Edible flowers of India with multiple medicinal uses: An Overview

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Abstract
India is a rich 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 Sesbania 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 varieties 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-sexual, yellowish-white flowers are borne on slender, hairy stalks in spreading or drooping lateral 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 Agasty or Agasti because it blossoms at the time when the star Agasty appears in sky (in autumn) and also eliminates toxins. It bears flowers fastly (shighra puspa) which are curved (vakrapuspa) [3]. (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 (monococccous). Pumkins are monococccous, 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 ovary at the base of the petals Fig.3b). These bright and colourfull flowers have extremely short life spans and may only open for as short a time as one day [17].

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 flowers contains free natural sugars, D-mannose and D-glucose in 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, Galactose and D-glucuronic acid in a molar ratio 1:1.9:0.9. [9]. *Sesbania grandiflora* Lin. flower contains proteins, tannins, oleamonic acid, kaempferol, grandifloral, cystine, isolucineaspargine, phenylalanine, valine, nicotinic acid, vitamin C. [10]. Oleamonic acid and its methyl ester and kaempferol-3-rutinoside are the major chemical constituents of this flower. *Sesbania grandiflora* also contain cyaniding and delphinidin glucosides [12]. Squash blossoms or pumpkin 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 pumpkin flowers folic acid levels are much higher [13]. Pmkin flower is also a source of protein. Glutamic and Aspetic acid, leucine, valine, phenylalanine and trypto than are among the amino acids identified. Phytosterols such as spinasterol have also been identified [18, 19].

**Composition of raw Pumpkin flowers per 100gm**

<table>
<thead>
<tr>
<th>Composition</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>95.15gm</td>
</tr>
<tr>
<td>Calories</td>
<td>14 kcal</td>
</tr>
<tr>
<td>Fat</td>
<td>0.24 gm</td>
</tr>
<tr>
<td>Proteins</td>
<td>1.16 gm</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>3.28 gm</td>
</tr>
<tr>
<td>Fiber</td>
<td>0 gm</td>
</tr>
<tr>
<td>Potassium</td>
<td>173 mgs</td>
</tr>
<tr>
<td>Iron</td>
<td>0.70 mgs</td>
</tr>
<tr>
<td>Sodium</td>
<td>3 mgs</td>
</tr>
<tr>
<td>Magnesium</td>
<td>24 mgs</td>
</tr>
<tr>
<td>Calcium</td>
<td>39 mgs</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>49 mgs</td>
</tr>
<tr>
<td>Zinc</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>-</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>28 mgs</td>
</tr>
</tbody>
</table>

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, abortificient, chologague 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 aemricrabbits and increased the excretion of faecal cholesterol. Pharmacological activities of *Moringa oleifera* flowers are detailed below:-

1) Flowers of *Moringa oleifera* posses Antihypertensive, 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) Ptergospermin has powerful antibacterial and fungicidal effect on *Moringa oleifera* flower [14].
4) The flowers also are considered to be of high medicinal value with anhelmetic activity [13].
5) The methanolic extract of flower buds showed antilucerogenic 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 antiaging 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 urogenital 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], important 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 antihypertensive and cholesterol lowering activity. The presence of quercetin well known flavonoid plays a significant
role in case of hepatoprotective effect. The wound healing activity of *Sesbania grandiflora* flower is remarkable due to the presence of tannin and nutritious content. 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.

5. Reference

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