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# ASSESSMENT OF POSTPRANDIAL GLYCEMIC RESPONSE IN HEALTHY HUMAN WITH RESPECT TO SOME PROMISING INDIGENOUS MANGO VARIETIES OF PAKISTAN

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**Abstract**

**Background:** Mango is an important herb because of its high glycemic response. Mangoes offer a wide variety of postprandial glycemic response and physiological benefits, and value-added goods have been included in this study.

**Objective:** To characterize the Assessment of Postprandial Glycemic Response in Healthy Humans with Regard to Some Promising Indigenous Mango Varieties of Pakistan.

**Methodology:** In this study, two groups are presented one is a control group and the second is a conventional treatment group. The current study was an observational study, with healthy volunteers chosen at random. Ten participants were chosen from the students and professors of a private institution in Lahore. All participants were educated about the study's methodology and asked to sign consent forms before participating voluntarily. The data collected was evaluated using the analysis of variance (ANOVA) approach. Statistical differences were defined as $p < 0.05$. Duncan's multiple range test was used to compare means and determine the significance of differences. All statistical analyses were carried out using SPSS software version 20.

**Results:** The results showed Mango had higher values of glycemic response.

**Conclusion:** In conclusion, It is strongly recommended that Mango be included in a diet-based treatment. The present study also revealed that there was an improvement in glycemic response among diabetic patients.

**Keywords:** Glycemic index, Mango, Glycemic load, Variety.

## Introduction

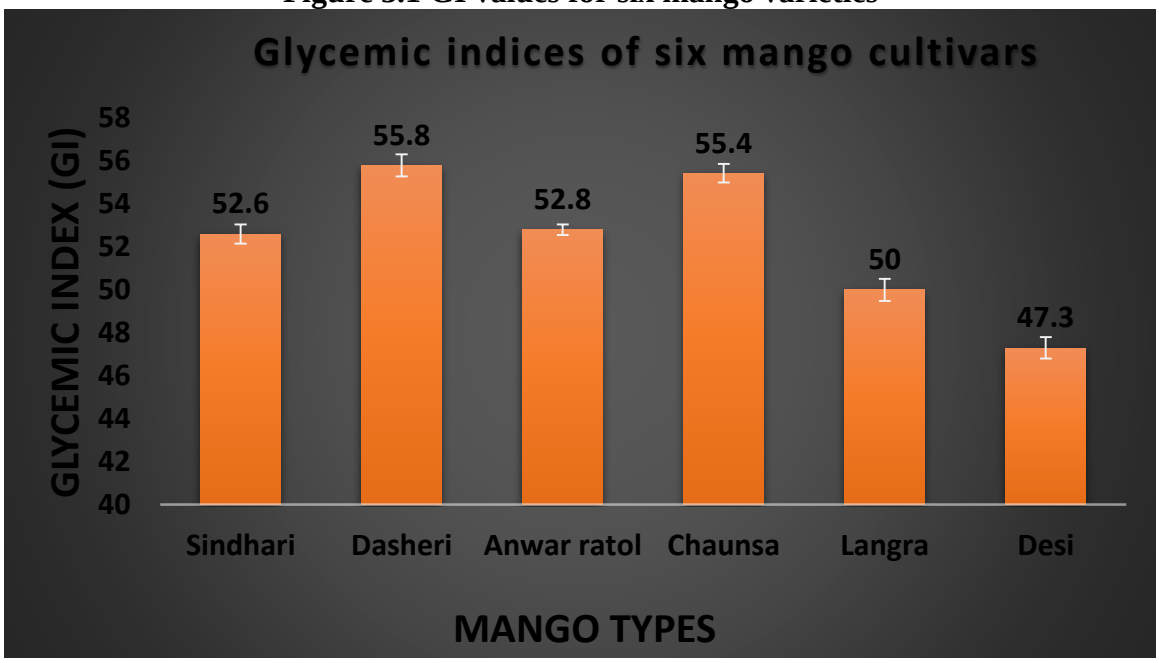
Mango (Mangifera indica L., Family Anacardiaceae) is one of the most popular tropical fruits in the twenty-first century, thanks to its distinct flavor, aroma, and high nutritional value. Fresh mango fruits are currently sold year-round in the global market. Harvests differ by producing country, and there are established standards for postharvest management, storage, and shipping logistics [1. Mango production worldwide is estimated to exceed 51 million tons in 2019, with more than 5 million hectares and up to 793 identified types [2]. More than 87 nations have recorded commercial production, with Pakistan (1.7 million tons) ranking in the top ten [1, 3, 4]. Consuming carbohydrate-based foods raises blood glucose levels; however, this increase may vary depending on the kind [5]. Carbohydrate intake raises blood glucose levels. The Glycemic Index is a straightforward measure for selecting appropriate carbohydrate diets, whereas GL determines the entire impact of that food on human health. High GI/GL diets are closely linked to the evolution of type 2 diabetes [6]. Mango has a medium glycemic index (GI) of 51-55 and is high in dietary fiber. Because different mango types have diverse nutritional compositions, it was critical to evaluate their postprandial glycemic response in order to determine the potential favorable influence of all variations on general human health [7]. Each study participant received samples of six mango kinds containing approximately 50 grams of accessible carbohydrate from each source, namely glucose, as well as six mango cultivars. Later, the finger-prick method was used to determine the postprandial blood glucose of all ten people over a 15-minute interval for up to 120 minutes. The glycemic index is a simple and effective technique for choosing the proper carbohydrate-based food; it is particularly useful in distinguishing between high and low glycemic index foods [8]. In 1981, Dr. David Jenkins proposed the glycemic index as an alternative approach for categorizing carbohydrate and carbohydrate-containing foods [9]. Carbohydrate foods are characterized as having a low, medium, or high glycemic index (GI) [10]. A study on the influence of fruits on postprandial blood glucose levels found that after eating fruits, blood glucose levels rose by 50-55%. Unhealthy food habits have a negative impact on human subjects' overall health, which may eventually lead to various chronic illnesses, particularly type 2 diabetes. When high glycemic meals are ingested over an extended period of time, they are thought to increase the risk of diabetes because they increase hyperglycemia [11]. This study aims to identify healthy mango varieties and reduce the relationship between mango consumption and type 2 diabetes prevalence in Pakistan. It also highlights mango as a medium-glycemic index food with high fiber content.

## Material and method:

The current study was carried out at the laboratory of the UVAS, Lahore, with the clinical section completed at the clinical techniques and therapeutics laboratory, Qarshi University, Lahore. In control groups gave placebo only and in the conventional treatment group the participants had fast for 8 hours before assessing their blood glucose levels on nine consecutive days. They were told to take 50g of carbohydrates from glucose and six mango kinds, as well as a reference diet to limit their glucose tolerance [12]. Later, healthy participants' postprandial blood glucose levels were monitored for two hours at 0, 15, 30, 45, 60, 90, and 120 minutes [13]. The subjects were not permitted to eat throughout the test, but they were allowed to drink plenty of water. All subjects used the same procedure on alternating days. The study included ten healthy volunteers from a private institution in Lahore, chosen based on their age and health state [14]. They learned about the study's approach and signed consent papers. For nutritional evaluation and glycemic response investigations, data were evaluated with ANOVA, Duncan's multiple range test, and SPSS software version 20. The current study was an observational study in which healthy volunteers were selected at random. A total of ten people were chosen among the students and faculty of a private university in Lahore. Subjects were chosen based on their age (20-30 years) and health status; volunteers with an ideal BMI (18.5-24.5) and no infectious diseases, hypertension, cardiovascular disease, or diabetes. All participants were informed of the study's approach and requested to sign consent forms in order to willingly participate.

## 3. Results

**Figure 3.1 GI values for six mango varieties**




The graphical depiction (Fig 3.1) depicts the glycemic index trend among six mango types. Dasheri and Chaunsa were both found to have higher glycemic indices, hence these cultivars produced the higher bars in figure 3.1. Desi displayed the shortest bar as this mango type has the lowest GI among all evaluated mangoes. *$p<0.05$ [$P$ value is showing a significant difference in GI values for six mango types].

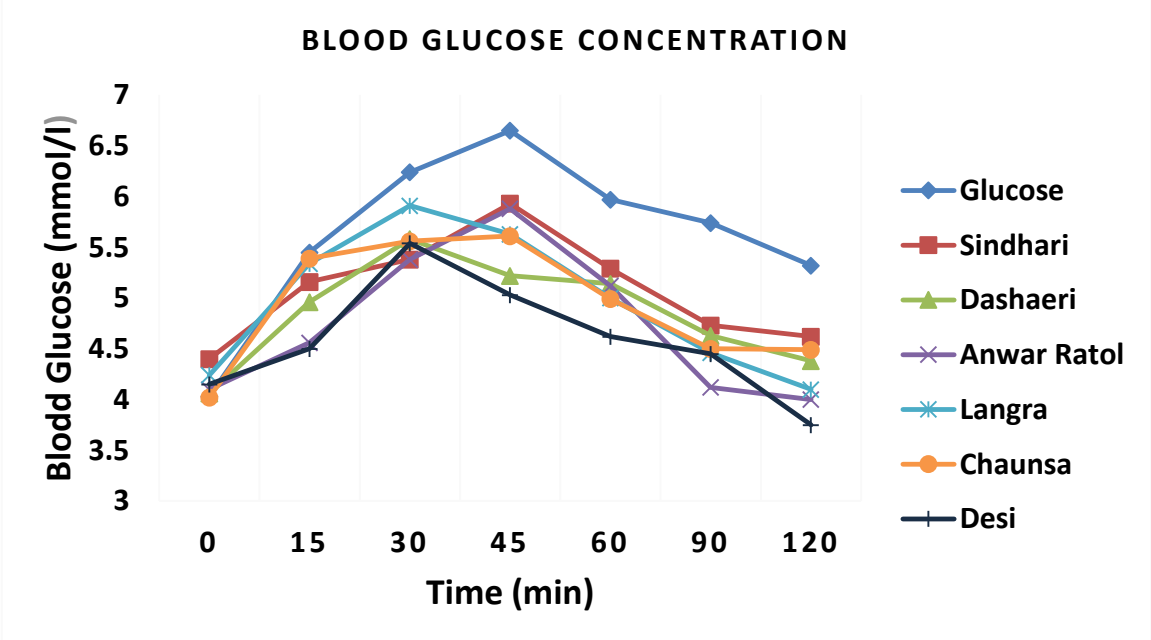



**Figure 3.2 average blood glucose concentration mmol/L level after consuming glucose(50g) and six mango types (50g available CHO's).**

Glucose as well as distinct mango types are expressed as change in capillary blood glucose level from fasting till two hours after consumption in healthy humans.

**Table 3.1 Mean ±SEM for glycemic load of different mango varieties**

| Treatments | Mean ±SEM |
|---|---|
| **Sindhari** | $6.3\pm0.05^{b}$ |
| **Dasheri** | $6.8\pm0.07^{c}$ |
| **Anwar ratol** | $6.5\pm0.9^{c}$ |
| **Chaunsa** | $6.6\pm0.06^{c}$ |
| **Langra** | $6.0\pm0.07^{b}$ |
| **Desi** | $5.7\pm0.09^{a}$ |

*Values are shown in **Mean ±SEM** *Column Values for different Mango types are different from each other *Means sharing the same superscript are not significantly different from each other *Superscript (a) describes the lowest value of GL in different mango varieties

Table 3.1 displays the mean±SEM glycemic load values for various mango types. Duncan's multiple range test was used to assess the relevance of these mean values across mango types. The results in Table 3.1 show the mean glycemic load of the six mango varieties examined. Dasheri had a high GL of 6.9±0.08c, followed by Chaunsa (6.7±0.08b) and Anwar Ratol (6.6±0.10c). The mean±SEM GL values for Sindhari and Langra were 6.4±0.07b and 6.1±0.06b, respectively. Desi mango has the lowest estimated GL value (5.8±0.08a) compared to other cultivars evaluated. Analysis of variance values for the glycemic load of various mango varietals. Table 3.3 shows substantial correlation ($P\leq0.05$) between mango types and glycemic load.

## 4. Discussion

Mango is one of the most popular fruits to eat, which is why it is grown on a large scale all over the world, primarily in Asia's tropical regions [15]. Nowadays, customers are more conscious of their sugar and calorie intake, so a specific type of fruit with the lowest sugar and calorie content is required. Jenkins et al. (2011) found that a diet with the lowest glycemic response was related with a lower incidence of CHDs and breast cancer [16]. Barclay et al. (2008) reported similar relationships between high glycemic response diets and the risk of chronic illnesses. In the clinical phase of the current study, ten healthy participants consumed 50 g of accessible carbs from six different mango varieties. After measuring the changes in blood glucose concentrations after consuming all of these mango types, the area under glycemic response curves for all assessed varieties were estimated and compared to the glycemic response curve obtained for glucose to calculate the glycemic index and glycemic load of six mango varieties [17]. The glycemic values for six mango varieties (Da, Ch, An, Si, La, and De) were 141.42±22.69, 138.60±27.31, 132.56±19.13, 130.98±26.79, 120.63±14.79, and 102.44±13.31, respectively [18]. Mann et al. (2004) discovered a link between low GI foods and the prevention of metabolic problems; according to their findings, low GI diets are gradually absorbed by the body, resulting in a modest spike in BGL [19]. Consumption of Dasheri and Chaunsa mangos resulted in elevated blood glucose concentrations, with mean GI values of 55.80±0.51 and 55.43±0.43. Similar but less pronounced effects were observed for Anwar Ratol (52.80±0.34), Sindhari (52.60±0.45), and Langra (50.0±0.62). Desi mango had the lowest glycemic index (47.30 ± 0.50), but caused the greatest blood glucose levels. All fruit cultivars showed significant results ($p\leq0.05$). Ayua et al.2021 found that the variable glycemic response of different mango cultivars could be attributed to delayed sucrose digestion and, as a result, slower glucose absorption [20].

## Conclusion

The study examines typical Pakistani native mango cultivars and their physicochemical properties, as well as their postprandial glycemic response in healthy individuals. Desi mango, which has the lowest GI and GL values, is recommended for individuals looking for a low/medium GI/GL fruit.

Consuming this sort of mango will help you stay healthy and fit by fostering a low-fat, high-fiber, and low GI/GL diet.

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