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Comparative Glycaemic and Insulinaemic Response to Table Sugar versus Monk Fruit: An N-of-1 Pilot Self-Experiment

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Abstract: ***Background: Excessive intake of refined sugar is associated with post-prandial hyperglycaemia and hyperinsulinaemia, contributing to insulin resistance and cardiometabolic disease (1,2). Monk fruit (Siraitia grosvenorii) is increasingly used as a non-nutritive sweetener, yet limited human data exist regarding its acute glycaemic and insulinaemic effects (3, 5). Objective: To compare post-prandial blood glucose and insulin responses following ingestion of table sugar versus monk fruit in a controlled self-experiment. Methods: A prospective crossover N-of-1 study was conducted comparing metabolic responses after ingestion of 75 g table sugar and 75 g monk fruit sweetener on separate days. Results: Table sugar caused a marked rise in blood glucose and insulin, whereas monk fruit showed minimal deviation from fasting values. Conclusion: Monk fruit demonstrated a negligible glycaemic and insulinaemic response compared to table sugar.***

Keywords: Monk fruit, blood glucose, insulin response, non-nutritive sweetener, N-of-1 study

1. Introduction

Post-prandial glucose and insulin excursions play a central role in the development of insulin resistance, type 2 diabetes, and cardiometabolic disease (1,2). Sucrose rapidly increases plasma glucose, leading to a robust insulin response. Non-nutritive sweeteners have been proposed as alternatives; however, several have demonstrated paradoxical metabolic effects (3,4). Monk fruit, derived from Siraitia grosvenorii, contains mogrosides that provide sweetness without caloric contribution and are believed not to participate in glycolytic pathways (5). Human data evaluating its acute insulin and glucose response remain scarce.

2. Methods

This was a prospective, crossover, observational N-of-1 self-experiment. On Day 1, 75 g table sugar (sucrose) was dissolved in 200 ml water. On Day 2, 75 g monk fruit sweetener was consumed in an identical manner. Both interventions were performed after a 15-hour overnight fast. Blood glucose and serum insulin were measured at baseline and at 30, 60, 90, and 120 minutes post ingestion. Data were analysed descriptively, and incremental area under the curve (iAUC) was calculated using the trapezoidal method (6).

3. Results

Table sugar ingestion resulted in a rapid rise in blood glucose from 77.8 mg/dL to a peak of 106 mg/dL at 30 minutes, accompanied by a sharp increase in insulin from 3.10 µIU/mL to 30.7 µIU/mL. In contrast, monk fruit ingestion resulted in minimal changes in glucose (68–70 mg/dL) and insulin levels, which remained close to fasting values throughout the observation period.

4. Discussion

This N-of-1 study demonstrates a clear divergence in metabolic response between table sugar and monk fruit. Sucrose induced significant post-prandial hyperglycaemia and hyperinsulinaemia, consistent with established glycaemic index literature (1,2). Monk fruit exhibited a near-neutral metabolic effect, aligning with prior pharmacological data on mogrosides, which do not stimulate insulin secretion or undergo glycolysis (5). These findings support monk fruit as a potentially safer alternative for individuals with insulin resistance or metabolic syndrome (3,4).

5. Conclusion

In this pilot self-experiment, monk fruit did not elicit a significant glycaemic or insulinaemic response compared to table sugar, supporting its potential role as a metabolically neutral sugar alternative. Larger controlled human studies are warranted.

Ethical Statement

This study was a self-experiment conducted by the author on himself. No external participants were involved, and ethical committee approval was not required.

Figures

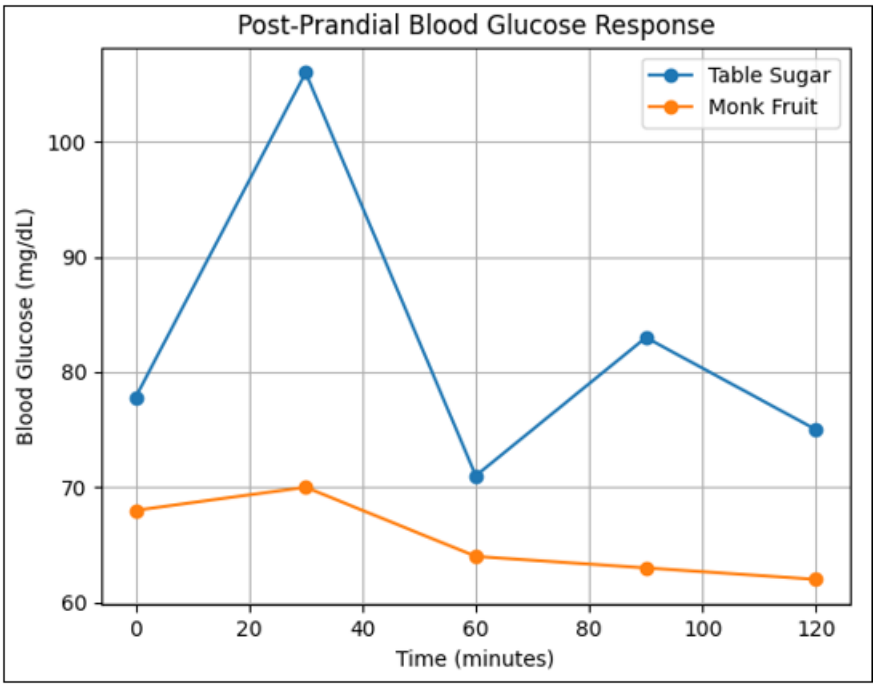

Figure 1: Comparison of post-prandial blood glucose response between table sugar and monk fruit

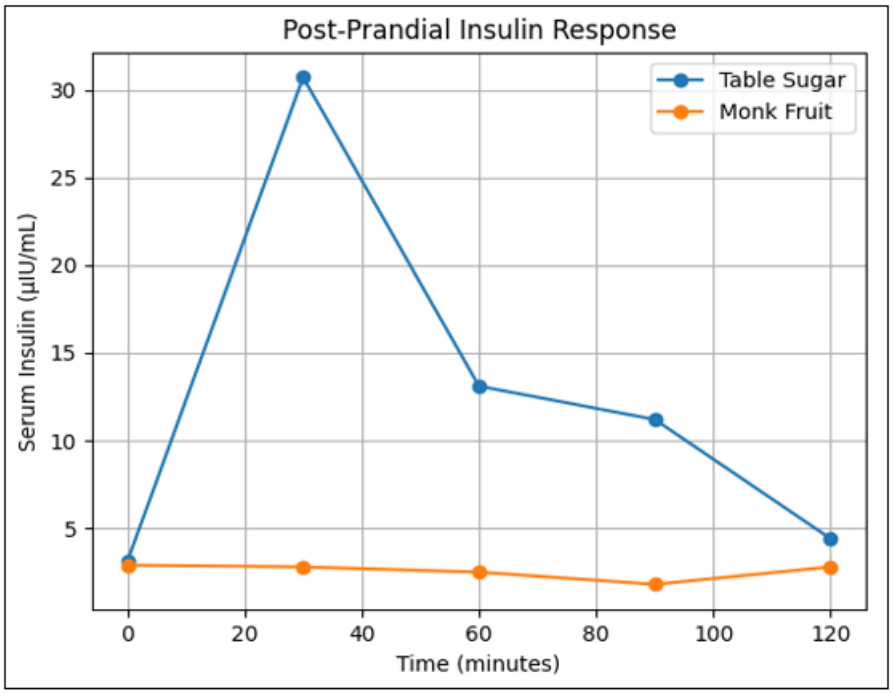

Figure 2: Comparison of post-prandial insulin response between table sugar and monk fruit.

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