



## A Review on Anti-diabetic properties of lady's finger (*Abelmoschus esculentus* L.) Plant

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### Abstract

The aim of present review is to highlight the anti-diabetic properties of Okra. It is well known that Diabetes Mellitus is one of the leading causes of morbidity and mortality; still it is an incurable one. Besides modern medicines and technologies, science is looking at some nature made remedies to avoid toxic side effects and to invent a hassle-free treatment for it. While plant resources have turned into a chief target to search new drugs, *Abelmoschus Esculentus* is claimed to be an alternative approach to current medicines of diabetes but yet need to explore more. *Abelmoschus Esculentus* or Okra belonging to the family Mallow is a nutritional source used for both medicinal and culinary purposes. Okra proved to have many therapeutic uses such as anti-diabetic, diuretic, anticancer, antioxidant, eye, heart disease and neurological disorders etc. Most of the pharmacological effects can be explained by the constituents like tannins, terpenoids, flavonoids and glycosides present in Okra

**Key-words:** Lady's Finger, *Abelmoschus Esculentus*, Medicinal Plants, anti-diabetic properties

### Introduction

Diabetes mellitus is a leading non-communicable disease with multiple etiologists. It is a variable disorder of carbohydrate metabolism caused by a combination of hereditary & environmental factors, characterized by inadequate secretion or utilization of insulin, by excessive urine production, & amounts of sugar in blood & urine.<sup>1,2</sup>

### Causes

Genetic defects, diseases in pancreas, Random blood glucose test, glycohemoglobin, lipid profile.<sup>3</sup> The need for anti-diabetic drugs becomes very important as the prevalence of diabetes mellitus increases. Diabetes mellitus becomes a serious threat to humans so that this disease must be cautious, because both men and women, young or old can get this disease, and the symptoms are not

recognized by the sufferer and when it is known that complications have occurred.<sup>4</sup> This problem will increase if there is no effort in terms of treatment and prevention. The selection of diabetes mellitus drugs has now undergone many changes, as it needs to consider the efficacy; side effects caused long-term use and economic value. Oral anti-diabetic drugs or exogenous insulin are commonly used in the therapy of diabetes mellitus pharmacologically.

However, this pharmacological therapy when used over a long period of time will lead to some risk of side effects of drugs such as hypoglycemia, liver and kidney damage, weight gain, and lactic acidosis.<sup>5</sup>

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The use of herbs and natural ingredients to treat and control the disease has been widely practiced by the world community. In recent years, there has been an increase in interest in herbal medicine in the care and management of diabetes both in developing and developed countries, due to its natural origin and its lesser side effects.<sup>6, 7, 8</sup> Most of these herbs refer to the use of roots, leaves, bark, flowers, seeds, and fruit for medicine.<sup>9</sup> Herbal treatments for diabetes mellitus has now been widely practiced, given the high potential of medicinal plants and not yet utilized all. Therefore, it is necessary to develop a new drug diabetes mellitus that is more efficacious with fewer side effects by using natural ingredients that are empirically useful as anti-diabetic. About 800 plant species have been reported to have anti-diabetic properties. Several plant species have been used for the prevention or management of diabetes by Native Americans, Chinese, South Americans, Indians and Asians.<sup>10</sup>

*Abelmoschus* is a genus of about fifteen species belongs to the family Malvaceae. The herb, popularly known as Lady's Finger or Okra (in English) is a nutritional source used for both medicinal and culinary purposes. The plant is widely distributed from Africa to Asia, Southern Europe, and America. Okra's peel and seed can lower blood glucose levels, making them useful in managing diabetes mellitus. They do so by inhibiting carb-breaking enzymes, increasing sensitivity to insulin, and ensuring there are sufficient insulin-producing cells in the pancreas. More insulin and fewer breakdowns of carbs to glucose mean lower blood sugar. Okra is beneficial and effective in stabilizing blood sugar due to its insulin-like property. Okra contains a type of dietary fiber, Eugenol. This helps in stabilizing blood sugar and slowing down the absorption of sugar in the intestinal tract. This comprehensive account provides a botanical description of the plant, its phytochemical constituents and pharmacological activities focusing anti-diabetic, anti-oxidant, anti-adhesive, gastro-protective, hepatoprotective, and immunomodulating actions. Most of the pharmacological effects can be explained by the constituents like tannins, terpenoids, flavonoids and glycosides present in all plant parts. However, future efforts should concentrate more on in vitro

and in vivo studies and also on clinical trials in order to confirm traditional wisdom in the light of a rational phytotherapy.

The first important step in the preparation of plant formulations is the extraction process. Some researchers have done enough to find an efficient method of extraction in order to achieve high efficiency and efficacy.<sup>11</sup> The choice of the right solvent becomes very important because if the solvent selection is not appropriate then the results obtained are little or none even obtained because the solvent is not appropriate.

#### Physical characteristics

It is an annual herb and often grows to around 2 meters tall. The leaves are long-petioles, orbicular around 10 - 20 cm long, broad and rough, palmately lobed with 5 - 7 lobes (**Figure 1**). Flowers of this plant are axillary and solitary, 4 - 8 cm in diameter having five white to yellow petals, often with a red or purple spot at the base of each petal (**Figure 2**). Fruits are elongated to 10 - 25 cm long, 1.5 - 3 cm in diameter and contain numerous seeds (Figure 1). Depending on the cultivar, its fruits are matured after 60 - 180 days of sowing. The plant requires moist and well-drained soil. It cannot grow in the shade.<sup>12, 13</sup>

#### Chemical constituents

Petals yield 13 flavonoid, glycosides; gossypetin and hibiscetin glucosides. Fresh fruits are rich in pectin and mucilage; it contains oxalic acid, protein, fat, minerals (potassium, sodium, magnesium, sulphur, copper, manganese and iodine), carbohydrate, calcium and phosphorus. Fresh fruits also contain vitamin A, thiamine, riboflavin, ascorbic acid and niacin. d-Galactose, l-rhamnose and d-dalacturonic acid also isolated from the mucilage of the fruit. Flavonoid compound has been reported from fruits. Essential oil isolated from pods and seeds contain aliphatic alcohols, cyclohexanol, p-tolualdehyde (in fruits), a-terpenylacetate (in seeds) and citral; nonvolatile neutral part contains  $\beta$ -sitosterol & its 3 $\beta$ -galactoside (in seeds). Leaves have got more or less same constituents. Ripe seeds contain 10-22% edible oil. (Anon, 1959; Asolkar *et al.*, 1992).

#### Conclusion

Regardless of the presence of antidiabetic drugs (oral antidiabetic drugs or exogenous insulin) known in the pharmaceutical market, natural resources are still regarded as potential candidates

for drug discovery and play an important role in drug development programs to treat the disease. Many traditional plants are empirically used throughout the world to treat the disease because it is considered less toxic and free from side effects than synthetic drugs. One of the plants that potentially as antidiabetic is derived from the Malvaceae family. Some researchers believe that the presence of bioactive chemicals is primarily responsible for this antidiabetic action. The effect of hypoglycemia on these plants is due to their ability to restore pancreatic tissue function by causing an increase in insulin output or decreased absorption of glucose in the intestine. This plant has been found to contain substances such as flavonoids and glycosides and others that are often considered to have antidiabetic effects. Further investigation in search of alternative treatments for diabetes mellitus from Malvaceae and other plant families will continue throughout the world as the disease poses many challenges not only to physicians but also to researchers.



Figure.1



Figure. 2

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