

# Mango and diabetes

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## Abstract

The mango is considered as the king of fruits. It is one of the most consumed seasonal fruits in South Asia. Most persons with diabetes and health-care providers assume that mango should be strictly avoided by persons with diabetes. However, mango is a fruit with good nutritive value, low glycemic load as well as with acceptable glycemic index. In this short review, we summarize the nutritive values of mango, as well as the ways in which mangoes can be enjoyed, in moderation, by persons with diabetes.

**Keywords:** Diabetes, fruits, glycemic index, mango

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**Received:** 10.08.2017, **Accepted:** 10.08.2017

## INTRODUCTION

The mango is considered as the king of fruits by all. For people with diabetes, however, it is thought to be the Menaka of fruits. Irresistible because of its taste, it is thought to lure its consumers to metabolic doom. In this way, it is similar to the fairy (apsara) Menaka, who seduced the venerable sage, Vishvamisra, and interrupted his meditation. Our brief communication aims to correct this misconception.

## SOURCE

The mango is a fruit of the *Mangifera* tree. It can be eaten raw or ripe. Mango is the national tree of Bangladesh, as well as the national fruit of India, Pakistan, and the Philippines. Apart from these countries, it is majorly produced in China, Thailand, Indonesia, and Mexico as well.

## NUTRITIONAL VALUE

The mango has been the subject of much research in clinical nutrition. The mango provides all the significant

Vitamins A, B, C, and K along with calcium, iron, copper, and potassium, respectively [Table 1]. There is no cholesterol in mango.<sup>[1]</sup>

The glycemic load of mango is 51, which is classified as low. Its glycemic index has been found to be similar to that of other tropical and subtropical fruits.<sup>[2]</sup>

Mangiferin, a bioactive substance found in mango seeds (0.42 mg/kg), peel (1690.4 mg/kg), and pulp (4.4 mg/kg), is thought to have hypoglycemic properties. Mangiferin is a xanthone with high antioxidative activity. It inhibits sucrase, isomaltase, and maltase, and thus decreases in glucose intestinal absorption. Mango also contains dietary fiber, which can reduce digestion of carbohydrate and lower glucose absorption.<sup>[3]</sup>

## EVIDENCE

Human studies suggest that mango consumption may improve postprandial glucose and markers of

Access this article online	
Quick Response Code:	Website: www.joshd.net
	DOI: 10.4103/joshd.J_Soc_Health_Diabetes_26_17

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**How to cite this article:** Kalra B, Gupta L, Khandelwal D, Choubey N. Mango and diabetes. *J Soc Health Diabetes* 2018;6:56-8.

**Table 1: Nutritional value of mango (/100 g)<sup>[11]</sup>**

Nutrient	Quantity
Energy	74 kcal
Carbohydrates	16.9 g
Moisture	81 g
Crude fiber	0.7 g
Fat	0.4 g
Protein	0.6 g
Vitamins	
Carotene	2743 mg
Thiamine (B1)	0.08 mg
Riboflavin (B2)	0.09 mg
Vitamin C	16 mg
Vitamin E	0.9 mg
Vitamin K	4.2 mcg
Minerals	
Magnesium	270 mg
Manganese	0.13 mg
Phosphorus	16 mg
Potassium	205 mg
Calcium	14 mg
Phosphorus	16 mg
Iron	1.3 mg
Copper	0.11 mg
Sodium	26 mg

atherosclerosis. Mango consumption for 42 days has been shown to decrease systolic blood pressure in lean subjects, but not in obese persons. Hemoglobin A1C improves significantly in obese but not lean subjects. Reduced expression of PAI-1, associated with reduced risk of atherosclerosis and thrombosis, is observed in both lean and obese individual.<sup>[4]</sup>

Pre-packaged ground freeze-dried ripe “Tommy Atkins” mango fruit powder has been shown to improve glucose values and increase insulin levels in obese diabetics.<sup>[5]</sup> A similar trend is noted in prediabetic individuals.<sup>[6]</sup>

## USAGE

Logical empiricism suggests that mango should not be banned from the diabetic menu. One should follow a person-centered counseling approach to mango consumption in persons with diabetes. Depending on the glycemic control, people may consume small portions of the fruit approx. 100–150 g of edible portion/day or 50 g mango slice thrice a day which is friendlier to glucose metabolism than a larger portion of it consumed with the heaviest meal.

The glycemic index may be further lowered by taking mango after consumption of high fiber food such as salads or beans or whole grains. Dicing the fruit into small cubes or thin slices increases its surface area, thus improving palatability and taste while keeping the total consumption within limits. Processing of mango puree by high hydrostatic pressure also reduces its glycemic index.<sup>[7]</sup>

Mangoes are weighed and bought by the kilogram. This makes it easy to explain the concept of serving size, and glycemic load calculation, to the average consumer. One must note that the peel and seed contribute to about 20%–25% of the total weight of the fruit. Mango peel, leaves, and mango kernel flour have been used to modulate glycemia in animal models, but are not part of South Asian diet.<sup>[8-10]</sup>

## RECIPES

Mango is a versatile fruit which is a gift to the chef. It adds taste, color, flavor, and variety to recipes and can be used in raw as well as cooked form. It can be grilled, boiled, steamed, roasted, baked, as well as stewed. Beverages such as aam panna or mango kanji can also be prepared from mango pulp. Tasty and healthy recipes which allow people with diabetes to taste its flavor include mango and cucumber salads, baked mango tart with mushroom, mango and dried nuts, mango salsa, and steamed mango idli. Boiled mango can be used to make sauces with a garnishing of chia seed, flax seed, and aniseed. Raw mango slices can be dusted with a starch and can be turned into a fritter, a great snack. Mango can be added as a natural sweetening agent to desserts, obviating the need for sugar.

## SUMMARY

Mangoes may be eaten in moderation by persons with diabetes. While they are purported to have multiple benefits on metabolism, one must be mindful of total caloric intake, portion size, frequency and glycemic load, while consuming this fruit.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Mango. Available from: <https://www.ndb.nal.usda.gov/ndb/nutrients/>. [Last accessed on 2017 Jul 23].
2. Oboh G, Ademosun AO, Akinleye M, Omojokun OS, Boligon AA, Athayde ML. Starch composition, glycemic indices, phenolic constituents, and antioxidative and antidiabetic properties of some common tropical fruits. *J Ethnic Foods* 2015;2:64-73.
3. Masibo M, Qian H. Major mango polyphenols and their potential significance to human health. *Compr Rev Food Sci Food Saf* 2008;7:309-19.
4. Fang C, Kim H, Barnes R, Talcott ST, Mertens-Talcott SU. Daily mango (*Mangifera indica* L.) Consumption for 42 days differentially modulates metabolism and inflammation in lean and obese individuals. *FASEB J* 2017;31 1 Suppl: 431-3.
5. Evans SF, Meister M, Mahmood M, Eldoumi H, Peterson S,

- Perkins-Veazie P, et al. Mango supplementation improves blood glucose in obese individuals. *Nutr Metab Insights* 2014;7:77-84.
6. Semkoff J, Evans S, Jantachotikun S, Eldoumi H, Mahmood M, Meister M, et al. The effect of mango supplementation on clinical parameters of pre-diabetic individuals. *FASEB J* 2015;29 1 Suppl:602-12.
  7. Elizondo-Montemayor L, Hernández-Brenes C, Ramos-Parra PA, Moreno-Sánchez D, Nieblas B, Rosas-Pérez AM, et al. High hydrostatic pressure processing reduces the glycemic index of fresh mango puree in healthy subjects. *Food Funct* 2015;6:1352-60.
  8. Gondi M, Prasada Rao UJ. Ethanol extract of mango (*Mangifera indica* L.) peel inhibits  $\alpha$ -amylase and  $\alpha$ -glucosidase activities, and ameliorates diabetes related biochemical parameters in streptozotocin (STZ)-induced diabetic rats. *J Food Sci Technol* 2015;52:7883-93.
  9. Lakshmi M, Usha R, Preetha R. Mango (*Mangifera indica*) stone kernel flour – A novel food ingredient. *Malays J Nutr* 2016;22:461-7.
  10. Patnaik R. Mango leaves in treating diabetes: A strategic study. *Int J Innov Res Dev* 2014;3(12):432-441.
  11. Available from: <http://www.icmr.nic.in/pricepubl/content/1.htm>. [Last accessed on 2017 Aug 09].