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FILE: ■ Elephant Yam (*Amorphophallus paeoniifolius*)
■ Glucomannan
■ Obesity

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RE: Review of Glucomannan Use in Obesity

Keithley J, Swanson B. Glucomannan and obesity: a critical review. *Altern Ther Health Med.* Nov-Dec 2005;11(6):30-34.

Obesity and weight-related health problems have reached alarming rates in the United States. In addition, the ephedra ban has left a void in the dietary supplement industry. Fiber supplements are marketed as weight loss aids. Glucomannan is a soluble dietary fiber extracted from elephant yam (*Amorphophallus paeoniifolius* a.k.a. *A. campanulatus*) tubers, which are native to Asia. Elephant yams have been used for centuries as food sources and herbal remedies, and today glucomannan is common ingredient in the food industry. Elephant yam tubers are considered food by the United States Food and Drug Administration. This article reviews the current knowledge on the efficacy, safety, and mechanism of action regarding the use of glucomannan as a weight loss aid.

Glucomannan is not digested and "passes relatively unchanged to the colon, where it is highly fermented by resident bacteria." Like other dietary fibers, glucomannan may cause feelings of fullness or satiety, and reduce energy consumption by reducing the amount of food needed to satisfy hunger. There are several proposed mechanisms of action for this effect, including increased mastication (chewing), delayed gastric emptying, slowed small bowel transit time, slowed absorption of food in the small intestines, faster delivery of food to the terminal ileum, and elevated levels of plasma cholecystokinin, a hormone that regulates satiety. In addition, soluble fibers like glucomannan are believed to inhibit carbohydrate, fat, and protein absorption, as well as improve glycemic parameters.

Glucomannan is available in many forms, including capsules, biscuits, and pasta. Glucomannan tablets and jelly candies are no longer available in the United States, due to their tendency to swell and cause choking. However, only a few mild adverse effects have been associated with glucomannan capsules. They include bloating, gas, and mild diarrhea. Glucomannan lowers blood glucose levels and should not be taken with hypoglycemic medications and dietary supplements. In addition, glucomannan reduces the absorption of

sulfonylurea and other medications. Therefore, oral medications should be taken one hour before or four hours after taking glucomannan capsules. The most commonly recommended dosage for weight loss is 1-3 g glucomannan daily, one hour before meals. Higher doses (3.6-13 g/day) have been recommended for managing other conditions, such as type 2 diabetes and insulin resistance.

The authors searched the following databases for clinical trials on glucomannan with weight loss as primary or secondary endpoint: Medline, PubMed, First Search, Google Scholar, the Cumulative Index to Nursing and Allied Health Literature, the Cochrane Library, and the Natural Medicines Comprehensive Database. In addition, the reference lists of all articles were searched to find more articles. Twelve clinical trials related to glucomannan and weight loss were identified: seven with weight loss as the primary endpoint and five with weight loss as the secondary endpoint.

The seven clinical trials with weight loss as the primary endpoint included both single- and double-blind studies with sample sizes ranging from 20 to 60 participants, and an average sample size of 39. The trials generally lasted four weeks to four months and used glucomannan doses of 2-4 g daily in divided doses administered with capsules. The participants included overweight and obese individuals, males and females, adults and children, healthy participants, participants with cardiovascular problems, and participants on normocaloric and reduced calorie diets. In six out of seven trials, a significant reduction in body weight was observed in the groups receiving glucomannan, although in one of these trials the weight loss was equivalent to that seen in the non-glucomannan group. In addition to weight loss, other benefits were observed, including improved cardiovascular profiles and increased satiety.

Reports of adverse effects were "minimal" and included bloating, flatulence, and diarrhea, causing two drop-outs from one study. Limitations of these clinical trials include their age (all were conducted ten or more years ago) and language. Four were written in Italian, a language not understood by the authors of this paper, thus limiting interpretation. The five clinical trials with weight loss as the secondary endpoint were generally more recent than the other seven. They included somewhat smaller sample sizes of 11-63 participants and shorter durations of three to four weeks. In these trials, glucomannan was administered in doses of 1.2-3.9 g glucomannan daily or 8-13 g daily of fiber-enriched biscuits. All of the trials were double-blind. The participants included healthy participants, type II diabetics, insulin-resistant participants, overweight participants, and participants with high cholesterol. Interestingly, no significant changes in body weight were found in any of these trials. It is speculated that this may be due to their shorter duration, which may not have allowed enough time for the treatment to have an effect. These clinical trials did find that glucomannan had other positive benefits, including positive effects on cardiovascular factors and fasting glucose levels. Reported adverse effects were "minimal" and included mild flatulence, minor abdominal discomfort, and soft stools.

The authors conclude that glucomannan may promote weight loss "...in conjunction with either a normocaloric or hypocaloric diet." In general, clinical trials using standardized glucomannan products with larger sample sizes and longer durations (>4 months) are

needed to confirm these effects. The clinical trials examined in this review show that glucomannan appears to be safe in adults and children and is relatively well-tolerated, with few adverse effects that were primarily gastrointestinal. However, caution should be taken when consuming hypoglycemic medications and dietary supplements, as well as sulfonylurea and other medications concomitantly with glucomannan. The authors conclude that the data reviewed indicate that glucomannan "...may be an acceptable alternative for overweight individuals who are unable or unwilling to increase fiber intake through food."

—*Marissa Oppel, MS*

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