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Controlling Rancidity of Purple Rice Bran by using Radio Frequency Heating Technique

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Abstract

A split split plot in complete randomised design (CRD) with 3 replications was designed in this experiment. The main plot was four cultivars of Thai rice bran which were 2 white rice (SPT1; KDML105) and 2 landrace purple rice (KDSK and KN), sub-plot was temperature of radio-frequency (RF) at 3 levels and sub-sub-plot was 4 storage periods. The rice bran samples were exposed to RF at frequency of 27.12 MHz at temperatures of 70, 75 and 80°C for 3 min. Then, the treated bran was packed in aluminum foil bag and vacuum sealed at a pressure of 80 kPa and stored at 25°C for 0, 2, 4 and 6 months. In each storage time, the bran were tested for contamination of microorganisms, moisture contents (mc), oil and protein contents and assessment of rancidity by thiobarbituric acid number (TBA) as well as anthocyanin content (in form of cyanidin⁻³-glucoside: C3G) in purple rice was also determined. The results showed that RF heating technique significantly decreased ($p \leq 0.05$) the mc decreased more than 1 %, but there was no significant difference between all treating temperatures. After 2 months storage, the mc of bran increased significantly due to moisture equilibration in their airtight containers. The RF at temperatures of 70 and 75°C reduced microbial contamination significantly. Storage for 2–6 months significantly resulted in increasing number of oil content. The interactions between temperature and cultivar also affected oil content. Rice bran treated at 75 and 80°C showed higher oil content than untreated, especially in cv. SPT1, KDML105 and KN. The same happened in protein content. Storage of 2–6 months resulted in TBA value, which tended to increase during the first 4 months and decreased in sixth month. The methods also provided higher C3G content extracted from purple rice bran compared to untreated samples.

Keywords: Anthocyanin, purple rice bran, radio frequency technique (RF technique), rancidity, storage