

ISSN 1906-9650

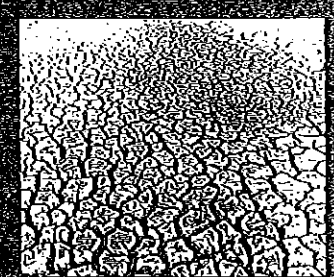
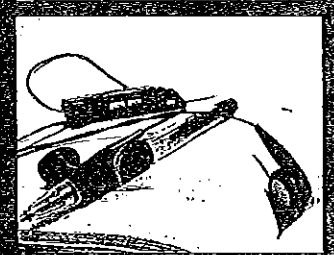


Thailand Research Symposium

2010

Proceedings

Oral Presentation



โดย

สำนักงานคณะกรรมการวิจัยแห่งชาติ (วช.)

National Research Council of Thailand (NRCT)

Simple process for quality improvement of cold-pressed rice bran oil

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Abstract

This research was conducted in cooperation with small scale cold-pressed organic rice bran oil manufacturer. The aim was to develop simple techniques for increasing production yield and purifying the rice bran oil product. It was found that heating of rice bran by hot air oven to reach 60°C before extraction by a screw press machine increased the yield for about double up when compared to extraction at room temperature. This research suggested three simple steps for crude oil purification: (1) filtering by filter papers (2) sedimentation with 4 %w/v bentonite and (3) bleaching by packed column of activated carbon. These steps significantly enhanced the qualities of rice bran oil when compared to crude oil before treatment. It was found that the brightness of oil as indicated by color value (L*) increased from 22.77 to 28.73, gum and wax decreased from 3.56 to 1.33 %w/w. However, the purification method had no effect on peroxide value and free fatty acid content. Moreover, it induced the loss of oryzanol content from 2.80 to 2.23 %w/w.

Background : Cold-pressed rice bran oil has become more popular due to their antioxidant activity and health benefits. Therefore, it has been produced by a number of small and medium scale manufacturers and readily available in the market. The production of cold-press rice bran oil uses only a single screw compression machine. This process is cheap and requires no sophisticated equipment. However, it results in very low production yield and the product contains high amount of impurities. This research aims to find simple techniques to overcome those problems.

Objectives : 1. To find the simple method to increase the yield of cold-press rice bran oil production.

2. To establish the simple refining process that applies no hazardous chemicals and suitable for small and medium scale manufacturers.

Setting : This research was conducted at a small scale manufacturer of organic cold-press rice bran oil in Lopburi province, Thailand.

Research Design : This research is applied research and conducted in cooperation with the industry partner.

Sample group : The sample group is a small scale manufacturer of organic cold-press rice bran oil in Lopburi province.

Method : 1. Determine the fatty acid composition of cold-press rice bran oil obtained from the manufacturer and identify the shelf life as indicated by peroxide value (P.V.) and free fatty acid content (FFA). 2.) Examine the effect of increased-rice bran temperature (40, 50, 60 and 70°C) prior to extraction by a single screw compression machine. The control sample was extracted at room temperature (28-30°C). 3.) Investigate the simple refining process which uses no hazardous chemicals and, is suitable for small scale manufacturers. This research examined the 3 steps simple refining method including (1) filtering by ashless filter papers (2) sedimentation by adding 4 %w/v fuller's earth (bentonite), leave for about 1 hr and then filter, and (3) bleaching by running through a packed column of activated carbon. Oil qualities including color, P.V., FFA, gum and wax content, oryzanol were evaluated.

Results : The major fatty acid in rice bran oil is oleic acid (41.03 %w/w). The results suggested that crude rice bran oil obtained from the manufacturer has the shelf life for about 4 weeks. During storage, FFA and P.V. increase until they reached the maximum level allowed. It was found that pre-heating of rice bran to 60°C prior to extraction by a screw compression machine can significantly increase production yields for about double up (from 4.80 to 8.30 %w/w). Using the 3-step simple refining process, the brightness of oil as indicated by color value (L*) increased from 22.77 to 28.73, gum and wax content decreased from 3.56 to 1.33 %w/w. However, the simple refining method had no effect on P.V. and FFA. Moreover, it slightly induced the loss of oryzanol content from 2.80 to 2.33 %w/w.

Conclusion : The production yield of cold-pressed rice bran oil can be easily increased by pre-heating of rice bran to 60°C prior to extraction. The quality of rice bran oil after extraction can be improved by simple refining process involving filtering by filter papers, sedimentation using bentonite and bleaching by activated carbon.

Keyword : Rice bran oil, Cold-pressed rice bran oil, Oryzanol, Peroxide value, Free fatty acid

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This research was financially supported by the Thailand Research Fund (TRF), grant number MRG-W1515S171 (2008).