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Review Article

A REVIEW ON: *ABELMOSCHUS ESCULENTUS (OKRA)*

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Abstract: Okra (*Abelmoschus esculentus* L.) is the only vegetable crop of significance in the Malvaceae family and is very popular in the Indo-Pak subcontinent. In India, it ranks number one in its consumption but its original home is Ethiopia and Sudan, and North-eastern African countries. Medicinal plants are the nature's gift to human being to have disease-free healthy life. It plays a vital role to preserve our health. In recent times, the use of herbal products has increased tremendously in the western world as well as developed countries. India is one of the most medico-culturally diverse countries in the world where the medicinal plant sector is part of a time-honoured tradition that is respected even today. Medicinal plants are believed to be safer and proved elixir in the treatment of various ailments. *Abelmoschus esculentus* (Okra) is an important medicinal plant of tropical and subtropical India. Its medicinal usage has been reported in the traditional systems of medicine such as Ayurveda, Siddha and Unani.

Key**words:** Okra, Abelmoschus esculentus, Ayurveda, Sidda, Unani.

Introduction:

Okra (*Abelmoschus esculentus*) is the only vegetable crop of significance in the Malvaceae family and is very popular in the Indo-Pak subcontinent. In India, it ranks number one in its consumption but its original home is Ethiopia and Sudan, the north-eastern African countries. It is one of the oldest cultivated crops and presently grown in many countries and is widely distributed from Africa to Asia, southern Europe and America. It is a tropical to subtropical crop and is sensitive to frost; low temperature, water logging and drought conditions, and the cultivation from different countries have certain adapted distinguishing characteristics specific to the country to which they belong[1].

It is an oligo purpose crop, but it is usually consumed for its green tender fruits as a vegetable in a 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 fibre, which is used in the paper industry[1].

Description:
Biological name:
Hibiscus esculentus, Abelmoschus esculentus.

Scientific classification:
Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
(Unranked): Rosids
Order: Malvales
Genus: Abelmoschus
Species: A.Esculentus
Binomial name: Abelmoschus esculentus

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

Figure 1: Okra plant

Chemical composition:

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. 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.

Okra Raw Nutrition Value per 100g

Energy	33kcal
carbohydrates	7.45 g (140 kj)
-sugars	1.48 g
-dietary fibers	3.2 g
fat	0.19g
protein	2g
water	90.19g
Vitamin A	36µg(7%)
Thiamine(B_1)	0.2 mg (17%)
Riboflavin(B_2)	0.06mg (5%)
Niacin (B_3)	1mg (7%0
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%)

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 .

Parts used: fruit, leave seed, root[20].

Medicinal uses:

Plants for a future cannot take any responsibility for any adverse effects from the use of plants. Always seek advice from a professional before using a plant medicinally. Antispasmodic; Demulcent; Diaphoretic; Diuretic; Emollient; Stimulant; Vulnerary. The roots are very rich in mucilage, having a strongly demulcent action. They are said by some to be better than marsh mallow (Althaea officinalis). This mucilage can be used as a plasma replacement. An infusion of the roots is used in the treatment of syphilis. The juice of the roots is used externally in Nepal to treat cuts, wounds and boils. The leaves furnish an emollient poultice. A decoction of the immature capsules is demulcent, diuretic and emollient. It is used in the treatment of catarrhal infections, dysuria and gonorrhoea. The seeds are antispasmodic, cordial and stimulant. An infusion of the roasted seeds has sudorific properties [19, 20].

Other Uses:

Fibre; Paper; A fibre obtained from the stems is used as a substitute for jute. It is also used in making paper and textiles. The fibres are about 2.4mm long. When used for paper the stems are harvested in late summer or autumn after the edible seedpods have been harvested, the leaves are removed and the stems are steamed until the fibres can be stripped off. The fibres are cooked for 2 hours with lye and then put in a ball mill for 3 hours.

The paper is Cream coloured. A decoction of the root or of the seeds is used as a size for paper [21].Used for: Sylvia Zook, a qualified nutritional specialist, states that okra can favour one's body due to its properties:

1. Okra contains special fiber which takes sugar levels in blood under control, providing sugar quantity, acceptable for the bowels.
2. Mucilage, found in okra, is responsible for washing away toxic substances and bad cholesterol, which loads the liver
3. Purgative properties okra possesses are beneficial for bowel purification. Due to okra fiber content, sufficient water levels in faces are ensured. Consequently, no discomfort and constipation bothers the patient. Wheat bran, applied for this purpose, can impose certain irritation on the bowels, while okra makes it smooth and all-convenient and safe for the user. Mucilage provides soft effect on the bowels. Stimulating bile movement, okra washes excess cholesterol and harmful substances from the body. This benefits the organism in general, as the toxins and bad cholesterol can induce various health conditions. Okra poses no threat to the organism, causes no addiction; it is completely safe and Reliable. Moreover, it contains a bunch of useful nutrients and is cheaper than chemical alternatives.
4. Fiber okra contains is a valuable nutrient for intestine microorganisms. This ensures proper intestine functionality.
5. Okra ensures recovery from psychological and mental conditions, like, depression and general weakness.
6. Okra is an effective remedy for ulcers and joint healthiness. It is used counteract the acids,
7. Due to its alkaline origin. It also guards the mucous membranes of the digestive system, by covering them with additional layer.
8. Okra is additionally applied for pulmonary inflammations, bowel irritations, and sore throat. According to Indian researches, okra is a complex replacement for human blood plasma. In order to keep the valuable substances safe, it's necessary to cook okra as shortly as possible, processing it either with steam, or on low heat. [4 17]

Production and international trade:

World production of okra (both species) as fresh fruit-vegetable is estimated at 6 million t/year. Common okra makes up 95% of this amount. It is only in West and Central Africa (accounting for about 10% of world production) that common okra and West African okra are both used. They share the market roughly fifty-fifty.[3]

Okra Distribution Through Out The World

Other botanical information:

Abelmoschus esculentus (usually 2*n* = 130) is probably an amphidiploids (allotetraploid), derived from *Abelmoschus tuberculatus* Pal & H.B.Singh (2*n* = 58), a wild species from India, and a species with 2*n* = 72 chromosomes (possibly *Abelmoschus ficulneus* (L.) Wight & Arn. ex Wight). Another edible okra species, *Abelmoschus caillei* (A.Chev.) Stevels occurs in the humid parts of West and Central Africa. There are strong indications that also *Abelmoschus caillei* is amphidiploids with *Abelmoschus esculentus* being one of the parental species.

There are no apparent differences in use between the common and West African okra, which is why they are often lumped together. Morphologically *Abelmoschus caillei* differs in several respects from *Abelmoschus esculentus*, but the epicalyx offers the best discriminating characteristic: the width of the epicalyx segments is 0.5–3 mm in *Abelmoschus esculentus* and 4–13 mm in *Abelmoschus caillei*. The two okra species can be quite reliably (but not with absolute certainty) recognized on the basis of fruit form.

Fruits of *Abelmoschus esculentus* are cylindrical to pyramidal, whereas fruits of *Abelmoschus caillei* are ovoid. Literature references on common okra have to be interpreted with care because they may include information related to *Abelmoschus caillei*. There are many cultivars of common okra. Some of the better known are 'Clemson Spineless', 'Indiana', 'Emerald' (United States) and 'Pusa Sawani' (India), which have been in use for about 30 years[3].

Diseases and pests:

The most serious fungal diseases of okra in Africa are damping-off (*Macrophomina phaseolina, Pythium aphanidermatum, and Rhizoctonia solani*), vascular wilt (*Fusarium oxysporum*), Cercospora blight (*Cercospora Abelmoschus, Cercospora malayensis*) and powdery mildew (*Erysiphe cichoracearum, Oidium abelmoschi*). Okra mosaic virus (OkMV), transmitted by flea beetles (*Podagrica*), is widespread in Africa but damage is much less important than that caused by okra leaf curl disease (OLCV), transmitted by whitefly (*Bemisia tabaci*). Whitefly is also the vector of yellow vein mosaic virus (BYVMV), a major cause of crop failure in Asia. These viruses can only be controlled through control of the vectors. Nematodes of the genus *Meloidogyne* constitute a major problem. Damage by nematodes is avoided by crop rotation (e.g. with cereals) and by large applications of organic manure. Important pests are fruit and stem borers (*Earias* spp. and *Heliothis* spp., *Pectinophora gossypiella*), flea beetles (*Podagrica* spp.) and jassids (*Empoasca* spp.). Chemical control is hazardous because crop harvesting is frequent. Common okra is in general more seriously affected by diseases and pests than West African okra[3 16 14 13].

Yield:

A vegetable yield of 10 t/ha can be considered a good harvest, but yields of over 40 t/ha can be realized under optimal conditions. Yields are usually low (2–4 t/ha) as a result of non-intensive growing methods. Seed yields are in the range of 500–1000 kg/ha[3].

Conclusion:

The okra fiber posses an excellent quantity of cellulose. Hence it can be used as cellulosic raw materials in cellulose based industries. It also contains low percentage of lignin, which is responsible for yellowing and photochemical degradation. it is a high molecular weight compounds. So it has some developed properties like colour fastness, tensile strength etc. in Philippines OBF is used as textile fiber. It is also having excellent anti oxidant activity and memory enhancement activity.

If we collect and properly use the okra bast by isolating fiber from it then a good prospect must be await for our country. And also we can use this extract as a good medicine for alzhemeirs disease.

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