



**Issue 21: November, 2024: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.**

## **Bran, bran & more bran!**

Bran is a by-product of the cereal grain milling and processing industries. It is produced in large quantities worldwide and is most often used in animal feeds. In a sense bran can almost be considered a forgotten nutrient with the exception of breakfast commercial brands such as All Bran, Bran Buds and a few similar products. However, the scene is now changing as consumers become more aware of the nutritive properties of bran and its potential for inclusion in a range of foods as a fibre enricher. This is a welcome development as Irish consumers had a fibre intake of 19g/person/day in 2011 and there is no reason to assume that daily intakes have increased since then (Flynn et al., 2011). The European Food Safety Authority recommends about 25g/day with upwards to 30-35g/day recommended by dietary experts in a number of countries.

### **Types & composition of brans**

There are many types of bran with those from wheat, oat, rice, barley, sorghum, millet, rye, maize and legume the best known; other sources include buckwheat and coffee bean silver skin. Wheat bran content is 14–19% of total grain weight. It is rich in dietary fibre (46%) comprising fractions arabinoxylan (70%), cellulose (24%) and  $\beta$ -glucan (6%). Wheat bran also contains oligosaccharides, polyphenols, minerals, sulphur compounds,  $\alpha$ -linoleic acid, carotenoids, vitamins B and E in addition to its fibre content (Patel, 2015.); many of these have beneficial health properties. Oat bran has a fibre content of circa 15% and one third is soluble dietary fibre with  $\beta$ -glucan one of the important components because of its therapeutic properties. Oat bran is also a good source of B complex vitamins, protein, fat,  $\beta$ -glucan, arabinoxylan, phenolic compounds, tocopherols, and minerals (Alrahmany & Tsopmo, 2012). Rice bran is the most abundant of the cereal brans because of the large amount of rice consumed worldwide. Rice bran contains many bioactives including phenolic compounds, tocotrienols, tocopherols, and  $\gamma$ -oryzanol in addition to a fibre content of circa 25%; however, fibre contents vary depending on rice variety (Singh et al., 2020).

### **Bran & food fortification**

Brans are a storehouse of non-starch carbohydrates, phenolic acids, flavonoids, vitamins, oligosaccharides, folates and sterols. This makes them suitable candidates for food fortification. These compounds may protect against cancer, vascular disease, type-2 diabetes and slow the progression of Alzheimer's disease. For example, bran polysaccharides suppressed several types of cancer including lung carcinomas (Han, et al., 2021). Inclusion of wheat bran in a range of common foods including bakery products converts these into functional foods with additional health promoting properties (Ktenioudaki & Gallagher, 2012). Arabinoxylan oligosaccharides extracted from wheat bran are promising prebiotic nutrients in the control of obesity and related

metabolic disorders via the proliferation of bifidobacteria (Neyrinck et al., 2012). Nutritional advantages of oats and opportunities for processing as value added foods have been reviewed by Rasane et al., 2013. Whyte et al., (1992) showed that a diet high in soluble oat fibre, including  $\beta$ -glucans, reduced plasma total cholesterol and low density lipoprotein cholesterol in mildly hypercholesterolaemic men thus potentially lowering the risk of coronary heart disease. Consuming  $\beta$ -glucan-enriched products can also play an important role in management of diabetes by reducing the risk of diabetes-associated complications (Bozbulut & Sanlier, 2019). Tan et al. (2023) have conducted a review on the use of rice bran as a food ingredient and also on its effects on health. Rice bran bioactives are linked with protection against cancer, vascular disease, type-2 diabetes and slow the progression of Alzheimer's disease. Bran particle size may also be important. For example, fine brans delivered higher quality pasta than coarse bran fractions (Alzuwaid et al., 2020). The conclusion of this section is, therefore, that brans are highly suitable for inclusion in a range of foods thus making them functional foods with enhanced health promoting properties.

### Brans in the kitchen

Cereal brans should command an important place in household and catering kitchens. Bakery products, porridge, soups, purees, yogurts, smoothies, burgers and fish cakes are among the most suitable candidate foods for the inclusion of cereal brans thus giving additional functionality and beneficial health properties. Inclusion of brans in foods is a subtle way of 'gently' increasing dietary fibre intake of the family or of restaurant diners. Inclusions of bran should be modest as large amounts may negatively impact on food flavour and mouth-feel. However, modest inclusions can improve food flavour and texture. For example, cereal brans increase bread's dietary fibre content and give a pleasant crunchy texture while bran muffins provide extra fibre and still remain delicate and moist (Gonzalez-Anton et al., 2015; Yaseen et al., 2012).

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