

RICE BRAN OIL EXTRACTION: EFFECT OF BRAN TYPE ON OIL YIELD AND PROPERTIES

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ABSTRACT

Rice is a unique crop of great antiquity and akin to progress in human cultivation. The rice seed mainly consists of the husk, rice bran, rice germ and white rice. Rice bran is the by-product of the rice milling process. The rice bran contains 15-20 wt. % oil, out of which about 95% is extractable. Rice Bran Oil is a high-grade vegetable oil with some very unique characteristics that is excellent in both edible and non-edible ways. Rice bran oil is vastly superior to traditional cooking oils due to its flavor, stability properties, good fry-life at high temperatures and high level of natural antioxidants with nutraceutical value. It also has a significant hypocholesterolemic effect and an anti-cancer effect and takes care of the skin. Rice bran oil can be used in soap, detergent, paint, sunscreen products, hair conditioners, cosmetics, etc. as well.

In this work effect of bran type on oil yield and properties has been studied for six varieties of rice available in Sri Lanka. IPA was used as the solvent in soxhlet apparatus to extract rice bran oil. Results show that the yield approximately varies from 18% to 11% for the types of bran tested and this may be due to the difference in degree of milling, seeding times and genetic variations of paddy. The properties tested include FFA content, Iodine value, Saponification value, Unsaponifiable Matter and specific gravity. Differences for these values for different bran type arose due to the genetic variations of paddy. Highest FFA content recorded was 1.98% and the lowest was 1.25%. Fatty Acid composition has been determined and Mass Transfer Co-efficient has been calculated for the chosen types. Oleic, Linoleic and Palmitic are the Fatty Acids which have the highest values. Mass Transfer Co-efficient was $4.264 \times 10^{-6} \text{ ms}^{-1}$ for AT307 variety and $4.258 \times 10^{-6} \text{ ms}^{-1}$ for BG352 variety.

Oil extraction and analysis of raw and parboiled bran has also been experimented and results show that bran obtained from parboiled paddy has a higher yield of rice bran oil compared to raw rice bran. FFA content is lesser in oil obtained from parboiled bran than that of raw bran. Cross flow extraction was carried out for selected bran types and the triangle diagram was prepared. In cross flow extraction, % of oil extracted reduces from the first to the last stage in any variety.

Suitability of rice bran oil extracted from varieties of bran available in Sri Lanka as a raw material for food items, pharmaceuticals and bio-fuel production was further studied. LD356 seems to be the best suited variety for biofuel production, from the varieties tested. BW364, which gives the highest unsaponifiable matter content, has the best potential for pharmaceutical production. For food applications, LD356 and AT307 are the best options in terms of fatty acid compositions. BG352 can be considered as the acceptable type for cosmetic and personal care industry.

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