water on the efficiency of phospholipid extraction from raw soybean oil

Indicator names	Unrefined oil	Hydrated with water	
		With natural water having a hardness of 4.0 mg*eq/l and alkalinity of 2.9 mg*eq/l"	With prepared water having a hardness of 0.1 mg*eq/l and alkalinity of 0.4 mg*eq/l"
50°C At temperature			
Mass fraction of phospholipids, %	0,9	0,45	0,33
Hydration, %	—	50	64
53°C At temperature			
Mass fraction of phospholipids, %	0,9	0,41	0,31
Hydration, %	—	55	66
56°C At temperature			
Mass fraction of phospholipids, %	0,9	0,41	0,31
Hydration, %	—	55	66

As a result of the physical-chemical and chemical effects of water, phospholipids with difil bonds are hydrolyzed. However, some groups of phospholipids, such as phosphatidic and polyphosphatidic acids, are resistant to the effects of water and remain in the oil. This pattern was also observed in the research results (Table 1), which showed that increasing the degree of hydration of the oil by 11% with prepared water did not significantly increase the overall hydration percentage, which amounted to 66%.

Conclusion

The temperature of the water used in the extraction of phospholipids from raw soybean oils, maintained at 53°C, ensures a high yield of the product.

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