



COLONY GUMS
Hydrocolloid & Stabilizer Systems

Konjac





Konjac

SOURCE & PROCESSING

Konjac is a dietary fiber which is based on Konjac flour being obtained from the tuber of *Amorphophallus Konjac* by means of drying and milling. Through further extraction and drying steps Konjac can be processed until Konjac glucomannan is obtained. It is a polysaccharide consisting of the monosaccharide glucose and mannose.

Fresh Konjac contains an average of 13% dry matter and 64% of the dry matter is glucomannan. Glucomannan is a type of soluble dietary fiber. Soluble fibers attract water and form a gel, which slows down digestion. It can delay the emptying of your stomach and makes you feel full, which helps in weight control. Slower emptying of the stomach may also affect blood sugar levels and have a beneficial effect on insulin sensitivity, which may help control diabetes. Konjac can also help lower LDL ("bad") blood cholesterol by interfering with the absorption of dietary cholesterol.

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QUALITIES

- ~ Water soluble
- ~ Thickener
- ~ Stabilizer
- ~ Gelling agent
- ~ Binding agent
- ~ Film former

USES

- ~ Health benefits
- ~ Food & beverages
- ~ Beverages & ades
- ~ Confectionary

APPLICATIONS OF KONJAC

Water solubility

Konjac is readily dissolved in water. Its water solution is a pseudo-plastic liquid, and has a shear thinning characteristic. A particle of Konjac powder consists of extremely long thread-like macromolecules tangled together.

When it comes in contact with water, the water molecules enter and are absorbed into the chain. Once it has entered the chain the particle can swell to about 200 times its original volume, turning the Konjac into a viscous liquid.

Thickener

Konjac has the highest molecular weight, highest density and strongest viscosity of any dietary fiber known to science. The unmodified natural acetylated Konjac glucomannans can produce extreme viscous solutions. Typically a 1% solution of konjac powder in water can produce 20,000cps to 40,000cps when measured at 30°C. This viscosity is the highest of any other natural thickening agent in the market place today.

Konjac interacts synergistically with Carrageenan, Xanthan Gum, Locust Bean Gum and starch. For example, the addition of 0.02 to 0.03% crude Konjac to 1% xanthan gum will raise the viscosity by 2 to 3 times when heated. Konjac - Xanthan Gum gels are cohesive and extremely elastic in nature. Maximum gel strength is seen at a ratio of Konjac and Xanthan Gum between 1:2.5 to 1:4.

The Konjac - Carrageenan interaction is similar to that of Locust Bean Gum - Carrageenan, but is slightly stronger in nature. Konjac will interact with most starches to produce a remarkable increase in viscosity allowing for an optimization of starch-rich

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POTENTIAL HEALTH BENEFITS OF KONJAC

Treatment of constipation

Glucomannan is a soluble fiber, and as such, has been investigated for the treatment of constipation. Glucomannans may relieve constipation by decreasing fecal transit time. In the treatment of chronic constipation, glucomannans significantly improve symptoms of constipation while being well-tolerated and free of relevant side effect.

Cholesterol and other lipids

Glucomannans have demonstrated statistically significant improvement in the total cholesterol of obese patients. In healthy men, four weeks of taking 3.9 grams of glucomannan decreased total cholesterol, low density lipoprotein, triglycerides and systolic blood pressure. Notably triglycerides dropped by 23%. Glucomannans have also been tested in children with high cholesterol in conjunction with a diet. Interesting enough, great decreases in total cholesterol and low density lipoprotein were observed in girls when compared to boys. When used in conjunction with chitosan, glucomannan decreases serum cholesterol, possibly by increasing steroid excretion via the feces.

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formulations, whether the purpose is a reduction of calories or improvement of texture.

Stabilizer

Unlike Xanthan Gum, Guar Gum or Locust Bean Gum, Konjac is the non-ionic type and therefore can not be influenced by the salt in a system. At ambient temperature, konjac gum remains stable without precipitation even if the pH drops to a level below 3.3. When Konjac Gum is used instead of Locust Bean Gum in a stabilizer and added to ice cream, cheese and other dairy products, it will stabilize their quality by preventing the development of ice crystals

Gelling Agent

As a gelling agent, Konjac is quite unique for its ability to form a thermo-reversible and thermo-irreversible gel under different conditions.

In the food industry, many kinds of products rely on the gelling property of hydrophilic colloids to form their special shape or structure and to guarantee their timely thaw at a certain temperature. Carrageenan, pectin, gelatin and sodium alginate fall into this category. Xanthan Gum does not gelatinize when used alone, but it can form a gel at any pH when used in combination with Konjac Gum. At a pH of 5, the two gums show the greatest synergistic effect. Furthermore, when Xanthan Gum and Konjac Gum are used at a ratio of 3:2, the greatest gelatification will be achieved. This gelatification of the compound gum behaves as heat reversible; it also appears in a solid state under room temperature only if it is no higher than 40°C. It will be in a semi-solid or liquid state at 50°C or above. When the temperature drops back to the ambient temperature, it will resume to

a solid state. Based on this property of the compound gum, various types of jelly, pudding and fat-free confectioneries can be made by adopting different concentrations of the compound gum and adjusting to different pH values.

Konjac is composed of a repeating polysaccharide chain, with addition of a mild alkali such as calcium hydroxide; Konjac will set to a strong, elastic gel resisting melting even under extended heat condition.

A Konjac solution does not form a gel because its acetyl group prevents the long chains of the glucomannan from approaching each other. However, it does form a gel when heated at a pH of 9-10. This gel behaves stable to heat and it will remain stable under repeated heating at 100°C or even 200°C. In a slight alkaline environment, a konjac solution forms thermo-irreversible gel after cooling from a hot solution. That is why this gel is called a non-reversible gel; whose mechanism is that acetyl deviates from glucomannan in a naked state when heated under an alkali condition. Partial structural crystallization occurs due to the formation of hydrogen bonds between molecules.

When making use of these heated non-reversible properties of Konjac Gum, it has been widely used to make a great variety of foods, such as Konjac cake, konjac chips, Konjac slices, Konjac noodles and imitating foods for vegetarians.

Film Former

Konjac is a powerful film-former – both alone and in combinations with other gums such as carrageenan.

Type 2 diabetes

Glucomannans may be useful as a therapeutic adjunct for type 2 diabetes. It has been shown to improve the lipid and alleviate the fasting blood glucose levels of type 2 diabetics.

Weight loss

In a study lasting 16 weeks, 200 overweight and obese subjects were given a mixture of Psyllium seed husk (3g) and glucomannan (1g) twice daily, the same mixture 3 times daily, or a placebo. The Psyllium and glucomannan groups lost, on average, 4.53kg and 4.60kg respectively compared to 0.79 kg by the control group. This was not a statistically significant difference. The glucomannan group has increased satiety compared to the control group and the LDL cholesterol was significantly reduced during the study period. The treatments were well tolerated in all groups. An 8 week double blind trial involved 20 obese patients. A placebo or a glucomannan fiber supplement of 1gm was given to the subjects one hour before each meal. No changes were made to the diet or exercise habits of the patients. The study found that over the 8 week period, cholesterol levels were significantly reduced, and the Glucomannan group has an average weight loss of 2.5kg.

KONJAC FLOUR APPLICATION IN THE FOOD INDUSTRY

Konjac flour is soluble in cold water and forms highly viscous solutions. Therefore, Konjac flour is used as a thickening agent in soups, sauces, and dressings. As a gelling agent, Konjac flour is also used to bind water in meat and vegetarian analogs. The gelling property of Konjac flour also allows it to be functional as a fat replacer in many types of processed foods. Additionally, Konjac flour is excellent film former, perfect for batters and breading.

Konjac Flour Characteristics

- ~ Add mouth feel
- ~ Control phase separation
- ~ Control viscosity
- ~ Create formed foods
- ~ Enhance spread ability
- ~ Extremely viscous solution
- ~ Extend shelf life
- ~ Form reversible gel
- ~ Form reversible or non-thermo non-reversible gel
- ~ Great water-binding capabilities
- ~ Prevent synerisis (watering out)
- ~ Retard crystal growth
- ~ Suspend particulate matter

Food Category Usages

For full descriptions of usages in each category, please visit our website at www.ColonyGums.com

- ~ Bakery products
- ~ Beverages
- ~ Carbonated beverages
- ~ Concentrates and ades
- ~ Confectionary
- ~ Desserts
- ~ Dough conditioners
- ~ Edible films
- ~ Fiber drinks
- ~ Formed foods
- ~ Frozen foods
- ~ Glazes
- ~ Gravies
- ~ Ice cream
- ~ Jellies
- ~ Meat
- ~ Meat products
- ~ Non-dairy creamers
- ~ Noodles
- ~ Pasta
- ~ Pudding
- ~ Cream
- ~ Yogurt

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