



BLOSSOMING WELLNESS: EXPLORING THE THERAPEUTIC POTENTIAL OF EDIBLE FLOWERS

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Abstract:

The reproductive part of plants [Flowers] have been part and parcel of human life since prehistoric times. They are the most visually appealing element of the plant, captivating with attractive harmony, colour and fragrance and are used for many purposes. It becomes part of the culinary preparation in many ways: cooking, drying, cocktails, tea, etc. They can play an important role in promoting good health and preventing various diseases. Indian history has ample evidence of the use of medicinal plants and plant parts to treat various health disorders. Ancient literature of India contains a wealth of knowledge about the medicinal uses of flowers. Flowers have a unique place in Ayurveda and have long been used to cure ailments. In addition to their taste and aesthetic appeal, edible flowers are increasingly appreciated for their potential health benefits. Many flowers contain antioxidants, vitamins, and minerals that can contribute to overall well-being. However, it is important to note that all flowers are not edible, and some may even be toxic due to some alkaloids. Therefore, it is crucial to ensure that the flowers being used are safe for consumption.

Keywords: Ayurveda, Medicinal Flowers, Therapeutic.

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INTRODUCTION:

Agriculture is the main source of food, with its rich and diverse vegetation types; it is one of the largest reservoirs of edible plants. The state's soil and climatic conditions are suitable for the reproduction, growth and survival of many plant species. According to early reports, flowers have been used in cooking since ancient times by Roman, Chinese, Middle Eastern and Indian cultures. Flowers are used for many purposes in everyday life, such as houseplants, ornaments, medicines, essential oils, and beauty products. Flowers are also a staple cuisine due to their high nutritional value. Due to their distinctive flavours, textures and colours these edible flowers have gained popularity in the culinary world. The flowers add colour and aroma to the food and increase their aesthetic appeal and acceptability. These are utilized to make beverages like herbal teas and wines and also as marinades and dressing. Flowers are consumed as petals or turned into a liquid decoction, tincture, or mixed with other components and then consumed. Flowers are utilised in a variety of formulations such as juice, powder, syrup, arka (distilled extract), fragrances, soups, and so on (Anagha et al., 2011).

More than 50,000 of the total 4, 22,000 flowering plants known from around the world are used for therapeutic purposes. More than 43% of the total blooming plants in India are thought to be medicinally important (Sanjay et al, 2006). India has a remarkably diverse flora, with approximately 17,500 blooming species, accounting for 12% of the world's documented flora. Various ethnic communities and rural folk use almost 2500 species as therapeutic plants to treat minor diseases (Trivedi, 2007). It has been reported that there are 7000 edible plant species known to mankind, but flowers of around 30 are used as food. This indicates that several plant species remain unexplored or underutilized in the hands of various human communities (Kumar et al., 2022).

These edible flowers not only add new colors, flavors and textures to kitchen, but also act as a potential source of a wide variety of bioactive chemicals such as phenols, flavonoids and pigments with very high antioxidant activity. The mineral composition of these flowers is comparable to the mineral content of fruits and vegetables. Additionally, they have many health benefits. The flowers have medicinal properties and are used in various medicines. There is a long history of using flowers in traditional medicine, including sedatives, cooling agents, tonics, aphrodisiacs, astringents, analgesics, diuretics, helminth treatments, acute and chronic tonsillitis, pharyngitis, and bronchitis as well as preventing

weakness (Chandra, 2011; Sinha et al., 2021). The use of medicinal plants is documented in ancient Indian literature. The following overview is intended to inform academics and clinicians who are actively involved in the research and practice of medicinal plants.

In modern times, the utilization of edible flowers has expanded, with chefs and home cooks incorporating them into a wide range of dishes. These blooms are often used to add a pop of color and a subtle floral essence to salads, desserts, and cocktails. Edible flowers are not only visually appealing but can also enhance the overall flavor profile of a dish, providing a unique and memorable culinary experience.

MATERIALS AND METHODS:

A meticulous and comprehensive review of the original works was undertaken to gather a deep understanding of the subject matter. To ensure a comprehensive exploration, we turned to renowned scientific databases including Google Scholar, Science Direct, and PubMed. These databases provided us with a vast collection of scholarly articles and research papers relevant to the investigation. To streamline our search, we used the name of the flower and its application in the context of health and disease as keywords. This strategic approach enabled us to focus specifically on literature and pharmacological activity, shedding light on the potential medicinal properties and therapeutic benefits associated with the flower. The process involved sifting through a substantial number of published articles, encompassing a broad range of studies and findings. Ensuring that our investigation was grounded in a solid scientific foundation. Throughout this rigorous review process, we meticulously collected data, drawing connections between the selected articles were focus of our research (Fig.1).

DISCUSSION:

Flowers are employed in flower therapy and are thought to have vibrational energy that can strengthen pleasant feelings and sensations. When discussing actual health, it is necessary to consider mental, emotional, and environmental wellness. Flowers from various families contain phenolics, flavonoids, diterpenes, triterpenoids, alkaloids, saponins, tannin, glycosides, with coloring compounds like carotenoids and anthocyanins, which are important for developing drugs in the nutraceutical industry as anti-hyperglycemic and antioxidant agents. A detailed discussion on different types of edible flowers was given below (Table 1).

Indigofera tinctoria (Girli / Jilhur phul)

For novel therapeutic medicines, *Indigofera tinctoria* flowers represent a significant source of potential bioactive components. The flowers are traditionally used as a cooling agent, tonic, aphrodisiac, astringent, demulcent, and for the treatment of helminths, acute and chronic tonsillitis, pharyngitis, as well as bronchitis (Mishra and Pradhan, 2013). They are also used as tonics, analgesics, and diuretics. The crude protein, carbohydrate, crude fiber, and ash content of this flower were calculated to be 2.63%, 23.92%, 19.65%, and 5.20%, as well as minerals such as calcium, magnesium, potassium, and phosphorus 9.38, 3.25, 1.61, and 0.25 mg/100gm respectively. Alkaloids, steroids, lipids and fixed oils, flavonoids, tannins, proteins, and carbohydrates are among the phytoconstituents found in *Indigofera tinctoria* flower (Chandra et al., 2014).

Madhuca indica (Mahua flower):

Mahua flowers have traditionally been used as a cooling agent, tonic, aphrodisiac, astringent, demulcent, and for the treatment against helminths, acute as well as chronic tonsillitis, and bronchitis. Tribal peoples utilized the flower's distilled juice as a tonic, both nourishing and refreshing purpose, and the treatment of tonsillitis, and during bronchial problems. The flowers can be used to stimulate fermentation and the production of alcohol. Flowers are used in liquor, jelly, sweet syrup and as an expectorant, to enhance milk production in women, as a stimulant, diuretic and antihelminthic. (Yosiokal et al., 1974; Ramadan et al., 2016; Abhyankar and Narayana, 1942; Manmode et al., 2012;). This flower includes almost 60% sugar and organic acids, both of which are required for candy production (Patel et al., 2010). Flowers from the Mahua plant are boiled in milk and mixed with sugar and given in a quantity of 40-50 ml to cure poor sperm count, premature ejaculation, and postpartum milk production (Neha et al., 2021). A cold infusion made from the plant's flower and bark, is taken in doses of 30-40 ml to relieve from fever, and burning sensations throughout the body (Bina et al., 2010). Mahua flowers are well known for their high quantity of reducing sugar and used as a sweetener in several regional dishes (Patel and Naik, 2008).

Crotalaria juncia (Sanai phul):

The flowers are beneficial in the treatment of gonorrhoea and blood problems. It has been reported that the ethanolic extract of the flower has potent antibacterial activity against *E. coli*, *K. pneumonia*, *P. aeruginosa*, *S. aureus*, and *V.*

chlorae. *Crotalaria juncea* exhibits significant antioxidant activity and detoxify cadmium (Cd) - induced Reactive Oxygen Species (ROS) due to the presence of steroids, triterpenes, flavonoids, phenolics and glycosides in the extracts (Chouhan and Singh, 2010). At doses of 100 and 200mg/kg, *C. juncea* significantly reduces serum total cholesterol, triglyceride, LDL, and VLDL while significantly increasing serum HDL when compared to control group of Male Wistar albino rats. The ethanolic extract of *C. Juncea* has dose-dependent antihyperlipidemic and anti-hyperglycemic action. (Oruganti et al., 2014).

Tamarindus indica (Tentuliphul):

In many countries, the leaves and flowers are combined to make curries, salads, stews, and soups, particularly during times of scarcity. Due to their sourness and distinct aroma, these are used in certain Thai culinary recipes (Zohrameena et al., 2017). The leaves and flowers are also valuable as a mordant for dyeing. As a remedy for measles, the leaves and flowers are used to create a sweetened tea that is consumed by children. A decoction of the flower blossoms is used to treat bedwetting and urinary complaints in children. The flowers are taken orally for the treatment of jaundice and applied topically to the eyes for the reduction of conjunctivitis (Kiranmai et al., 2021). *T. indica* flowers have a wide range of medicinal applications in human health care, and they are rich in vitamins B and C, which boost the immune system. Several carbohydrates, fats, proteins, tannins, acids, and minerals have been identified as having anti-diabetic, hypolipidemic, antioxidant, hepatoprotective, antimicrobial, analgesic, and anti-inflammatory properties.

Cardia obliqua (Bahal phul):

The flower has calming, antihelminthic, purgative, diuretic, expectorant, and chest, urethra, dry cough, biliousness, and chronic fever-fighting properties. According to the Unani system of medicine, it reduces thirst and the scalding of urine, removes joint pain, poor humors, and throat burning, and is also beneficial for spleen diseases (Gupta and Gupta, 2015). The raw form of buds can be consumed as a vegetable is popular a number of Indian states, notably Odisha, and contributes to their high demand. In addition to this, it is employed in the treatment of a wide range of ailments in traditional medical practices. A report on nutritional profile of flower blossoms indicated the presence of carbohydrates (38.7 mg/g), proteins (89 mg/g), fibre (127 mg/g), and vitamin C (2.5 mg/g). In addition to those elements, it also has traces of elements such as S, K, Mg, P, Mn, Ca, Fe,

Zn, Ni, and Cu. It was also discovered that the flower blossom possessed a significant amount of antioxidant activity (Naik et al., 2023).

Woodfordia fruticosa (Palasa):

Woodfordia fruticosa is a well-known medicinal plant that has been used historically to treat several ailments. This flower is used as an ointment in India and Nepal. The flower has a deep saffron shade and contains Oenothin A, Woodfordin C, Woodforin F, and Isoschimawalin A, among others. Various medicinal preparations such as treatment of gastrointestinal ailments, stimulation of probiotic bacterial growth, contain *Woodfordia fruticosa* as a major constituent. Traditional medical practitioners prescribe these formulations to treat numerous diseases. It is evident from published studies that the *Woodfordia fruticosa* plant play a crucial role in the pharmaceutical and industrial applications required to produce modern herbal formulations as it is rich in phenolic compounds (218.52 mg GAE/g of extract) (Shubha and Bhatt, 2021). The plant has numerous therapeutic and medicinal properties, including antioxidant, antidiabetic, hypertensive, antifungal, antibacterial, antitumor, antiviral, antispasmodic, and many others (Thakur et al., 2021).

Sesbania grandiflora (Agasthi phul):

The nutritional analysis carried out by Bhokre et al., 2022 showed that each 100 gm of *S. grandiflora* flower has a high level of calcium (62mg), potassium (180mg), iron (0.80mg), phosphorus (28mg), magnesium (22mg), zinc (0.30mg), and selenium (20.40 g). In addition to that the study revealed the presence of good amount of protein (1.18%), carbohydrates (5.75%), ash (1.10%), and fibre (1.60%). The phytochemical study revealed that the flower contains a greater quantity of total carotenoid (3120 g/100g), total phenolic (105 mg/100g), and total flavonoid (32.25 mg/100g). Both the flowers and the leaves of *Sesbania grandiflora* are excellent sources of vitamin A. Vitamin A is a natural antioxidant that inhibits the activity of free radicals. It plays a critical role in the improvement of the immune system, as well as vision, inflammatory processes, and the growth and development of cells. They were an excellent source of vitamin C, i.e. 60 mg/100g. It is highly important for maintaining healthy cardiovascular function and lowering the levels of free radicals in the cells, both of which contribute to an improvement in the body's ability to absorb iron. The flower has been found to have 80 micrograms of vitamin B9 per 100g (Bhokre et al., 2022).

Clitoria ternatea (Aparajita):

It is common practise to utilise the flower of the *Clitoria ternatea* (CT) plant in the treatment of respiratory conditions such as bronchitis. The *Clitoria ternatea* flower is also an ingredient in a variety of Ayurvedic formulations that are used to treat respiratory conditions. CT has antioxidant, local anesthetic, anthelmintic, antipyretic, and anti-inflammatory effects (Singh et al., 2018). The colours of the flowers of the butterfly pea can range from white to a deep blue, with a variety of tints in between. The amount of anthocyanin present and the degree of aromatic acylation are the primary contributors to this colouring. In Asia, where flower petals are used to colour teas, desserts, and garments, the deep blue pigment of *C. ternatea* has been particularly popular over the past few decades. In more recent times, floral extracts from the *C. ternatea* plant have been used to make bright blue alcoholic gins. The colour of these gins shifts depending on the pH of the solution, such as when they are mixed with tonic water or lime. Because of the potential health risks associated with synthetic blue food colorants, a natural alternative to using the dark blue colour found in *C. ternatea* blooms has become increasingly popular. According to research that was published in 2019, the addition of *C. ternatea* extracts to sponge cakes increased the amount of polyphenolic and antioxidant content in the cakes, improved the oxidative stability of patties, and decreased the predicted glycemic index of flour (Oguis et al., 2019).

Bauhinia variegata (Koinarbhum):

The flower buds of the *Bauhinia variegata* have been recognized for their therapeutic properties in various health conditions. Research conducted by Mali et al. in 2009 highlighted the multiple uses of these flower buds in treating ailments such as piles, cough, eye diseases, liver complaints, and as a styptic in haematuria and menorrhagia. Traditional medicinal practices suggest that these parts of the plant can aid in the treatment of gall bladder issues, kidney stones, and piles. The flowers are initially boiled for a certain period, after which the boiled water is discarded. Subsequently, the flowers are roasted and cooked with a small amount of oil, along with ingredients such as tomato, green chili, onion, and salt. This flavorful concoction is then consumed with rice, providing a palatable and therapeutic meal option. The combination of boiling, roasting, and cooking the flowers with complementary ingredients is believed to enhance their medicinal properties and make them more easily assimilated by the body. It is important to note that while these traditional uses and preparation methods have been documented,

further scientific research and clinical studies are necessary to validate the efficacy and safety of the *Bauhinia variegata* plant in the treatment of specific ailments (Singh et al., 2013).

***Azadiracta indica* (Neem Flower):**

Anorexia, nausea, belching, and intestinal worms can all be treated with the blooms of the neem tree. Neem flowers are recommended in Ayurvedic medicine for their ability to protect the eyes, as well as their usage in the treatment of skin diseases and headaches. Because of the relaxing impact, they have a place in aromatherapy. In traditional Chinese medicine, the flowers are used to treat congestion and reduce bile (Chaudhary et al., 2018).

***Moringa oleifera* (Drumstick Flower):**

If the fruit is a miracle, then the flower itself must also be a miracle. This flower is an excellent tonic for the reproductive system and has been shown to treat a variety of conditions, including oligospermia, infertility, and erectile dysfunction, in addition to gastrointestinal issues like colitis. This flower can be used to make chutneys, can be served alongside vegetables, or can be made using vegetables. The beverage that is made from these flowers is an all-natural way to boost healthy sexual drive, which is lacking in modern times. Drumsticks are prepared by bringing milk, cardamom powder, and sugar or jaggery to a boil, then continuously stirring the mixture while it cooks until it becomes thick (Yadav et al., 2022).

***Cucubita maxima* (Pumpkin flower):**

In Mexico, the pumpkin blossom is used to make a dish called Flores de Calabaza. In West America, it is used to make a dish called Classic Stuffed Peppers. In India, it is used to make Pakoda or Vajji. The flowers can be eaten raw in salads, cooked with other veggies, and steamed in soups. The health advantages of pumpkin blossoms are numerous, particularly due to their high vitamin B9 content. Eating pumpkin flowers is a great way to boost your immune system, get rid of viruses like the cold and flu, and minimise your risk of having a stroke. Even these flowers have the potential to enhance the quality of a sperm while also dealing with difficulties related to infertility. In addition to this, it quickens the rate at which the body absorbs iron, which allows it to be better prepared to fight off any infection that may arise. Historically, the flower was prescribed as a treatment for a variety of ailments, most notably the common cold, male infertility, eye issues, and bone development. Antioxidant defences, immune system performance, and other biological processes in the

body can all be strengthened by the flower. The overall use of the flower is to enhance the immune system of the human body (Ghosh and Rana, 2021).

***Mangifera indica* (Mango Flower):**

It's not simply the leaves that have decorative value; the mango flower itself may also be eaten. The dried flowers of the mango tree are used to make a caffeine-free floral tea. These flowers offer significant health benefits to whoever consumes them. Diabetes, conditions associated to high cholesterol, heat exhaustion, diarrhoea, and dehydration are all conditions that can be treated with the juice that is collected from mango flowers. Simply soak the mango flower in water overnight, and in the morning of the next day, filter and ingest the juice. Even this juice that has been filtered can be utilized to treat ear infections and nosebleeds. Carotenoids and Vitamin B complex, are abundant in mango flowers. These mango flowers, after being dried out and then burned, can be used as a natural mosquito repellent, which is an interesting fact (Masibo and He, 2009).

***Foeniculum vulgare* (Fennel Flower):**

The fennel blossoms lend a flavour that is exceptional and deserving to the cuisine likewise the fennel seeds. The anti-inflammatory and antibacterial qualities of fennel flowers can be found in fennel flowers. Flowers from the fennel plant can alleviate some of the discomforts associated with menstruation, boost mental health, good for breast-feeding mothers, and also fight cancer (Anka et al., 2020; Rafieian et al., 2023).

***Carica papaya* (Papaya Flower):**

The papaya plant's flowers have the most potential as a medicinal herb. It has a high concentration of all nutrients as well as antioxidants, which help protect against strokes caused by free radicals and poor blood circulation. This flower, when used to make a decoction, is beneficial for lowering insulin levels in diabetics, assisting with weight loss, and boosting metabolism (Bergonio and Perez, 2016). The floral extract in n-hexane shows highest total phenolic content and total flavonoid content and antioxidant activity using DPPH free radical scavenging assay as 0.76 ± 0.04 mg GAE/g, 1.53 ± 0.10 mg QE/g and 64.07% respectively. Antibacterial screening shows that the flower was effective against two pathogens i.e. *Escherichia coli* and *Bacillus subtilis* (Dwivedi et al., 2020).

Conclusion:

Our traditional textbooks mention many different pushpas (flowers), some of which have yet to be studied. Collaborative research is most needed to

study their botanical constituents, pharmacological properties and effects, as well as therapeutic significance. Emerging evidence suggests that extracts derived from flowers possess promising properties in reducing anxiety and pain. These preliminary findings have sparked interest among researchers, leading to a growing need for further exploration and investigation to shed light on the therapeutic potential of several significant flowers listed in traditional Ayurvedic texts such as Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhava Prakasha Naiganthu, and Pushpa Ayurveda. These ancient Ayurvedic texts hold a wealth of knowledge regarding the medicinal properties of various plants, including flowers, and their applications in healthcare. The study of medicinal flowers and its preservation serves as a pharmacological key that can unlock valuable insights for the betterment of human society.

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Table-1 List of some edible flowers used in India

Scientific Name	Local name	Family	Medicinal Aspects	Mode of preparation/use
<i>Indigofera pulchella</i>	Girli/Jilhur	Fabaceae	Prevent anaemia	Raw boiled- fried, dried form fried
<i>Madhuca indica</i>	Mahul	Sapotaceae	Cures constipation, Bowel disease, Analgesic activity and Immunomodulatory activity	Juice, jam, candy, honey and fermented liquor.
<i>Crotalaria juncia</i>	Sanai phul	Fabaceae	Prevents bleeding disorder	Raw salad
<i>Tamarindus indica</i>	Tentuli phul	Caesalpiniaceae	Prevents indigestion, hyper acidity, oedema, useful in conjunctivitis, Appetizing, urinary discharges, bad odour in perspiration	Chutney/ paste with spices
<i>Cardia oblique</i>	Bahal phul	Boraginaceae	Constipation and dysentery	Raw boiled- fried
<i>Woodfordia fruticosa</i>	Rekaiphul/palaasa	Lythraceae	Wormcidal, Antimicrobial activity, Antidiabetic, Cut wound and diarrhoea	Batter-dipped and fried
<i>Sesbania grandiflora</i>	Agasthiphul	Fabaceae	Prevent gout, headache and cough, useful in night blindness, antipyretic and antidiabetic activity	Batter-dipped and fried
<i>Clitoria ternatea</i>	Aparajita	Fabaceae	Prevent bronchitis and respiratory disorders. Act as antioxidant, local anesthetic, anthelmintic, antipyretic and anti-inflammatory	Decoction tea extract.
<i>Bauhinia variegata</i>	Koinar phul	Fabaceae	Prevents bleeding disorder	Raw fried with tomato and onion
<i>Azadiracta indica</i>	Nima phul	Meliaceae	Prevent worm infection, skin disease and snake bite	Dry-roasted or fried
<i>Moringa oleifera</i>	Sajnaphul	Moringaceae	Prevent infertility and colitis	Steamed and cooked with mustard paste
<i>Cucubita maxima</i>	Makhan phul	Cucurbitaceae	Boost immune system, Prevent infertility, cold and flu	Batter-dipped and fried
<i>Mangifera indica</i>	Amba Baula	Anacardiaceae	Antidiabetic and prevent obesity	Raw salad, Chutney/ paste with spices
<i>Foeniculum vulgare</i>	Paanamahuriphul	Apiaceae	Prevent menstrual problems, anti-cancer, improves mental health and good for lactating mothers	Raw salad
<i>Carica papaya</i>	Papaya phul	Caricaceae	Prevent stroke, obesity, and anti-diabetic	Blanched and fried with spices



Fig. 1. Various plant species of edible flowers