International Journal of Herbal Medicine
Available online at www.florajournal.com

I J H M International Journal of Herbal Medicine

E-ISSN: 2321-2187
P-ISSN: 2394-0514
IJHM 2015; 3(2): 07-09
Received: 06-04-2015
Accepted: 09-05-2015

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Edible flowers of India with multiple medicinal uses: An Overview

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Abstract
India is a reach source of edible flowers in which three have an impressive range of medicinal uses with high nutritional value. These three flowers are *Moringa olifera, Sesbania grandiflora* and *Squash blossoms.* Flowers of *M. olifera* is very important for medicinal value such as Hepatoprotective, anti-inflammatory, hysteria, lower of serum cholesterol, phospholipid, Triglyceride etc. Flower extract of *Sesbanis grandiflora* is used to heal wrinkles, sight weakness and also promoting vision. It is also used in leucorrhoea and all types of fever. *Squash blossoms* or Pumkin flowers is generally used to stop the growth or problems with osteoporosis. This review focuses on the phytochemical composition, medicinal uses along with pharmacological aspects of these flowers.

Keywords: *Moringa olifera*, sesbania grandiflora, squash blossom, phytochemical composition, medicinal uses, pharmacological aspects.

1. Introduction
The plant *Moringa oleifera* belongs the family *Moringaceae*. Its flowering phenology varies widely among varities and with location. Trees may flower once in a year between the month of April and June in seasonally cool regions such as North India, twice in a year South India, or year-round in locals with more constant seasonal temperature and rainfall regimes. The fragrant, bi- sextual, yellowish-white flowers are brone on slender, hairy stalks in spreading or drooping latral flower clusters 10 to 25 cm long and 2 cm broad five unequal yellowish-white, thinly veined petals [1, 6] (Fig 1). *Sesbania grandiflora* is an important agroforestry species belongs to the family *Leguminosea* and therefore they have the ability to provide soil through the fixation Atmospheric nitrogen [2]. The plant (*Sesbania grandiflora*) is known as Agastya or Agasti because it blossoms at the time when the star Agastya appears in sky (in autum0 and also eliminates toxins. It bears flowers fastly (shighra puspa) which are curved (vakrapuspa) [3]. (Fig. 2).

Fig 1:

Fig 2:

Flower clustures hanging at leaf base have 2-5 large or giant flowers. Pink, red or white, pea like, 5-10 cm in length, curved about 3 cm wide before opening [4]. According to Ayurveda this plant is divided into four categories on the basis of its colour. Shweta (white), peeta (yellow), Nila (blue), Rakt (red). Commonly red or white flowered plants are found in India [5]. Pumkins are members of the geneus curcubita of the family *Cucurbitaceae*. The mpkins flowers are unisexual, with male and female flowers usually on different plants (dioecious),

or less common on the same plant (monoecious). Pumkins are monoecious, having both male and female flowers. The male flowers are on erect stem that is fairly thin, and shoots up several inches above the vine. The center stamen contains the pollen (Fig. 3a). The female flowers are distinguished by small overy at the base of the petals Fig.3b). These bright and coloureful flowers have extremely short life spans and may only open for as short a time as one day [17].

Fig 3a:

Fig 3b:

2. Phytochemical constituents

Flowers of *Moringa oleifera* contain nine amino acids, sucrose, D- glucose, traces of alkaloids, wax, quercetin, isoquercetin, kaempferat kaempherol and kaempferitrin [8]. The ash is rich in potassium and calcium [7]. The aqueous extract of the mature flowrs contains free natural sugars, D-manose and D-glucosein the ratio of 1:5 and two un identified carbohydrate bearing materials along with protines and ascorbic acid of the above materials with varying proportion. It also contains polysaccharides which on hydrolysis gives D-glucose, Ggalactose and D-glucuronic acid in a molar ratio 1:1.9:0.9. [9]. *Sesbania grandiflora* Lin. flower contains proteins, tannins, oleanolic acid, keampferol, grundifloral, cystine, isolucineaspargine, phenylalanine, valine, nicotinic acid, vitamin C. [10]. Oleanolic acid and its methyl ester and kaemferol-3-rutinoside are the major chemical constituents of this flower [11]. Flowers of *Sesbania grandiflora* also contain cyaniding and delphinidin gluocosdes [12]. Squash blossoms or pumkin flowers have abundant amount of water and little amount of fat. They are rich in Calcium, Phosphorus, Iron and especially high in vitamin A and C. More over in pumkin flowers folic acid levels are much higher [13]. Pmkin flower is also a source of protein. Glutanic and Aspeticacid, leucine, valine, phenylalanine and tryptophan are among the amino acids identified. Phytosterols such as spinasterol have also been identified [18, 19].

Composition of raw Pumpkin flowers per 100gm[13]

Composition	Amount
water	95.15gm
Calories	14 kcal
Fat	0.24 gm
Proteins	1.16 gm
Carbohydrates	3.28 gm
Fiber	0 gm
Potassium	173 mgs
Iron	0.70 mgs
Sodium	3 mgs
Magnesium	24mgs
Calcium	39 mgs
Phosphorus	49 mgs
Zinc	-
Manganese	-
Vitamin C	28 mgs
Vitamin A	195 UI
B_1 vitamin (Thianin)	0.042 mgs
B_2 vitamin (Riboflavin)	0.75 mgs
B_3 vitamin (Niacin)	0.690 mgs
B_6 vitamin (Pyridoxime)	-
Vitamin E	-
Folic acid	59 mcg

3. Medicinal uses and pharmacological aspects

Moringa oleifera has numerous medicinal uses which have long been recognized in the Ayurvedic and Unani systems of medicine. The flower of *Moringa oleifera* have high medicinal value as a stimulant, aphrodisiac, abortifacient, cholagogue used to cure inflammation, muscle diseases, hysteria, tumors and enlargement of the spleen; lower the serum cholesterol to phospholipid ratio and atherogenic index; decrease lipid profile of liver, heart aorta in hypercholesterol aemicrabbits and increased the excretion of faecal cholesterol. Pharmacological activities of *Moringa oleifera* flowers are detailed below:-

1) Flowers of *Moringa oleifera* posses Antihypertensitive, diuretic and cholesteriol lowering activity [13].
2) The aqueous and alcohol extracts from *Moringa oleifera* flowers were also found to have significant hepatoprotective effect due to the presence of quercetin, a well-known flavonoid [7].
3) Pterygospermin has powerful antibacterial and fungicidal effect on *Moringa oleifera flower* [14].
4) The flowers also are considered to be of high medicinal value with anthelmentic activity [13].
5) The methanolic extract of flower buds showed antiulcerogenic activity against aspirin induced gastric ulcer at a dosage of 4 g/kg body weight [15].
6) Hot water infusions of flowers possess antiplasmodic activity [15].

Ayurvedic properties as well as pharmacological actions of *Sesbania grandiflora* flower are stated below:- The flowers of *Sesbania grandiflora* are cooling, bitter, astringent, acrid, emollient, laxative and antipyretic. The juice of flowers is applied to eyes for checking blindness and sight weakness and also promoting vision. Flowers are use in leucorrhoea and also useful in all types of fever, periodic fever, small pox, poisoning cases, biliousness and general debility [10]. An antiageing treatment containing *Sesbania grandiflora* flower extract with heal wrinkles at the base and the surface of the skin. Increased collagen will smooth the base of the wrinkle. It also contains tannins that will pull the surface edges of the wrinkle wound together for smoother appearing similar uro-genetal complaints [10]. Sinus congestion is reduced by taking a flower decoction. The flower juice is used as nasal drops of opposite side migraine [16]. The flower of *Sesbania grandiflora* also possess antimicrobial activity due to its astringent nature [3]. mportant medicinal properties of pumkin flowers are stated below: - The pumkin flowers are rich source of calcium and phosphorus and for why it Is used to restore the growth or problems in osteoporosis [13]. Moreover it is rich in potassium which is useful in hypertension.

4. Conclusion

It is concluded that all these three flowers are very much important for their medicinal as well as nutritional value.The flowers of *Moringa oleifera* contains alkaloids, flavonoids, anthocyanins, proanthocyanidins which posses antihypertensitive and cholesterol lowering activity. The presence of quercetin well known flavonoid plays a significant

role in case of hepatoprotcetive effect. The wound healing activity of *Sesbania grandiflora* flower is remarkable due to the presence of tannin and nutritious contaent. The available literature regarding the chemical constituents and pharmacological properties of these flowers are very impressive. This review enrich our knowledge regarding the phytochemical composition as well as the therapeutic value and pharmacological aspects of these three edible flowers. If widely cultivated these edible flowers we can to derive the maximal amount of commodities of a multifarious nature for the welfare of mankind.

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