Comparison of the glycemic and insulinemic and fructose response and GI tolerability of a new sweetener blend versus sucrose in healthy individuals: An acute randomized controlled trial

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Introduction

The Sola Company has developed a new sweetener which is intended to replace sucrose in the diet; however, the metabolic response to this sweetener is not known. This study compared postprandial glucose, insulin and fructose response of a typical dose of the new sweetener with the same amount of sucrose. In addition, the tolerability of the sweetener was assessed for 24 hours after ingestion.

Study Objectives

Compare the glycemic response of the new sweetener with sucrose; compare insulin, and fructose response and GI symptoms.

Methods

Subjects

Inclusion criteria: Subjects (N = 15) men and non-pregnant, non-lactating women, 18-75 years of age; BMI of 18 - 40 kg/m^2 inclusive and normal glycemia, fasting serum glucose <130/85 and no pharmaceutical usage except for oral contraceptives, lipid-lowering medications or small doses of anxiolytics/sedatives to assist sleeping.

Test Meals

The test foods consisted of 2 isovolumetric beverages: 30 g sucrose control and 30 g of sweetener blend dissolved in 500 mL water. The sucrose test meal acted as the control. Test meals were administered in a randomized order.

Test product in this trial is a non-commercially available sweetener blend. Each beverage sample was assigned a unique product code to maintain blinding of the subjects.

Name of Ingredient

Tagatose, maltitol, erythritol, stevia extract monk fruit extract, natural flavor

Results

Blood Glucose Responses

The blood glucose response to the two test meals are shown in Figure 1. At 15, 30, and 45 min blood glucose levels were significantly lower after the Sola Sweetener than after the sucrose control and at 90 and 120 min blood glucose levels were significantly higher after the Sola Sweetener than after the sucrose control ($p<0.04$).

*Figure 1: Postprandial glucose responses to Sucrose Control beverage and the Sola Sweetener beverage. Data are expressed as Mean±SEM. *p<0.000001; **p=0.0733; ^p= 0.0326; +p=0.0127.*

Insulin Responses

The postprandial serum insulin response to the two test meals are shown in Figure 2. At 15, 30, and 45 min serum insulin levels were significantly lower after the Sola Sweetener than after the sucrose control ($p<0.003$).

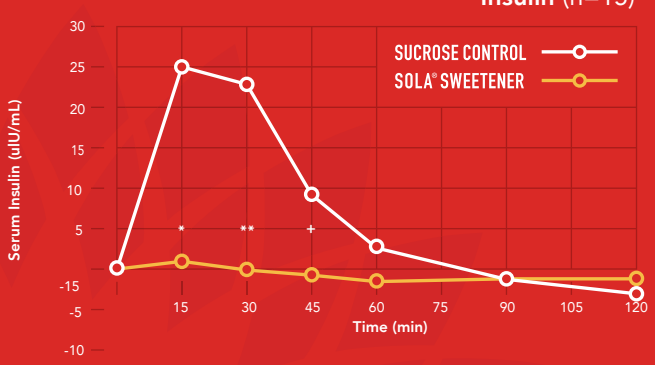

*Figure 2: Postprandial insulin responses to Sucrose Control beverage and the Sola Sweetener beverage. Data are expressed as Mean±SEM. *p=0.0004; **p=0.0001; +p=0.0023.*

Side Effects

Mild GI intolerance was seen in some subjects

Summary

The postprandial glucose, insulin, and fructose response of a new sweetener was compared to sucrose. A total of 18 subjects were screened, of which 3 were ineligible and a total of 15 subjects were recruited. All 15 subjects (9M;6F, age: 29±10y, BMI: 26.3±2.7kg/m^2) consumed each test beverage. The incremental areas (IAUC) of the postprandial glucose, insulin and fructose response to the test meals were (Mean±SEM) as per table below.

Fructose Responses

The postprandial serum fructose response to the two test meals are shown in Figure 3. At 15, 30, and 45 min blood glucose levels were significantly lower after the Sola Sweetener than after the sucrose control ($p<0.04$).

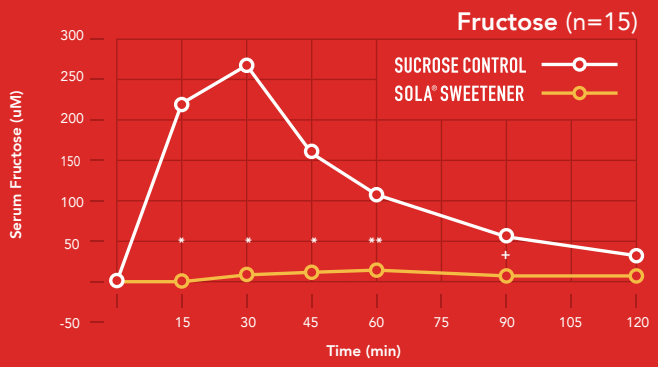

*Figure 3: Postprandial fructose responses to Sucrose Control beverage and the Sola Sweetener beverage. Data are expressed as Mean±SEM. *p=0.00001; **p=0.001; +p=0.0045.*

Test Beverage	Amount (g)	Protein (g)	Fat (g)	Dietary Fiber (g)	Available CHO (g)
Sucrose control	30 g	0 g	0 g	0 g	30 g
*Sola Sweetener blend	30 g	0 g	0 g	0 g	<10 g

Table 1: Nutritional composition of test beverages

Test Meal	Glucose (mmol/L.min)	Insulin (µU/L.min)	Fructose (µM.min)
Sucrose control	96.9±10.1a	1035.3±128.1a	13918±851a
Sola Sweetener	15.4±9.5b	60.5±14.5b	1989±592b

Disclaimer: These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
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