



rice-bran-oil

4/20/2024

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Cruising Review

Rice-Bran-Oil: Publications and Research from SwissMixIt



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Rice bran oil (RBO) is an important product of rice bran. It is considered to be one of the most important nutritious oil due to its favorable fatty acid composition and unique composition of naturally occurring biologically active antioxidant compounds. The findings of the study show beneficial effects of RBO in learning and memory functions. Moreover, the study also highlights the attenuating effect of RBO on stress induced behavioral and neurochemical effects.

PDF Version of the webpage (first pages)

Rice Bran Oil Botanical Information

Rice bran oil (RBO) is an important product of rice bran. It is considered to be one of the most important nutritious oil due to its favorable fatty acid composition and unique composition of naturally occurring biologically active antioxidant compounds. The findings of the study show beneficial effects of RBO in learning and memory functions. Moreover, the study also highlights the attenuating effect of RBO on stress induced behavioral and neurochemical effects. rice bran oil, γ -oryzanol, γ -tocotrienol, type 2 diabetes, insulin resistance, type 2 diabetes, blood lipids, Tocopherol, oryzanol, equol, daidzein, intestinal microbiota, Memory, Restraint stress, Serotonin, Rice bran oil spread, Trans fatty acids, Growth performance, Rice bran oil, Total cholesterol, high-energy diet (HED), lipid metabolism, lipidomics, sleep-promoting, caffeine-induced arousal, histaminergic, Antioxidant /synergistic effect, Natural antioxidant, Oryzanol concentrate

Keywords: rice bran oil, γ -oryzanol, γ -tocotrienol, type 2 diabetes, insulin resistance, type 2 diabetes, blood lipids, Tocopherol, oryzanol, equol, daidzein, intestinal microbiota, Memory, Restraint stress, Serotonin, Rice bran oil spread, Trans fatty acids, Growth performance, Rice bran oil, Total cholesterol, high-energy diet (HED), lipid metabolism, lipidomics, sleep-promoting, caffeine-induced arousal, histaminergic, Antioxidant /synergistic effect, Natural antioxidant, Oryzanol concentrate

Description and Research Abstract: Rice bran oil (RBO) is an important product of rice bran. It is considered to be one of the most important nutritious oil due to its favorable fatty acid composition and unique composition of naturally occurring biologically active antioxidant compounds. The findings of the study show beneficial effects of RBO in learning and memory functions. Moreover, the study also highlights the attenuating effect of RBO on stress induced behavioral and neurochemical effects.

Rice bran oil is an unique vegetable oil produced from the outer brown layer of rice which is commonly known as rice bran are removed during the processing and polishing of rice in milling industry. Besides having an about ideally balanced fatty acid profile, it is splendid in actual anti-oxidants. A numeral of controlled systematic studies conducted in India and abroad compromise considerably acknowledged the improved on cholesterol lowering properties of rice bran oil as contrasted to other conventional vegetable oils.

Oryzanol components are complex compounds that can act as an antioxidant, improving solubility in cell membranes and potentially lowering cholesterol by competitive inhibition of absorption and synthesis. The antioxidant activities of four of the vitamin E and three oryzanol components purified from rice bran were investigated in a chemical model of cholesterol oxidation. All components exhibited significant antioxidant capacity and inhibited cholesterol oxidation. All three oryzanol components had higher antioxidant capability than any of the four vitamin E components.

The brownish portion of rice which is taken out in fine grain form during de-husking and milling of paddy is the rice bran. The bran is the hard outer layer of rice consisting of aleurone and pericarp. Rice bran contains an array of micronutrients like oryzaols, tocopherols, tocotrienols, phytosterols, 20 percent oil and 15 percent protein, 50 percent carbohydrate (majorly starch) dietary fibers like beta-glucan, pectin, and gum.

In vitro and in vivo studies evaluating the rice grains with different pericarp colour (light brown, red and black) showed potential beneficial effects on health related to the polyphenol content of the grain, such as reduction of oxidative stress, aid in the prevention of cancer, cardiovascular diseases and complications of diabetes, among others.

The skin healing benefits of rice have been known for centuries. Rice (*Oryza sativa*) water is a food processing waste that can potentially be incorporated into cosmetic formulations. However, no scientific evidence supports their role in skincare products. The gel formulation containing 96% rice water was biocompatible with the human skin and presented suitable cosmetic properties. Rice water should be thus considered as an anti-aging ingredient to be used as raw material for skincare applications.

A novel blend of 20 percent cold-pressed unrefined sesame oil and 80 percent physically refined rice bran oil as cooking oil, lowered hyperglycemia and improved the lipid profile in type 2 diabetes mellitus patients.

Extracts and fermentation products of rice bran serve important roles in mediating inflammation, cell cycle, cell apoptosis, and cancer prevention.

Nanoemulsions have practical application in a multitude of commercial areas, such as the chemical, pharmaceutical and cosmetic industries. Cosmetic industries use rice bran oil in sunscreen formulations, anti ageing products and in treatments for skin diseases.

Obesity has become an epidemic worldwide. It is a complex metabolic disorder associated with many serious complications and high morbidity. Rice bran is a nutrient-dense by product of the rice milling process. Asia has the world's highest rice production (90% of the world's rice production); therefore, rice bran is inexpensive in Asian countries. Moreover, the high nutritional value of the rice bran suggests its potential as a food supplement promoting health improvements, such as enhancing brain function, lowering blood pressure, and regulating pancreatic secretion.

The neuroprotective and neurotogenic effects of rice bran extracts were also evaluated. D and KN extracts were the best two neuroprotective and neurotogenic extracts because they had the highest contents of γ -oryzanol and colour pigments. Thus Thai rice bran oil has the potential to be an excellent food supplement product due to its high antioxidant contents.

The molecules with antioxidant activity contained in rice include phenolic acids, flavonoids, anthocyanins, proanthocyanidins, tocopherols, tocotrienols, γ -oryzanol, and phytic acid.

Emerging evidence suggests that dietary rice bran may exert beneficial effects against several types of cancer, such as breast, lung, liver, and colorectal cancer. The chemopreventive potential has been related to the bioactive phytochemicals present in the bran portion of the rice such as ferulic acid, tricin, β -sitosterol, γ -oryzanol, tocotrienols/tocopherols, and phytic acid. Studies have shown that the anticancer effects of the rice bran-derived bioactive components are mediated through their ability to induce apoptosis, inhibit cell proliferation, and alter cell cycle progression in malignant cells.

Rice bran oil (RBO) is gaining popularity among other traditionally used cooking oils because of its better cooking quality, prolonged shelf life and well-balanced fatty acid composition as well as the presence of many antioxidant components. RBO has lower viscosity and relatively high smoke point, which make it as healthy cooking oil. RBO is rich in vitamin E (both tocopherols and tocotrienols) and bioactive phytonutrients, which include phytosterols, γ -oryzanol, squalene and triterpene alcohols.

RBO may improve lipid abnormalities, reduce the atherogenic index, and suppress the hyperinsulinemic response in rats with streptozotocin/nicotinamide-induced T2DM. In addition, RBO can lead to increased fecal neutral sterol and bile acid excretion.

The results showed that the homeostasis model assessment index of insulin resistance, the area under the curve for postprandial serum insulin, and serum low-density-lipoprotein cholesterol concentrations increased significantly in the placebo group. In the rice bran oil group, fasting and 2-h postprandial blood glucose concentrations and the area under the curve for postprandial plasma glucose increased significantly; however, total serum cholesterol and low-density-lipoprotein cholesterol concentrations decreased significantly. Consumption of 18 g rice bran oil modified milk daily for 5 weeks significantly decreased total serum cholesterol concentrations and tended to decrease low-density-lipoprotein cholesterol concentrations in patients with type 2 diabetes. However, no significant influence on insulin resistance was observed.

Rice bran oil is a non-Newtonian fluids having shear thinning behavior. Heating was found to cause an increase in the flow behavior index. Fatty acid composition did not show significant changes except for the linoleic acid content which decreased from 29.4 to 27.1 and Tocopherol content was found to decrease from 48 mg/100gram to 5 mg/100gram at the end of 8 h of heating whereas, oryzanol was fairly stable (1.59 to 1.40

Overall, the current study for the first time demonstrates that RBO regulates inflammatory responses in murine macrophages by upregulating mitochondrial respiration. Previous studies have revealed the anti-inflammatory properties of rice bran oil (RBO), but the detailed mechanisms are poorly understood. Recent studies on the molecular/cellular anti-inflammatory mechanisms of dietary components have demonstrated that mitochondrial respiration plays a key role in macrophage functioning.

Natural sleep aids are becoming more popular due to the widespread occurrence of sleep disorders. The objective of this study was to assess the sleep-promoting effects of rice bran—a product that is considered as a functional ingredient. Our findings suggest that RBS may be a promising natural aid for relieving sleep problems.

This study suggests that dietary rice bran oil has the potential to affect the metabolism of daidzein by altering the metabolic activity of intestinal microbiota.

Studies were carried out to replace hydrogenated fat (HF) with rice bran oil (RBO) and two varieties of rice bran oil spread RBOS1 and RBOS2 in the preparation of cake. Physico-chemical properties, sensory properties, scanning electronic microscopic (SEM) study and fatty acid estimation with reference to trans fatty acids of cake made with control and experimental samples were studied. TFA content assumes significance in terms of its ill effects on the health of consumers, only if fat content is also high. Hence, consumption of the HF products might prove to be harmful, if consumed in large amounts and at higher frequencies. Therefore RBOS can be promoted as healthy fat for production of baked products.

These results suggest that dietary RBO may be used functional ingredient to improve growth performance, total cholesterol in serum, and immune response of birds.

Instead of using synthetic antioxidants like TBHQ, we can add natural oryzanol (purified or as concentrate) to sunflower oil to increase its oxidative and thermal stability.

4/20/2024
