

Larch:

THE VERSATILE PREBIOTIC FIBRE

As studies continually emerge touting the numerous benefits of a high-fibre diet, health-conscious



consumers have taken notice and are basing more of their food choices on fibre content. **BRYAN RODRIGUEZ** investigates a novel prebiotic fibre's characteristics for foods and beverages

Food-product developers consistently seek new methods and ingredients to help incorporate fibre into packaged goods, seeking to win over fickle consumers with great-tasting, health-promoting foods. Increasing fibre content can present a significant set of challenges, because the increased fibre content should not sacrifice variables that affect the product, such as taste, colour, aroma or mouthfeel.

High-performance GI products

Prebiotic fibres boost beneficial probiotic bacteria in the gut. Some specific prebiotics can also decrease *E. coli* colonies, and ferment slowly, thus eliminating common fibre side effects such as gas and bloating (gastrointestinal distress). Larch arabinogalactan, for instance, has performance characteristics ranging from improved taste and aroma to stability under heat and low pH. It also is water-soluble, retains moisture in baked goods and improves dough-handling characteristics, while providing no insulin or glucose response.

Prebiotic fibres offer food-product developers a functional fibre that allows for eased formulation into foods and drinks. Larch arabinogalactan produces low-viscosity solutions that have minimal impact on mouthfeel and viscosity. Testing has also shown that it has little off-taste or unpleasant after-taste. The ingredient is stable at a wide temperature and pH range, providing instant, trouble-free formulation into various applications. In beverages, it does not degrade or lose functionality and will not hydrolyze.

Food applications

In a recent study conducted by an independent food laboratory to evaluate larch arabinogalactan, specifically Lonza's Fiber-

Aid, functionality was tested in breads, cakes, tortillas, and cookies. Properties considered were moisture retention, rheology control, processing functionalities and shelf-life stabilisation.

When larch arabinogalactan was added to various baked products, a self-limiting level of addition was found in cookies and in straight-dough white pan breads. In straight-dough white breads, the ingredient slightly decreased volume and increased crumb firmness; however, the use of larch arabinogalactan was shown to improve dough-handling characteristics and the fineness of grain. Used as a partial replacement for carboxymethyl cellulose in fibre breads, the ingredient resulted in a slight increase in loaf volume and a decrease in crumb firmness. It also improved the dough-handling characteristics of tortillas, and increased the diameter and spread ratio of cookies.



PUTTING HIGH-FIBRE FUNCTIONAL INGREDIENTS IN END PRODUCTS THAT ALREADY HAVE THE APPEARANCE OF BEING FIBRE RICH IS ONE WINNING STRATEGY

The ingredient's addition contributed positive characteristics to baked goods (fineness of grain), which appear to have a self-limiting level that when exceeded, produces products whose total quality are less than comparable controls. These results indicate that larch arabinogalactan used at low percentages in baked goods can, under optimised conditions, improve quality, >>

in addition to improving the nutritional value of the baked good due to its soluble-fibre content.

Beverage applications

Highly water soluble, larch arabinogalactan readily disperses in a hot or cold beverage, remains clear in solution and does not precipitate out of solution. In addition,

it is nonreactive and heat stable, making it an ideal candidate for beverage mixes, and refrigerated or shelf-stable, ready-to-drink beverages. It will not hydrolyse at a low pH, and it has a high thermal stability, which allows it to be pasteurised or UHT treated. Neutral in taste, and also odour and colour free, it provides low sensory impact.

Recent work was conducted in which

leading commercial beverages – flavoured water and orange juice – were benchmarked for their sensory attributes to establish flavour targets for the development of beverages formulated with larch arabinogalactan that matched the commercial beverages. Results showed that market-ready products can be developed using 5.1g of the larch arabinogalactan per 8oz serving, matching the sensory

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TAKING PREBIOTICS FURTHER

Prebiotic fibres, such as larch arabinogalactan, provide the benefits of traditional fibre, with the ability to increase beneficial microflora, thus improving gastrointestinal health. Some prebiotic fibres also have functional and technological attributes that improve finished-good product nutrition and overall quality.

Larch arabinogalactan-based products benefit from a highly branched structure that is freely soluble, dissolving completely in hot or cold water. Its gastrointestinal benefits are provided without the typical side effects, such as gas and bloating, that are commonly associated with other dietary-fibre ingredients. Lonza's FiberAid was shown to have a high digestive tolerance at dosages up to 15g/day in various studies, whereas effective dosages are already achieved at 4.5g/day.¹ It is a low-calorie additive (1.4 kcal/g), and is reported to have no glycaemic response.

As a prebiotic fibre, larch arabinogalactan offers various benefits for gastrointestinal health, such as providing a positive influence on the microflora of the gut, and increasing the production of

attributes of the commercial standards with conventional ingredients and processes. Additionally, the ingredient is water soluble and does not require any mechanical agitation for dispersion.

The end result

Human clinical and functionality studies have shown that prebiotics, and spe-

short-chain fatty acids (SCFAs).

Evidence from human and in vitro studies indicates that FiberAid ingestion has a significant effect on enhancing beneficial gut microflora, such as bifidobacteria and lactobacilli, while decreasing clostridia and *E. coli*.²

The ingredient was reported to increase SCFAs in the gut.³ These acids lower the colon pH and create an environment favouring the development of beneficial bacteria. The majority of the strictly anaerobic bacteria in the large intestine derive their energy from fermentation of carbohydrates, which results in the production of volatile SCFAs. Acetate, propionate and butyrate are the major SCFAs produced by friendly gut microflora.

FiberAid has been shown to decrease the generation and absorption of ammonia in the gut.⁴ Most of the ammonia in the large intestine is reported to be produced by the deamination of amino acids by the microflora. High levels of ammonia in the large intestine appear to contribute to detrimental health conditions, having a toxic effect toward epithelial cells. —BR

cifically larch arabinogalactan, can provide consistent benefits across a wide variety of applications. As a dietary fibre offering gastrointestinal health benefits, the range of applications extends from dietary supplements, to nutritional bars, beverages, baked and even frozen goods. As fibres continue to be recognised as a vital part of nutrition, we will continue to see consumers learning

about the importance of prebiotics, and how incorporating them into a diet will provide healthy benefits.

(The complete list of references is available online at functionalingredientsmag.com.)

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