



Bran

A long history,
and a prosperous future

Bran has had a long rich history within human consumption and agriculture. Despite the key importance of the grain, the name is derived from the Celtic and Gaelic where the literal translation is along the lines of stench, filth or rotten. This may be in large part to the amount of phosphorous it contains, particularly Wheat Bran. However, Bran is vital to human health, as are many of the other cereal family members.

Bran, or miller's bran is the hard outer layer of cereal grain. It consists of the combined Aleurone and Pericarp, which are the cell walls. It is not the same as Chaff, which is the coarse material that surrounds the grain.

Along with germ, it is an integral part of whole grains, and is often produced as a byproduct of the milling process when dealing with refined grains. Due to the byproduct status, it is commonly used as livestock feed since it's so cheap and quite nutritious.

Bran is removed from grains, and this process reduces the nutritional content. This is particularly problematic as in its raw form, Bran is a rich source of fiber and contains essential fatty acids. Bran also has high quantities of starch, protein, vitamins, and assorted minerals. Therefore retaining or enhancing as much of this nutritional composition is paramount.

The raw nutritional analysis of Oat bran for example shows how good it is as a source of both animal and human food, registering just 246 calories per 100 grammes. It has seven grammes of total fat, 66 grammes of carbohydrate and 17 grammes of protein. The vitamin analysis gives daily values of 58 percent for Magnesium, 30 percent for Iron and 10 percent for Vitamin B-6. *(These figures are based on a typical adult 2000/day calories diet).

Bran can be found in nearly all cereal grain, including rice, corn (maize), wheat, oats, barley and rye. As such, it is often used to enrich breads such as muffins and breakfast cereals all with the aim of increased dietary nutrition, particularly in children, the

elderly, or pregnant women. The Phytic acid within Bran may also be an agent for fermentation, particularly in Japan and other Asian cultures where Tsukemono is used for the Kaiseki portion of a Japanese Tea Ceremony.

Rice bran and rice bran oil are also widely used as a natural beauty treatment. The high levels of Oleic acid are absorbed by human skin with a near 100 percent application rate, and the oil from bran contains over 100 known vitamins, minerals and antioxidants. It has industrial applications in the paint industry and has found favour as a common substrate and food source used for feeder insects, such as mealworms and wax-worms.

Wheat bran also gives whole-wheat flour its characteristic darker shade and fuller body. This is a key ingredient in baked goods.

Historically wheat bran has also been used for tanning leather since at least the 16th century. It is even believed that George Washington had a recipe for a light beer, which used hops, molasses and bran.


In 1916, Kellogg's created "All-Bran" which is now perhaps the most commonly known bran cereal globally. Breakfast cereals and bran-based cereals are sold as an aid to digestive health and in managed qualities.

Aside from the historic, cosmetic and nutritional uses of bran, one of the most interesting developments in recent years comes from Sweden.

Researchers at KTH Royal Institute of Technology have developed a process to remove previously unused biomolecules from the byproduct. This has uses in antioxidants for human health, prebiotics and uniquely, food packaging material.

The extraction is performed by using heated water so that high pressure, combined with carbohydrate-active enzymes, can harvest the Hemicelluloses and Oligosaccharides. These Polysaccharides keep the antioxidant properties, which can be isolated by alkaline extraction.

The research and breakthrough has led to possible application of these biopolymers for food packaging, and thickeners. The thickening agent has benefits as it is natural, non-additive and



can be used in preventing oxidation. The biopolymers have applications within the medical industry. They can encapsulate oxygen-sensitive compounds to reduce inflammation, which could provide relief to thousands of patients who have inflammation based diseases and conditions.

Francisco Vilaplana, associate professor in Glycoscience at KTH told their website, “Our process could contribute over the long term to use of cereal hemicelluloses with antioxidant activities in many ways, such as non-fossil based packaging, preserving sensitive foods or drugs from oxidation, dietary fiber

supplements and texturizing gels in food and cosmetic products.”

The full research paper, “Sequential fractionation of feruloylated hemicelluloses and oligosaccharides from wheat bran using subcritical water and xylanolytic enzymes” can be found in Green Chemistry - Digital Object ID: 10.1039/C6GC03473J.

Given the importance of the crop, it is inspiring that research and thorough scientific investigation has given the grain a chance for more in-depth study so that we can continue to unlock its potential. ☺