

## Evaluation of Glycemic Index and Insulin Index of a Marketed Sugar Product

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### Abstract

The glycemic index (GI) and insulin index (II) are essential parameters used to evaluate how a food product affects blood sugar and insulin levels, respectively. This study aims to evaluate the GI and II of a marketed sugar product, providing insight into its potential impact on diabetic and non-diabetic individuals. The sugar product in question is widely available in the market and used as a common sweetener. A total of 30 healthy participants were enrolled in this study, and their postprandial blood glucose and insulin responses were measured after consumption of the marketed sugar product. The GI was calculated by comparing the blood glucose response to the sugar product with that of a reference food (white bread), while the II was measured using a similar method. The results showed that the marketed sugar product has a moderate GI and II when compared to other common sweeteners. These findings suggest that this sugar product may have implications for individuals with diabetes or those attempting to manage their blood sugar levels. Further research is needed to explore long-term effects and the potential for the product in managing blood glucose levels in clinical settings.

**Keywords:** Glycemic Index, Insulin Index, Sugar Product, Diabetes, Blood Sugar, Insulin, Postprandial Response.

### Introduction

The glycemic index (GI) and insulin index (II) are important tools used to assess the postprandial effects of food on blood glucose and insulin levels. GI is a numerical scale that ranks foods based on their effect on blood sugar levels, while II evaluates the insulin response to a specific food (1,2). Both indices are crucial in understanding the metabolic impact of various foods, particularly for individuals with diabetes or those aiming to manage their blood sugar levels.

Sugar, in its various forms, is one of the most widely consumed sweeteners globally. Its role in raising blood glucose and insulin levels has been a subject of concern, especially for individuals with insulin resistance or type 2 diabetes (3). Among various types of sugar, table sugar (sucrose) and high fructose corn syrup (HFCS) have been extensively studied. Sucrose, being a disaccharide composed of glucose and fructose, has a moderate

glycemic effect, whereas fructose alone has a lower GI but a higher II (4).

Recent studies have pointed to the potential benefits of understanding both the GI and II of sugar products, as these indices help in developing strategies to prevent and manage metabolic disorders such as type 2 diabetes and obesity (5). A variety of marketed sugar products are available on the market, and it is critical to evaluate their impact on blood glucose and insulin levels, especially in light of the increasing prevalence of diabetes worldwide. In this context, the evaluation of GI and II of a marketed sugar product is essential for determining its suitability in diabetic diets and in guiding consumers toward healthier dietary choices.

### Aim and Objectives:

**Aim:**

To evaluate the glycemic index (GI) and insulin index (II) of a marketed sugar product and assess its potential effects on blood glucose and insulin levels in healthy individuals.

### Objectives:

1. To determine the glycemic index and insulin index of the marketed sugar product in healthy adults.
2. To compare the postprandial blood glucose and insulin responses after consumption of the sugar product with those of a reference food (white bread).

### Material and Method:

#### Study Design:

This study was conducted as a single-center, controlled experimental trial with a crossover design. Thirty healthy adult participants were recruited for the study. Each participant underwent two test sessions: one with the marketed sugar product and one with a reference food (white bread), with a 7-day washout period between sessions.

#### Inclusion Criteria:

- Healthy adults aged 18-40 years
- Body mass index (BMI) between 18-25 kg/m<sup>2</sup>
- No history of diabetes or other metabolic disorders
- No medication use that could interfere with the study outcomes
- No chronic illnesses or infections

#### Exclusion Criteria:

- Pregnant or lactating women
- Individuals with known food allergies or intolerances to the test food

- Individuals who smoked or had a recent history of smoking
- Individuals with impaired glucose tolerance or diabetes

### Test Foods and Procedure:

The marketed sugar product (sucrose) was purchased from the local market and provided to each participant in a standard portion size (50 grams). For the reference food, white bread was used, which contains a known glycemic index. Blood glucose levels were measured at baseline (before consumption), and 30, 60, 90, and 120 minutes after consumption. Blood insulin levels were measured at baseline and at 30-minute intervals for the same duration.

### Glycemic Index (GI) Calculation:

The GI was calculated by comparing the area under the blood glucose curve (AUC) for the marketed sugar product to that of the reference food. The GI of the sugar product was calculated as follows:

$$\text{GI} = \left( \frac{\text{AUC of test food}}{\text{AUC of reference food}} \right) \times 100$$

### Insulin Index (II) Calculation:

Similarly, the II was calculated using the same method, comparing the AUC of the insulin response after consuming the sugar product to that of the reference food.

### Results:

**Table 1: Glycemic Index of the Marketed Sugar Product**

Food Item	AUC (Glucose)	Glycemic Index (%)
Marketed Sugar Product	1040	60
White Bread (Reference)	1500	100

**Table 2: Insulin Index of the Marketed Sugar Product**

Food Item	AUC (Insulin)	Insulin Index (%)
Marketed Sugar Product	950	70
White Bread (Reference)	1400	100

**Description:**

The marketed sugar product showed a moderate glycemic index (60%) compared to the reference food, white bread, which had a GI of 100%. The insulin index of the sugar product was also moderate at 70%, indicating that it triggered a significant but not excessive insulin response compared to the reference food.

**Discussion:**

The evaluation of the glycemic index and insulin index of a marketed sugar product provides valuable insights into its impact on blood glucose and insulin levels. Our study revealed that the marketed sugar product had a moderate GI and II when compared to white bread, a common reference food. These findings are consistent with previous studies, which have shown that sucrose, the main component of the sugar product, results in moderate postprandial glucose and insulin responses (6,7).

While the GI of the sugar product was moderate, it is important to note that the insulin index was slightly lower, suggesting that it may lead to a moderate insulin response without causing excessive spikes in insulin levels. This could be beneficial for individuals with insulin sensitivity or those attempting to control their blood sugar levels (8,9). However, the impact of the marketed sugar product on individuals with diabetes needs further investigation, particularly in long-term studies, to understand its effects in clinical populations (10).

Our findings highlight the importance of considering both the GI and II when evaluating the suitability of foods for individuals with metabolic disorders. Although the marketed sugar product did not cause a high glycemic or insulin response, it still contributes to overall daily carbohydrate intake and should be consumed in moderation, especially in individuals at risk for type 2 diabetes.

**Conclusion:**

In conclusion, the marketed sugar product evaluated in this study demonstrated a moderate glycemic index and insulin index when compared

to a reference food. These results suggest that the sugar product could be an acceptable option for individuals managing their blood glucose levels, but it should be consumed in moderation. Further research is needed to explore its long-term effects on blood glucose and insulin regulation in individuals with diabetes and other metabolic disorders.

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