Glucose Assist™

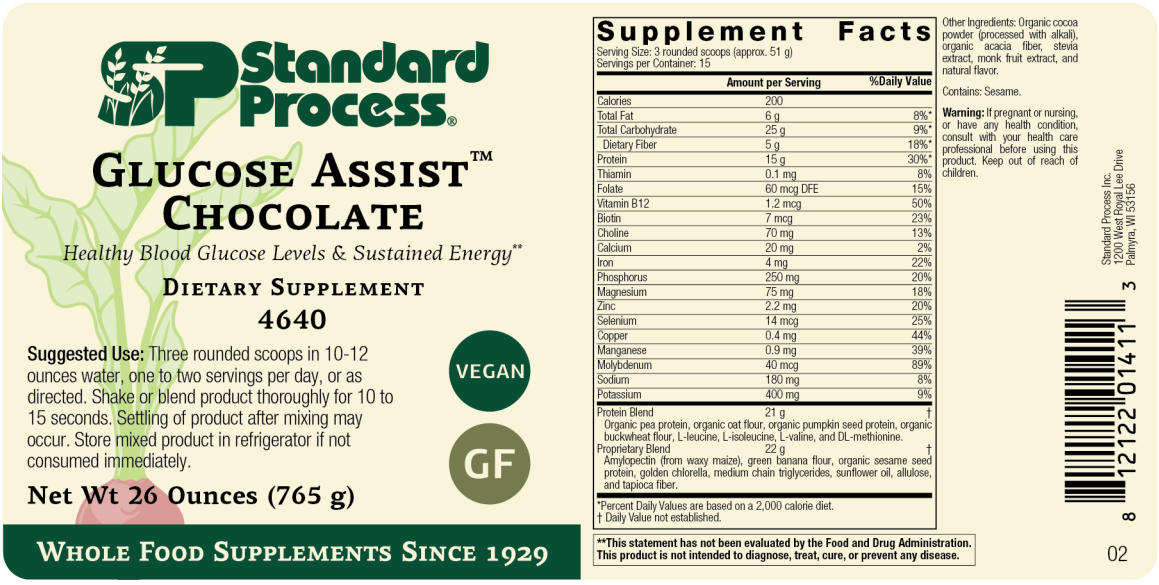
WHITE PAPER

Blood glucose is one of the major sources of energy for the body, especially the brain and muscles.[1,2] When carbohydrates are consumed, they are broken down into glucose, resulting in a spike in blood glucose levels. Circulating glucose triggers the actions of insulin which allow for its uptake into cells where it can then be used as energy. Maintaining healthy blood glucose levels is critical for metabolic health and wellness, including preventing or delaying long-term health issues.

The glycemic index (GI) is a measure used to assess the effects of foods on blood glucose levels. A low GI indicates the carbohydrates contained in that food are more slowly digested, absorbed, and metabolized. Therefore, they cause a lower and more gradual rise in blood glucose levels. In contrast, high GI carbohydrates (GI >70) — such as white rice or cake — cause a rapid increase in blood glucose levels. Low GI foods, including nuts and some vegetables (GI <55), tend to contain more complex carbohydrates and indigestible carbohydrates like dietary fiber and resistant starches.[3,4] Consumption of low GI carbohydrates may be beneficial to improving and maintaining glycemic control.[5] Food items that produce a slow rise in blood glucose levels are of special interest, given the rising prevalence of diabetes and obesity.[6]

OBJECTIVE

To determine whether Glucose Assist™ Chocolate supports a reduction of post-meal glycemic response in healthy individuals.



METHODS

This was a randomized, controlled, double-blind, cross-over study where 8 non-diabetic (HbA1c < 6.5), otherwise healthy adults (ages 18-65) with BMI from 18.5 to 35 kg/m^2 consumed 1 of 4 test formulas in each arm of the trial in a random order, completing all 4 treatments in a 2-week timespan. The test formulas are shown in Table 1. Blood glucose was monitored continuously for the 2-week time span using Freestyle Libre Pro sensors from Abbott Diabetes Care. After an overnight fast, participants consumed their assigned treatment (time=0) and finished it within 5 minutes. An oral glucose tolerance test was monitored from 0-180 minutes after consumption.

Table 1.

Treatment	Contents	Amount of CHO	Description
OGTT-Control	Glucose Reference Control†	24.78 g	Equivalent to one serving of GA for assessment of glycemic response (GR) via OGTT
OGTT-GA	Glucose Assist™ Chocolate	24.78 g	One serving of GA for assessment of GR via OGTT
GI-Control	Glucose Reference Control†	50 g	To calculate GI via AUC of OGTT
GI-GA	Glucose Assist™ Chocolate	50 g	To calculate GI via AUC of OGTT

ANALYSIS

Data from participants (n=8) were normalized to fasting blood glucose levels and compiled to generate plots of Comparative Oral Glucose Tolerance Test (Figure 1) and Glycemic index (Figure 2). The incremental area under the curve (iAUC) based on 50g of carbohydrate consumption is used to calculate the glycemic index of a particular item.

RESULTS

Consumption of Glucose Assist™ Chocolate resulted in a blunted, more optimized glycemic response in healthy individuals when compared to a high glycemic reference glucose control formula (p=0.003) (Figure 1). Consumption of Glucose Assist™ Chocolate also notably did not result in “peaks and valleys” in blood glucose when compared to the consumption of the glucose reference control. Similarly, a significant change in the GI was observed with the consumption of the whole food-based glucose balance formula when compared to a reference control group (Figure 2). Based on iAUC calculations, Glucose Assist™ Chocolate is a low GI nutritional formulation with a glycemic index of 27.4. Reduction in post-meal blood glucose response was observed with the consumption of nutritional formulation combined with low glycemic carbohydrate and plant-based protein blend, for both glucose response (GR) and glycemic index (GI).

† Glucose Reference Control was a standardized dextrose beverage: 24.78g of sugar (OGTT-Control) or 50g of sugar (GI-Control)

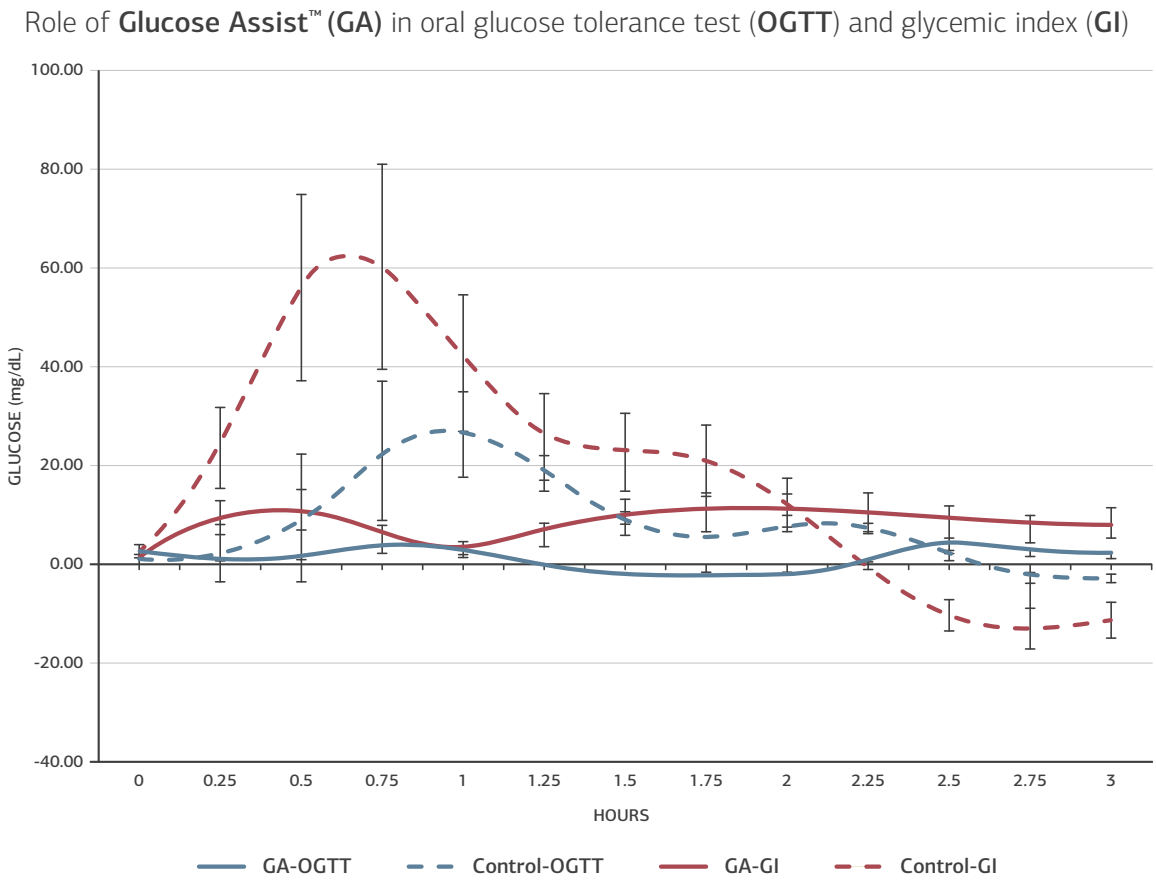


Figure 1. Normalized blood glucose levels in non-diabetic, otherwise healthy adults (n=8) in response to consumption of Glucose Assist™ Chocolate (GA-OGTT and GA-GI) compared to controls (Control-OGTT and Control-GI).

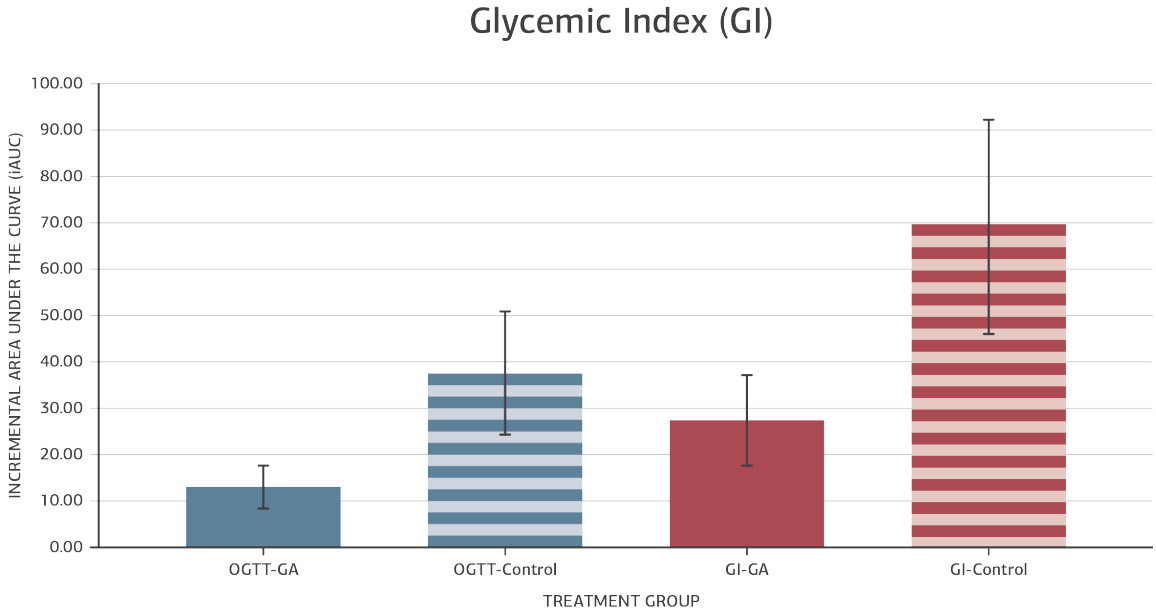


Figure 2. Glycemic index, calculated from the Incremental Area Under the Curve (iAUC) of glucose response of GA compared to controls from standard OGTT in otherwise healthy individuals using current GA formula and reference control consuming 50g of net carbohydrate. A low glycemic index indicates a smaller effect on blood glucose levels.

TASTE & TOLERANCE

An additional taste and tolerance test revealed Glucose Assist™ — both chocolate and vanilla — was well tolerated by a set of healthy individuals (n=18) for ten consecutive days, with no reported adverse events.

CONCLUSION

Consumption of Glucose Assist™ Chocolate in otherwise healthy individuals resulted in a reduction in post-meal glycemic response. This suggests that combining low glycemic index carbohydrates with a plant-based whole food protein blend (organic oat flour, pea protein, pumpkin seed protein, and buckwheat flour) might help minimize acute blood glucose spikes. It may also help with steady blood glucose management in healthy individuals whose blood sugar levels are already within a normal range.

REFERENCES

1. Diepenbroek, C., Serlie, M.J., Fliers, E., Kalsbeek, A. & la Fleur, S.E. Brain areas and pathways in the regulation of glucose metabolism. BioFactors (Oxford, England) 39, 505-513 (2013).
2. De Feo, P., et al. Metabolic response to exercise. Journal of endocrinological investigation 26, 851-854 (2003).
3. Bjorck, I. & Elmstahl, H.L. The glycaemic index: importance of dietary fibre and other food properties. The Proceedings of the Nutrition Society 62, 201-206 (2003).
4. Topping, D.L. & Clifton, P.M. Short-chain fatty acids and human colonic function: roles of resistant starch and nonstarch polysaccharides. Physiological reviews 81, 1031-1064 (2001).
5. Wang, Q., Xia, W., Zhao, Z. & Zhang, H. Effects comparison between low glycemic index diets and high glycemic index diets on HbA1c and fructosamine for patients with diabetes: A systematic review and meta-analysis. Prim Care Diabetes 9, 362-369 (2015).
6. Bhupathiraju, S.N., Hu, F.B. Epidemiology of obesity and diabetes and their cardiovascular complications. Circ Res 118, 1723-1735 (2016).