

MICROWAVE EXTRACTION OF ANTIOXIDANT COMPONENTS FROM RICE BRAN

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Microwave-assisted extraction is a novel process that uses microwave energy to heat the solvent and the sample in order to increase the mass transfer rate of solutes from the sample matrix into the solvent. Microwave-assisted extraction is advantageous over other extraction methods because it is rapid, uses low solvents quantities, and yields consistent results.

The goal of the research was to optimize the extraction of rice bran oil, a source of vitamin E, using microwave extraction. The objectives of the research were 1. To effectively extract rice bran oil from rice bran using microwave assisted extraction and 2. To analyze the influence of processing parameters on the rice bran oil yield.

The hypothesis was that the rapid, localized microwave heating resulted in a disruption of the physical structure of the source material, therefore leading to an increase in the diffusion rates and decrease in the extraction time as compared to other extraction methods. Factors that affected the extraction process were numerous, but this project addressed only three major processing parameters: solvent to sample ratio, temperature, and extraction time.

Isopropanol was selected as the extraction solvent. Samples of finely ground rice bran were obtained and placed into the extraction vessel along with a 2:1 or 3:1 isopropanol to bran ratio. The extraction vessel was then heated to extraction temperatures of 40°C, 50°C, and 60°C. The rice bran oil was extracted at each temperature for various amounts of time. These times were 5, 10, 15, 20, and 30 minutes. After each extraction time the solvent and bran were allowed to cool at room temperature. Then, the oil was separated from the solid material by filtration and analyzed for vitamin E concentration.

Results showed that the rice bran oil yield increased with extraction time and temperature. More experiments are required to assess the effect of processing parameters on the antioxidant activity of the extracted rice bran oil. This will be the objective of a subsequent study.