

Okra (*Abelmoschus esculentus* L. Moench) as a Nutraceutical - A Concise Review on Health Benefits

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ABSTRACT

Okra (*Abelmoschus esculentus* L.) is an annual vegetable crop belonging to *Malvaceae* family cultivated in tropical, subtropical, and warm temperate regions. The vegetable, ladies finger is a common in Indian kitchens and finds its place in many cuisines. Okra as a medicinal plant with useful carbohydrates, protein, fat, fiber, minerals, and vitamins and flavonoid compounds is a highly nutritive supplement. Okra is well documented in traditional medicine as a home remedy for common ailments. The vegetable is consumed in many forms like fried, boiled, and cooked. Okra water obtained by over-night soaking of sliced pod taken on empty stomach adds to all-round health, Studies suggest okra pod, seeds, leaves and roots are of medicinal value in treatment of diarrhea, hyperglycemia and dyslipidemia etc. Okra with low glycemic Index (20) and soluble fiber content is an ideal nutritive supplement to diabetics.

Keywords: Okra, *Abelmoschus esculentus* L. (Moench), medicinal value, health benefits

INTRODUCTION

Many of the plant species are well known for their medicinal properties especially vegetables across the world in multi-cuisines. Some of them are consumed raw while, some are commonly used as cooked or fried. Okra (*Abelmoschus esculentus* L.)

is an annual vegetable crop plant belonging to *Malvaceae* family. Originated in Ethiopia, okra is widely distributed and in India popular as *Bhindi* (Hindi), *Dhenras* (bengali), *Bhindo* (Gujarati), *Vendai* (Tamil), *Bendekayi* (Kannada and Telugu), *Ventaykka* (Malayalam), *Asra-patraka* (Sanskrit) (Priya Singha *et al.*, 2014). Okra is a highly useful crop with leaves, buds, flowers, pods, stems and seeds being rich in nutritive and medicinal value (Vipul *et al.*, 2024). Okra is a mine of many essential bio-active compounds (Kumar *et al.*, 2013). Presence of useful carbohydrates, proteins, fiber and minerals makes okra as a nutritive supplement. Okra pod, seed and root extracts are reported in traditional medicine. Nutraceutical value of okra can be a better exploited in dietary preparations to address many of the common ailments including Diabetes mellitus (Muhammad *et al.*, 2018; Husen *et al.*, 2020;). The paper is a concise review on the nutraceutical value of okra.

CHEMICAL AND NUTRITIONAL VALUE

Phyto-chemical, nutritional and medicinal value of *Abelmoschus esculentus* (L.) are well documented (Vipul *et al.*, 2024; Habtamu *et al.*, 2014; Amit, 2017). The potential nutritive value of okra is from the rich source for carbohydrates, minerals and vitamins (Moyin-Jesu, 2007). Okra seed is rich in protein, fat and sugar (Adelakun *et al.*, 2009). Dietary fibers are abundant (8.16 g/100 g fresh weight) in okra followed by

carbohydrates (4.86 g/100 g fresh weight) and proteins (3.55 g/100 g fresh weight) (Romdhane *et al.*, 2020). Okra pod has low fat content (0.19 g/100 g) and energy (33 kcal/100 g equivalent to 138 kJ/100 g) of okra fruits (USDA, 2019). Seed is a rich source of unsaturated fatty acids linoleic acid essential for human nutrition and a mineral mine for Ca, K, Cu, Fe, P, Mg, Zn, and Mn (Petropoulos *et al.*, 2017). Okra seed is reported to contain tannins, terpenoids and glycoside. Significant amounts of gamma-tocopherols, liposoluble pigments, and linoleic and palmitic acid are reported in seed (Honda *et al.*, 2003; Huang *et al.*, 2007; Petropoulos *et al.*, 2017). The main chemical make up of fiber is 67.5% α -cellulose, 15.4% hemicelluloses, 7.1% lignin, 3.4% pectic matter, 3.9% fatty and waxy matter (Torkpo *et al.*, 2006). Leaves are a good source of minerals and tannins (Elkhalifa *et al.*, 2021). There is no change in chemical efficacy of viscous dietary fiber even when heated (Khatun *et al.*, 2011).

OKRA USE IN TRADITIONAL MEDICINE

Different parts of okra plant are reported to be useful to correct various ailments in traditional/tribal medicine. Juice/infusion of root and leaves are good as laxative, in ulcer treatment and for hair conditioning (Barrett, 1994; Babu and Srinivasan, 1995). Flower decoction is used for bronchitis and pneumonia (Marwat *et al.*, 2011; Lim, 2012). Pod infusion is reported for its diuretic and antipyretic property and in treatment of dysentery (Maramag, 2013; Smit *et al.*, 2013) Infusion of the roasted seeds has a sudorific property, to treat diabetes mellitus and for tumor treatment (Crossley and Hilditch, 1951; Marrtin, 1982; Vaidya and Nanoti, 1989; Calisir *et al.*, 2005; Jarret *et al.*, 2011; Marwat *et al.*, 2011).

HEALTH BENEFITS OF OKRA

Health benefits of okra are mainly attributed to the bioactive compounds present in different plant parts. Different parts of okra, flowers, leaf, seed and pods are reported to

have substantial antioxidant activity (Yuan, 2012). Polyphenol, quercetin-3-O-gentiobioside the most abundant phenolic compound in okra pods acts as antioxidant by lowering the MDA level and increasing the SOD and glutathione peroxidase (GSH-Px) levels (Shen, *et al.*, 2019; Gemede *et al.*, 2015; Xia *et al.*, 2015). Rhamnogalacturonan polysaccharide is reported to prevent adhesion of *Helicobacter pylori* to human stomach tissues (Lengsfeld *et al.*, 2004; Subrahmanyam *et al.*, 2011; Messing *et al.*, 2014; Thole *et al.*, 2015) Reports based on both in vitro and clinical studies with supplementation of okra suggest reduction in blood glucose (BG), and fasting BG (FBG) (Majd *et al.*, 2018; Nguekouo *et al.*, 2018; Sabita *et al.*, 2011; Husen *et al.*, 2020; Ali *et al.*, 2022). Several studies suggest multiple mechanisms of antidiabetic property of okra like inhibition carbohydrate metabolizing enzymes, enhancement of insulin sensitivity and enhancement of insulin secretion and release (Pannerselvam *et al.*, 2011; Dubey and Mishra 2017). Rhamnogalacturonan in okra pods also, reported to mediate the anti-diabetic activity (Zhang *et al.*, 2018). Okra polysaccharides are reported to lower the body weight and decrease the total serum cholesterol level in animal model with a high-fat diet (Fan *et al.*, 2014). Arezoo (2020) reported good response on lipid profiles and glycemic indices in clinical studies with Type 2 diabetic adults. The slimy mucilage and fiber content of the okra fruit and root finds its medicinal value for diarrhea, hyperglycemia and dyslipidemia (Prabhune *et al.*, 2017). Mucilage and fiber content also, acts as anti bacterial agent and activates active bowel movements (Soma Das *et al.*, 2019). Mohammad Reza *et al.*, (2024) concluded that okra pod powder can improve serum levels of lipid profiles (TC, LDL-C, HDL-C), as well as liver transaminase among pre-diabetic individuals. Different parts of okra reported to reduce blood glucose level and glycated hemoglobin and an improvement in the lipid profile compared in alloxan-

induced diabetic rats and comparable with the metformin-positive control group (Abi *et al.*, 2017; Yaradua *et al.*, 2017). Saatchi *et al.* (2022) reported significantly lower fasting blood sugar and HbA1c in the okra group compared to the placebo group in a study with okra pod on patients with T2DM. Okra reported to promote selective antitumor effects in human breast cancer cells and in animal experiments (Pienta *et al.*, 1995; Monte *et al.*, 2013).

CONCLUSION

Okra with many bio-active compounds is not only nutritive vegetable but also, a good source for exploiting as nutraceutical diet. Bio-active compounds of okra in pod, seed, leaves and roots are helpful for overall development and good health could be an ideal nutraceutical. Okra water obtained by soaking sliced pod over-night is popular for detoxifying and good laxative. More clinical studies are needed to confirm and define the scanty information available okra as a health remedy to develop nutraceutical products.

Declaration by Author

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