Development of a Novel Bioactive Margarine Rich in γ-oryzanol

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Rice (*Oryza sativa*) is a common food consumed and grown in Asia. Rice bran, the main byproduct of rice milling, is a rich source of vitamins, protein, and oil. It is also rich in bioactive substances such as tocopherols, tocotrienols, γ-oryzanol, phytosterols, polyphenols, and squalene, which have strong antioxidant properties. It has also been suggested that γ-oryzanol may have hypo-cholesterolemic effects. With an emphasis on cardiovascular health, the goal of this study was to determine whether rice bran oil (RBO) has the potential to replace traditional, saturated fatty acid-rich coconut and palm oils in margarine. RBO blends were developed and tested their physico-chemical characteristics at different levels: 5, 10, 15, and 20%. Furthermore, to compare the natural antioxidant capacity of RBO, another three different blends were developed that combined RBO with common antioxidants such Ascorbyl palmitate (0.015%), TBHQ (tertiary butylhydroquinone) (0.015%), rosemary extract (0.2%) and compared with 20% RBO 0.0075% Ascorbyl palmitate (half of the standard amount for margarine) as the final blend. The oxidative stability and γ-oryzanol content of RBO blends at 5, 15, and 20% did not differ significantly ($P>0.05$) from one another. Finally, the novel margarine was formulated with 20% RBO and 0.0075% Ascorbyl palmitate which showed an oxidative stability similar to TBHQ. Notably, the addition of RBO resulted in a substantial change in the fatty acid composition, with lower total saturated fatty acids (42.61%±0.06) and more monounsaturated fatty acids (22.4%±0.02) and polyunsaturated fatty acids (10.34%±0.01). It is interesting to note that consumer preferences for the novel RBO margarine and the traditional table margarine did not significantly differ ($P>0.05$) in terms of flavor, aroma, mouthfeel, and spreadability. This study shows that it is feasible to incorporate RBO into the manufacture of margarine, resulting in a functional food product with an enhanced fatty acid profile and antioxidant potential.

Keywords: γ-oryzanol, Rice bran oil, Natural antioxidant, Oxidative stability