

Various utilization and preparation of rice bran



**ASSIGN
BUSTER**

Rice bran is a by-product collects during rice milling process. Bran is just a waste during rice milling process, but it contains high amount of nutrients and needs to be utilize. Rice is a plant. The outer layer of the grain (bran) and the oil made from the bran are used for medicine. Rice bran oil is popular as " healthy oil" in Japan, Asia, and particularly India.

Be careful not to confuse rice bran with other forms of bran such as oat and wheat bran. Rice bran is used for treatingdiabetes, high blood pressure, high cholesterol, alcoholism, obesity, and AIDS; for preventing stomach and colon cancer; for preventing heart and blood vessel (cardiovascular) disease; for strengthening the immune system; for increasing energy and improving athletic performance for improving liver function; and as an antioxidant.

Also edible coatings using rice bran can improve the quality of frozen, fresh, poultry, seafood products, and processed meat by retarding moisture loss, reducing lipid oxidation and discoloration, enhancing product appearance in retail packages by eliminating dripping, sealing in volatile flavours, functioning as carriers offoodadditives such as antimicrobial and antioxidant agents, and reducing oil uptake by battered and breaded products during frying

Introduction

Rice bran is a byproduct collects during rice milling process. Bran is just a waste during rice milling process, but it contains high amount of nutrients and needs to be utilize. In a study of " processing of rice bran and its utilization in food products" by Shweta Bhosale, it stated there that the rice

bran was safe from microbes, pesticide residue, heavy metals, and was stabilized by microwave heating (Bhosale, 2014).

The rice bran is a good source of protein and fat. Rice bran also contains health benefits such as its antioxidant property, lowering cholesterol, anti - ageing/cosmetics and personal care, and many other health benefits that is part of this review paper (Prasadan, 2011). It is also one of the most important by products which produced by rice milling, it contains 14-18% of oil that can be use as rice bran wax (Göhl, 1982). When rice bran is stabilized, it is converted into a high-quality ingredient for feed, food and edible oil.

It is important to stabilize rice bran because the higher the FFAs in the oil, the higher the refining loss for edible oil. For human consumption, rice bran has been used by the American Heart Association to lower cholesterol. The USDA also states that rice bran is a good source of vitamins, minerals and omega 3, 6, and 9. In animal feed, stabilized rice bran can be used as an ingredient for equine, swine, poultry, aquatics, and deer (Cisneros, 2017). Many products can be made or produced by rice bran such as edible grade oil, industrial grade crude oil, free fatty acid manufacture, plasticizers, rice bran wax and others mention throughout this review paper.

Rice Bran as Edible Grade Oil

Rice bran oil has very low content of linolenic acid and high content of tocopherol. Therefore, bran oil has distinct advantages over other vegetable oils. Traditionally, in many of the Asian countries, including Indonesia and India, rice bran has largely been fed to cattle. However, Japan has

considered rice bran to be a valuable resource since ages and extracted oil out of it. Besides, rice bran oil is more popularly known as 'Heart Oil' in Japan. Now, it is emerging as popular cooking oil in several Asian countries, especially for deep and shallow frying applications (Rifinery, nd). Chemical characteristic of rice bran oil was shown below.

- PUFA 34%
- MUFA 44%
- SFA 22%
- Trans Fats Nil
- γ -Oryzanol 10, 000 – 14, 000 ppm
- Free Fatty Acid (% as oleic) 0. 1% max
- Color (1? cell, Lovibond 5R+Y) 12. 0 max
- Iodine Value (Wijs method, g/100 g sample) 91-98
- Peroxide Value (meq/kg) 1. 0 max
- Saponification Value 180-185
- Unsaponifiable Matter 3. 5 max
- Refractive Index 1. 464-1. 465
- Specific Gravity 0. 917
- Para Anisidine Value 55 max
- Smoke Point 255 Deg. Cel.
- Moisture (%) 0. 05% max

Rice Bran as Protective Coating

Rice bran oil can be used to manufacture surface coatings like alkyd and resin based paints, enamels, varnishes and lacquers (a clear or coloured varnish). Edible coatings using rice bran can improve the quality of frozen,

fresh, poultry, seafood products, and processed meat by retarding moisture loss, reducing lipid oxidation and discoloration, enhancing product appearance in retail packages by eliminating dripping, sealing in volatile flavours, functioning as carriers of food additives such as antimicrobial and antioxidant agents, and reducing oil uptake by battered and breaded products during frying (Gennadioa, 1996).

Rice Bran as Plasticizers

Bran oil can also be used to manufacture plasticisers for use in plastic and rubber industries. With environmental and toxicity concerns becoming more critical, there are increasing efforts to remove phthalates from polymer compounds around the globe more rapidly. Phthalates can be replaced by natural products; in particular, those obtained from vegetable oils and fats. In the present study, a natural-based plasticizer, synthesized by oxidation of non-toxic rice bran oil (RBO) with proxy acid generated in situ has been added to poly (vinyl chloride).

The influence of various reaction parameters on oxidation was studied by investigating the reaction ratio, temperature, reaction time and stirring speed. Oxidized rice bran oil obtained from an optimized reaction condition was analyzed by iodine number and oxidant content. FTIR was used to analyze epoxy group formation. Product ERBO was obtained with 82 % oxidant conversion within 3 h of reaction period. PVC sheets were formulated using a conventional plasticizer di-octal phthalate and was partially replaced by synthesized ERBO.

The effect of ERBO addition was tested by mechanical properties (tensile strength, modulus, elongation-at-break, shore D hardness) and compared with commercially available ESBO (oxidized soybean oil). ERBO presented fairly good incorporation and plasticizing performance, as demonstrated by the results of mechanical properties, exudation, migration tests, thermal stability by thermo gravimetric analysis, T_g values as shown by differential scanning calorimetric, replacing about 60 % of the total plasticizer (Nihul, et al., 2014).

Rice Bran as Tocopherol

Crude bran oil contains 2-4% tocoferol which has nutritional and antacid effects. The antioxidant activities of vitamin E (α -tocopherol, γ -tocotrienol, δ -tocopherol, and β -tocotrienol) and γ -oryzanol components (cycloartenyl ferulate, 24-methylenecycloartanyl ferulate, and campesteryl ferulate) purified from rice bran were investigated in a cholesterol oxidation system accelerated by 2, 2'-azobis(2-methylpropionamidine) dihydrochloride. All components exhibited significant antioxidant activity in the inhibition of cholesterol oxidation.

The highest antioxidant activity was found for 24-methylenecycloartanyl ferulate, and all three γ -oryzanol components had activities higher than that of any of the four vitamin E components. Because the quantity of γ -oryzanol is up to 10 times higher than that of vitamin E in rice bran, γ -oryzanol may be a more important antioxidant of rice bran in the reduction of cholesterol oxidation than vitamin E, which has been considered to be the major antioxidant in rice bran. The antioxidant function of these components

against cholesterol oxidation may contribute to the potential hypocholesterolemic property of rice bran (Xu, et al., 2001).

Rice Bran as Rice Bran Wax

Rice Bran Wax is a by product of Rice Bran Oil production. It is a natural hard, crystalline vegetable wax obtained from rice husks with a high melting point of 77-86°C. It consists of very long chain saturated C46-C62 esters, also known as Policosanols, from C20-C36 fatty alcohols and C20-C26 fatty acids. Rice Bran Wax naturally contains Phospholipids which act as binding agents, Phytosterols (healthy plant sterols) and Squalane which is moisturising and has antioxidant properties.

It can also be used as component in formulations like carbon paper base, stencils, candles etc. Rice bran wax is used in a wide-range of cosmetic, food and industrial applications. Cosmetic products that may use rice bran wax include body butters, lip balms, lipsticks, lotions, face creams and mascara. Rice bran wax can be used on grown fruits and vegetables to prevent the loss of moisture and protect the product's shelf life. Industrial and consumer products that may use vegetable waxes such as rice bran are crayons, polishes, coatings for wood or paper and lubricants.

In other hand Rice Bran Wax is obtained through the cold press de-waxing of rice oil and which yields a yellow, hard natural wax with a high melt point, which is often compared to Carnuba Wax. However, there are functional differences between the two of note. Rice Bran Wax is a superior binder of oils and has been useful in combining with and stabilizing oils in both anhydrous and emulsion systems. It is seen as particularly effective in

reducing syneresis in lipstick and other oil-based systems. It is finished in beads and packaged in 25 kg cartons (Strahl, 2013).

Rice Bran as Beauty and Spa Product

A pinay citizen created a beauty and spa product from rice bran. In Laguna native has found a way to infuse rice bran oil's vitamins, nutrients and antioxidants into soaps, lotions, shampoos, body scrubs and pain relief products under the spa brand. " Rice bran, which is the flagship of Oryspa, is rich in Vitamin E and A. Vitamin A is for skin renewal.

Rice bran also has oryzanol, a nutrient that is an anti-oxidant, its anti-aging," Oryspa founder Sherill Quintana told ABS-CBNnews. com in an interview. Quintana never thought she would become an entrepreneur.

Asociologygraduate from UP, she worked in community development and projects with US Agency forInternational Development(USAID) and World Wide Fund for Nature (Garcia, 2014).

Rice Bran Could Be the Next Big Superfood

The bran is the outer coating of your everyday grain of rice, and is often removed during processing and used as animal feed - but a new study says it's actually really nutritious. In fact, according to a US study it could be the next big super food. Researchers at Colorado State University have found that rice bran is particularly high in B vitamins like thiamine, niacin and B6, which play a vital role in energy production, cardiovascular health and warding offdepression, the Mail reports.

" A single serving of rice bran - 28 grams - delivers more than half of a person's daily requirements of important vitamins such as thiamine, niacin

and vitamin B6," said study author Professor Elizabeth Ryan. " Traditionally, rice bran is thought to be a cheap fibre source and only considered useful as a source of lipids, for example as cooking oil (Young, 2017).

Health Benefits of Rice Bran as Oil

- Has a Neutral Taste

The outer layer of the rice grain is called bran and the oil is extracted from this brown husk. It has a mild flavour and is neutral in taste. The taste does not clash with Indian food and you can even use it in cookies and cakes. It may lend a mild nutty flavour. It can be used for sautéing, grilling, marinades and is great in salad dressings. It's light and quite versatile.

- Contains Good Fats

The National Institute of Nutrition and The Indian Council of Medical Research recommend oils that have an equal proportion of saturated fatty acids, monounsaturated fats and polyunsaturated fats. Rice bran oil has an almost balanced fatty acid composition that is close to this ratio. Rice bran oil is rich in monounsaturated and polyunsaturated fats and free of trans-fats.