

Chitoglucan® Overview

Chitoglucan is a bioactive component obtained from the edible enoki-take mushroom (*Flammulina velutipes* Sing) through hot water extraction of the fruiting body, followed by alkali treatment of the extraction liquid. Among its main constituents are vegetal chitosan, beta-glucan and fatty acid complex (as free fatty acids).

Chitoglucan has an anti-obesity property that is believed to be based on two of its natural components. One component is vegetal chitosan, which inhibits fat absorption in the digestive tract, resulting in reduction of obesity induced by excessive fat calorie intake, without acting directly on the body's fat tissue and therefore does not reduce fat that has already accumulated in the body. Another component is a fatty acid complex that is under investigation for contribution to metabolic effects on weight loss.

Chitoglucan's anti-obesity property may be the result of a synergetic effect of its various components, including chitosan, which inhibits lipid absorption, and fatty acid complex, which decomposes body fat. The fatty acid complex directly acts on decomposition of neutral fat (triglycerides) accumulated in the fat cells in body fat tissues (visceral fat and subcutaneous fat) and thereby reduces the amount of body fat, decreasing the tendency of obesity. In this physiological state, the decrease in body weight can be directly attributed to the decrease in body fat.

Edible mushrooms are a valuable source of bioactive compounds that include polysaccharides such as beta-glucan and are used in the treatment of diseases such as cancer, HIV, and cardiovascular diseases. Mushrooms have been shown to stimulate the immune system, decrease DNA damage, reduce carcinogen concentrations and their activation, inhibit the growth of cancer cells by cell cycle and cytokine modulation, and induce tumor cell death. Mushrooms also contain components that decrease the LDL fraction of cholesterol and lipids in the blood. It is thought that these therapeutic properties of mushrooms result from both specific polysaccharides, such as beta-glucans and chitosans, that are present in the fruiting bodies (Rajewska, 2004).

Studies for weight loss using Chitoglucan showed that a far lower daily dosage was required — only 300 mg per day, which is roughly 10 times lower than the conventional, crustacean-derived chitosan dosage of 2,500 to 3,000 mg per day.

In one study of 46 Japanese males and females ages 32 to 59 years having BMI of 25 or more, subjects were given 400 mg equivalent per day

of Chitoglucan, resulting in a significant 5 percent decrease of body fat compared with baseline after 8 weeks. The control showed a decrease of only 3 percent body fat, so that the active treatment (Chitoglucan group) had an additional 66 percent decline relative to the control. A decrease in the amount of body fat, body fat percentage, weight, abdominal fat percentage, BMI, and waist circumference was observed in all Chitoglucan groups. There were no changes observed in the blood chemistries, and the physical conditions of patients did not change before and after the treatment (Hori).

In another double-blind study of Chitoglucan, the visceral fat area was measured in 42 Japanese males and females who were 48.0±13.5 years. The group consumed 150 mg of Chitoglucan twice a day for 8 weeks. After 4 and 8 weeks, blood tests, visceral fat area in an abdominal slice measured by CT scan, body weight, and cardiovascular health parameters were measured.

The body weight and visceral fat area of the Chitoglucan group decreased significantly compared with the control group. The LDL and total cholesterol in the Chitoglucan group decreased significantly as well. A significant decrease was observed in the BMI and body fat percentage of the Chitoglucan group after the 4th and the 8th weeks, in waist circumference in the 8th week, and in the visceral fat area after the 4th and 8th weeks. However, little change was observed in the control group. It was found that in males, where there was more likely to be visceral fat accumulation, and in females, where there was more likely to be increased subcutaneous fat, both sexes had a significant decrease in entire body fat. A significant decrease of 3.3±1.8 kg was observed in the amount of the average weight loss in the Chitoglucan group. In the blood chemistries, in the 4th and 8th weeks, a significant decrease was observed in the value of total cholesterol and LDL cholesterol in the Chitoglucan group compared with the control group. The results of this study showed significant and safe effects on weight loss and body fat, significant improvements in cardiovascular health indices with no adverse effects, and no changes in blood electrolytes, indicating that impaired absorption of minerals did not occur (Kataumi, 2007).

In summary, Chitoglucan is a safe and effective means of decreasing body fat and cardiovascular disease risk factors at a much lower dosage than regular crustacean-derived chitosan. It also offers a more effective kosher, nonallergenic, and alternative form of chitosan for those with shellfish allergies, or those with safety or religious reasons for not wanting to ingest substances originating from shellfish.

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