

Thesis Title	Effect of Glucomannan on Postprandial Plasma Glucose Levels in Rats and Healthy Subjects
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Date of Graduation	6 August B.E. 2540 (1997)

Abstract

Dietary fibers have received considerable attention in both popular press and scientific literature. They have been recommended as part of the treatment and prevention of many diseases. Current evidence suggests that postprandial glycemic response is reduced with the addition of soluble dietary fibers such as glucomannan, a soluble fiber isolated from the tubers of *Amorphophallus konjac*. The objectives of the present study were to determine the effect of glucomannan on gastrointestinal absorption of glucose in both rats and healthy volunteers by using the oral glucose tolerance test, and also to examine this effect in these subjects by using the meal tolerance test.

The effects of glucomannan on gastrointestinal absorption of glucose in male Wistar rats (140-170 g) were determined by using the oral glucose tolerance test. Rats were gavaged with both glucose solution (3 g/kg) and 3 different doses of glucomannan (0.125, 0.25 and 0.5 g/kg). The results showed that glucomannan administration was associated with a significant reduction in postprandial plasma glucose levels. The mean plasma glucose levels in glucomannan-fed rats were considerably lower than those of the control group receiving glucose solution alone. With all 3 doses of glucomannan, the effect was most pronounced in the glucomannan-treated group at the dose of 0.25 g/kg,

though not statistically different. The values for the area under the plasma glucose concentration-time curve from time zero to one hour (AUC_{0-1h}), to two hours (AUC_{0-2h}), to three hours (AUC_{0-3h}) and the maximum plasma glucose concentration (C_{max}) were significantly lower in all glucomannan-treated groups as compared to those of the corresponding control.

In 12 healthy subjects, the effects of glucomannan on gastrointestinal absorption of glucose were determined by using the oral glucose tolerance test and the meal tolerance test. The results obtained from the oral glucose tolerance test suggested that glucomannan (3.6 g total dose, 1 h before glucose administration) did not have remarkable efficacy in lowering plasma glucose. However, glucomannan tended to decrease postprandial plasma glucose levels and produced a significant decrease in mean plasma glucose concentration at 45 min after glucose administration. When glucomannan was given to the subjects, AUC_{0-1h} and C_{max} values were also reduced.

More pronounced effects on postprandial plasma glucose were demonstrated when a high-carbohydrate test meal was substituted for glucose solution. Mean plasma glucose values at 15, 30 and 45 min were significantly lower in the subjects receiving glucomannan (3.6 g total dose) than those in the control experiment. The results also revealed significant differences in AUC_{0-1h} , AUC_{0-2h} and C_{max} . Glucomannan was well tolerated and no adverse effects were reported during the study period.

The overall results suggest that glucomannan should be useful in reducing postprandial glucose and help achieve better blood glucose control in diabetic patients. However, further studies are required in order to fully demonstrate the usefulness of glucomannan administration in diabetic patients.