

The Medicinal Effects of *Abelmoschus Esculentus* of Type 2 Diabetes

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Abstract

Abelmoschus esculentus L., is commonly known as lady's fingers, Bhindi, okra or gumbo, it is a flowering plant which belongs to family malvaceae. The geographical origin of okra is South Asian and West African origins. The plant is cultivated in the tropical, subtropical and warm temperature regions around the world. The species is an annual or perennial, growing up to 2 m tall. It is a health rich food due to its high fiber, vitamin C and folate content. It is rich in source of calcium and potassium. In addition, the plant also used medicinally in treatment of several disorders like Anticancer, Antimicrobial, Anti-ulcer activity, Antioxidant property The aim of present study is to highlight the reduction of blood sugar for the treatment of diabetes.

Keywords: *Abelmoschus esculentus*; okra; Antioxidant; folate; Anti-ulcer activity

Introduction

Abelmoschus esculentus L

Abelmoschus esculentus L. is commonly known as lady's fingers, Bhindi, okra or gumbo, is a flowering plant belongs to family malvaceae. The geographical origin of okra is South Asian and West African origins. The plant is generally cultivated in tropical, subtropical and warm temperature regions around the world. The species is an annual or perennial, growing up to 2 m tall. It is a popular and rich health food due to its contains high fiber, vitamin C and folate content. It is also known as flowering plant known for its edible seed pods [1].

It is an oligo- purpose crop, but they generally consumed for its green tender fruits as a vegetable in a different variety of ways. These fruits are rich in Vitamins, calcium, potassium and other mineral matters. The mature okra seed is a good source of oil and protein has been known to have superior nutritional quality. Okra seed oil is rich in unsaturated fatty acids such as linoleic acid, which is essential for human nutrition. Its mature fruit and stems contain crude fiber, which is used in the paper industry [2].

Description of *Abelmoschus esculentus*

Biological Name: *Hibiscus esculentus*, *Abelmoschus esculentus*

Synonyms: Kacang Bendi, Okra, okura, Okro.

Kingdom: Plantae

Order: Malvales

Genus: *Abelmoschus*

Species: *A.Esculentus*

Family: Malvaceae

Origin: Distributed from Africa to Asia, southern Europe and America.

Part used: Seeds, fruits, pea pods, root

Extract used: Water extract

Other Names: Kacang Bendi, qiu kui, Okra, okura, Okro, Quiabos, Ochro, Quiabo, Gumbo, Quimgombo, Bamieh, Banya, Quingumbo, Bamia, Ladies Fingers, Bendi, Bhindi, Kopi Arab [2]. (Figures 1, 2)

Chemical constituents

Okra contains Flavonol glycoside, Phenolic compounds, 2.7% aqueous extract .Okra bast, a multicellular fiber was analyzed and the estimated average chemical compositions of OBF (*Abelmoschus esculentus* variety) are 67.5% a-cellulose, 15.4% hemicelluloses, 7.1% lignin, 3.4% pectic matter, 3.9% fatty and waxy matter and 2.7% aqueous extract [2, 3]. It is clear that the main constituents of OBF are a-cellulose, hemicelluloses and lignin and the rest are very minor in proportion, so render a little influence to the structure of OBF. Therefore, the structure of a-cellulose, hemicelluloses and lignin and the mode of combinations that exist in between themselves are dominating the structure of OBF [3]. (Table 1)

Percentages are related to US recommendations to for adults. (Source: USFDA database) Okra is a popular health food due to its high fiber, Vitamin C, and folate content. Okra is also known for being high in antioxidants. Okra is also a good source of calcium and potassium.



Figure 1: *Abelmoschus esculentus*.



Figure 2: *Abelmoschus Esculentus* Flower.

Table 1: Okra Raw Nutrition Value per 100g.

Energy	33 kcal
Carbohydrates	7.45 g (140)
Sugars	1.48 g
Dietary Fibers	3.2 g
Fat	0.19g
Protein	2g
Water	90.19g
Vitamin A	36µg (7%)
Thiamine(B1)	0.2 mg (17%)
Riboflavin(B2)	0.06mg (5%)
Niacin (B3)	1mg (7%)
Vitamin C	23mg (28%)
Vitamin E	0.27 mg (2%)
Vitamin K	31.3 µg (30%)
Calcium	82mg (8%)
Iron	0.62 mg (5%)
Magnesium	57 mg (16%)
Potassium	299mg (6%)
Zinc	0.58 mg (6%)

Parts Used: fruit, leave seed and root [4].

Diabetes Mellitus

Diabetes happens when your body isn't able to take up sugar (glucose) into its cells and use it for energy .it describes a group of metabolic disease in which the person has high blood glucose (blood sugar). People living with type 2 DM are more vulnerable to various forms of both short- and long-term complications, which often lead to their premature death. This tendency of increased morbidity and mortality is seen in patients with type 2 DM because of the commonness of this type of DM, its insidious onset and late recognition, especially in resource-poor developing countries like Africa [4].

Diabetes mellitus is a chronic disorder of carbohydrates, fats and protein metabolism. A defective or deficient insulin secretory response, which translates into impaired carbohydrates (glucose) use, is a characteristic feature of diabetes mellitus, as is the resulting hyperglycemias. Diabetes mellitus (DM) is commonly referred to as a "sugar" and it is the most common endocrine disorder and usually occurs when there is deficiency or absence of insulin or rarely, impairment of insulin activity (insulin resistance) [5]. The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025 [6].

This results in a buildup of extra sugar in your bloodstream [7].

- Insulin production is inadequate.
- Body's cell do not responded properly to insulin
- They are 4 types of diabetes [8].
- Type 1:- Type 1 diabetes is a chronic disease. In which cells in the pancreas make insulin are destroyed, for this reason body is unable to make insulin.
- Type 2:- The cells have stopped responding well to insulin. The body struggles to move glucose from the blood into the cells, despite having adequate levels of the hormone. Eventually, their bodies may stop making adequate insulin entirely.
- Pre diabetic: Prediabetes has a higher blood sugar level than normal blood sugar level. It's not high enough to be considered type 2 diabetes.
- Gestational: Gestational diabetes is diabetes diagnosed for the first time during pregnancy (gestation). Like other this is also types of diabetes, its

affects how your cells use sugar. It causes high blood sugar that can affect your pregnancy and your baby's health.

How okra is help for diabetes?

Okra is a rich source of many nutrients, including fibre, vitamin B6, and folate. Vitamins B slow the progress of diabetic neuropathy and reduce levels of homocysteine, a risk factor for this disease [9]. The soluble fiber also helps stabilize sugar [10]. Okra is a vegetable that is widely consumed in India. It is cooked with a number of spices and eaten with chapatis. Who knew it could help us control symptoms of diabetes as well [11, 12].

How it is used?

Take 2 piece of lady finger & cut it both the end. Also put a small cut in the middle. After put the two piece of lady finger in glass of water & cover with glass and kept it room temperature during at night.

How it is consumed?

Early morning, before breakfast, remove these two pieces of ladies finger from the glass and simply drink this water. Keep doing it on a daily basis within two weeks .you will see remarkable results in the reduction of your sugar [13, 14].

Water extraction process for Okra [15, 16]

By Rotary Evaporator:

- 500 g seed powder was macerated
- Extracted with distilled water for 72 h at RT
- Chloroform was added to the mixture to prevent microbial contamination
- After completion of extraction, it was filtered
- Solvent was removed by evaporation in a rotary evaporator
- And the solid mass was freeze-dried
- The percentage yield obtained was 17% w/w (Figure 3)

Health Benefits of Okra [17]

- Controls blood sugar: Okra contents high amount of soluble and insoluble fibers and having low glycemic index. For this so fiber helps us to maintain and stabilize the blood sugar by delaying the gastric emptying of sugar.
- Prevents Migraine: It contains mucus forming fiber, so they hold and keep you hydrating throughout a day
- Promote gut health: okra is rich in fiber which helps to move smoothly through the intestine.
- Promotes vision: okra is powerhouse of vitamin A and antioxidant like beta carotenes, xanthein and lutein are powerful compounds that destroy free radicals responsible for cell degradation and vision. So after taking regular intake of okra in your diet you can protect your eyes too.

Conclusion

The conclusion of this paper was studied that the water extract of



Figure 3: Reference image of rotary evaporator.

Abelmoschus esculentus is used for the treatment of reducing the blood sugar level in humans. It is generally used to cure Type 2 Diabetes due to Non-Insulin depended condition.

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