LifeVita UK Ltd.

Dietary Fibre
Larch Tree Extract (ARABINOGALACTAN)

Larch Tree Substances for Nutraceuticals, Cosmetics, Food Industry and Agriculture

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Larch Tree Extract (Arabinogalactan)
(Larch Arabinogalactan – LAG – dietary fibre)

INTRODUCTION by LIFEVITA UK Ltd.

DESCRIPTION

Larch Tree Extract (Arabinogalactan) is a natural larch tree polysaccharide derived from the derived from Larch tree species (*L. dahurica* L., *L. gmelinii, L. laricina* Koch., *L. occidentalis* Nutt., and *L. sibirica lebed.* Family: Pinaceae).

LAG is a low-molecular weight, long-chain, indigestible polysaccharide fiber, fermentable by gut microflora with the resulting health benefits for the gastrointestinal and immune systems.

LARCH TREE EXTRACT (ARABINOGALACTAN) DEFINITION AS THE DIETARY FIBER

According to the American Association of Cereal Chemists, dietary fiber “the edible part of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the human large intestine” (DeVries J. 2003). Dietary fiber promotes healthy bowel movements and supports healthy blood cholesterol and blood sugar levels.

The unique characteristic of dietary fiber is its resistance to digestion and absorption in the small intestine. After passing through the small intestine undigested, dietary fiber reaches the large intestine, where it is completely or partially fermented. It is thought that this fermentation has a positive impact on bowel regularity, on colonic pH, and on the formation of the by-products that impart positive physiological effects.

Dietary fiber includes polysaccharides, oligosaccharides, lignin, and associated plant substances. Polysaccharides constitute the main group of dietary fiber and include such compounds as cellulose and hemicellulose, arabinoxylans and arabinogalactansm polyfructose, inulin, and oligofructans, as well as galacto-oligosaccahrudesm gums, mucilages, and pectins (DeVries J. 2003).

ARABINOGALACTANS are long, densely branched water-soluble polysaccharides of molecular weight ranging from 16,000 to 100,000 Daltons. Arabinogalactans are found in plants, fungi and bacteria. Normal dietary intake of arabinogalactans comes from foods such as leek seeds, carrots, radish, black gram beans, pear, maize, wheat, red wine, Italian ryegrass, tomatoes, ragweed, sorghum, bamboo grass, and coconut meat and milk (Kelly 1999; Monograph 2000).

FOOD AND NUTRACEUTICALS APPLICATIONS

Current market requirements to dietary fibers are:
1/ To be competitive in the marketplace.
2/ To provide well-researched health benefits.
3/ To have a good taste.
4/ To present a unique delivery system.

MODERN TRENDS:

Newest technologies allow for some dietary fiber producers and food market major players to supply modified fibers. These specific fibers are adjusted by acidic flora and enzyme processing.

They are composed of glucose-terminated fructose chains with a maximum chain length (subject to acid degrees for polymerization) of five units and 95-percent pure active prebiotic. Yet, these fibers are known to display relatively small functionality.

The unique physical, biological and sensory characteristics of Larch arabinogalactan, on the other hand, are both multifunctional and novel, making it an ideal candidate for a variety of food applications.

Larch arabinogalactans are highly soluble in water and even the addition of up to 70% of the original volume of ethanol does not precipitate these polysaccharides from aqueous solutions.

The highly branched molecular structure and relatively low molecular mass are thought to be responsible for these rheological properties of Larch arabinogalactans.

Relative structural stability of Larch arabinogalactans with an increased temperature is another property that can be utilized in the food industry. Thus, it was shown that although the viscosity of Larch arabinogalactans solutions decreased with increasing temperature, it returned to the original values after cooling of the solutions.

Moreover, the viscosity of Larch arabinogalactans is not affected by either changes in pH (over the range of 1.5 to 10.5) or the presence of electrolytes, such as sodium and calcium salts (Stephen et al. 2006)

Larch arabinogalactans have multiple applications in food industry where they can be used as an emulsifier, humectant, processing aid, and stabilizer.

Some evidence suggests that Larch arabinogalactans are capable to help retain moisture, enhance mouth feel, and improve shelf life of food products. Larch arabinogalactans could also improve texture in the baked goods, possibly by reducing the stickiness of the dough and improving the external symmetry and internal grain scores.

In confectionery foods, Larch arabinogalactans could lower water activity and aid in flavor and oil retention.

Larch arabinogalactans were also shown to increase the stability of oils (by mixing or co-spray drying) that are often sensitive to degradation. The unique physical and chemical properties of Larch arabinogalactans suggest a possibility of using them in browning compositions for uncooked foods, in seasoning powders to improve flow and reduce hygroscopicity, and in starch-containing foods to inhibit swelling.

Beside cost dependable processing aid applications, Larch Tree Extract (Arabinogalactan) is ideal for numerous functional applications, including but not limited to kefir, yogurt and other dairy applications, sports products, functional waters, nutrition bars, soymilk, green foods, probiotic supplements, mineral supplements, medical foods, pet foods, and more.

With the fear of commodification continuously looming, food manufacturers are turning to microencapsulation technologies as a way of achieving much-needed differentiation and enhancing product value.

Low-molecular weight Larch arabinogalactans can be ideal candidates for microspheres that could be utilized in the encapsulation technology for nutraceuticals or probiotics.

Larch Tree Extract (Arabinogalactan) can be used as a novel emulsifying wall component for microencapsulation of lipophilic food ingredients such as omega-3 fatty acids.

Larch arabinogalactans can also be utilized for microencapsulation of freeze-dried probiotics to enhance probiotics' viability in new applications such as powders, cream-type formulas and processed foods.

The controlled-release of ingredients can improve the efficacy of bioactive compounds allowing much smaller quantities of the bioactive to be used, so their value to the food industry, particularly as the more and more manufacturers explore the realm of functional foods.

It is known that the survival of probiotic strains in the acidic stomach environment is one of the detrimental factors responsible for the beneficial effects of the probiotics. Many studies have demonstrated that very few viable microorganisms supplemented in powders, capsules and other forms, are capable of passing through the stomach to optimal sites in the intestines.

As a part of a delivery system, low-molecular weight arabinogalactans could form a protective layer around the probiotics and control their release in the intestines.

Larch Tree Extract (Arabinogalactan) dietary fiber supports gastrointestinal health and enhances colon health by acting as a food source for beneficial bacteria in the gut, specifically Bifidobacterium, *Lactobacillus acidophilus*, and *Enterobacteriacea* (Kelly G. S. 1999; Kim L.S., Waters R.F., Burkholder P.M. 2002).

These bacteria are believed to be associated with the acidity of the gastrointestinal environment, destruction of toxic substances and production of antimicrobial compounds (Robinson R.R., Feirtag J., Slavin J.L. 2001).

The low-molecular Larch arabinogalactans also support various functional aspects of the immune system (Kelly GS. 1999).

In particular, fermentation of Larch arabinogalactans by the colonic microflora results in the increase in the production of butyrate and propionate, which are of particular value to colon cells, and are preferred fuel for energy generation by the intestinal epithelial cells [Kim LS, Waters R.F., Burkholder P.M. 2002; Kelly G.S. 1999 Apr;4(2):96-103; Robinson R.R., Feirtag J., Slavin J.L. 2001).

Slow fermentation of arabinogalactans in the gastrointestinal tract could help avoid gas and bloating, common to the consumption of other fiber choices.

SAFETY

Larch Arabinogalactan has been approved since 1965 as a direct food additive. It is Generally Recognized As Safe (GRAS) ingredient that is approved for use in food applications in the United states and in many foreign countries.

Dossier Developed by

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