

Sesbania grandiflora leaves: Superfood for Upcoming Generations

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Introduction:

Agathi (*Sesbania grandiflora* L. Pers.) is a perennial fast-growing tree of the Fabaceae family and is often found in the tropical and sub-tropical regions of Asia, mostly in India, Sri Lanka, Malaysia, Indonesia and Philippines. The plant also known as Agathi, Hummingbird Tree, Vegetable Hummingbird or Agathi Keerai in South India. It has long been known for its nutritional and medicinal properties. In traditional systems of medicine such as Ayurveda, Siddha and Unani, various parts of the plant such as leaves, flowers, pods, bark and roots were used. Of these plant parts, leaves are especially important for their

excellent nutrient density and bioactive compounds that are beneficial to human health.

Agathi leaves are rich in proteins, vitamins, minerals, dietary fibre and antioxidants and possess immense potential in this regard. However, despite of these advantages, Agathi remains underutilised as compared to other leafy vegetables like spinach, fenugreek and amaranth. The promotion of Agathi leaves consumption can greatly help in improving dietary quality, nutritional security and public health in general and especially in developing countries.

Botanical Description and Cultivation



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Sesbania grandiflora is a shrub which can attain a maximum height of 10 meters. It grows in warm climates and can adapt to various types of soils. The shrub is highly adaptive, drought resistant and grows rapidly hence ideal for cultivation in both household and agricultural settings.

The leaves of this shrub are compound and pinnate; soft and green in colour. It bears large edible flowers that come in white, red or pink colours. Agathi can fix atmospheric nitrogen through symbiosis with rhizobial bacteria and can therefore serve as an effective method of increasing soil fertility in sustainable farming practices. It is economically attractive to farmers with few resources.

Nutritional Composition of Agathi Leaves

The leaves of agathi are regarded as very nutritious because they have several nutrients necessary for proper body functioning. The agathi leaves are highly packed with vitamins, minerals, protein, and fiber.

Macronutrients

The leaves are rich in proteins, making them an ideal source of proteins. Proteins play a crucial role in the growth and development of tissues, production of enzymes, and body immunity. Moreover, the leaves of Agathi are rich in carbohydrates, which are sources of energy, and fiber.

Vitamins

The Agathi leaves have very high

Composition of fresh flower and leaves

Parameter	Flower	Leaves
Moisture (%)	90.20	76.8
Protein (%)	1.18	8.25
Carbohydrate (%)	5.75	6.30
Fat (%)	0.10	1.25
Ash (%)	1.10	3.15
Fiber (%)	1.60	2.90

Mineral content of fresh flower and leaves

Mineral	Flower	Leaves
Calcium (mg/100g)	62	702
Potassium (mg/100g)	180	574
Iron (mg/100g)	0.80	2.45
Phosphorus (mg/100g)	28	48.30
Magnesium (mg/100g)	22	80.56
Zinc (mg/100g)	0.30	0.44
Selenium (µg /100g)	20.40	30

(Bhokre, Gadhe, & Joshi, 2022)

amounts of vitamin A, especially beta carotene. Vitamin A plays an important role in sustaining vision, the immune system, and epithelial cell maintenance. In addition to vitamin A, the Agathi leaves are very rich in vitamin C, which acts as a good antioxidant and promotes wound healing.

Moreover, Agathi leaves have many different types of B-complex vitamins such as thiamine, riboflavin, and niacin.

Minerals

These leaves contain high amounts of calcium, phosphorus, iron, magnesium, and potassium. Calcium and phosphorus help develop bones and teeth, whereas iron helps in producing haemoglobin, which carries oxygen in the body. Potassium plays a significant role in regulating blood pressure, while magnesium takes part in many enzymatic processes in the body.

Bioactive Compounds

The agathi leaf contains different plant chemicals like flavonoids, phenols, saponins, tannins, and alkaloids. These natural active components have antioxidants, anti-inflammatory, antimicrobial, and cytoprotective effects that lead to disease prevention and wellness.

Health Benefits of Agathi Leaves

1. **Promotes Eye Health** - The presence of vitamin A in large quantities in Agathi leaves is one of its greatest

nutritional values. The function of vitamin A is to preserve vision and protect the body from visual disorders like night blindness. The intake of Agathi leaves will enhance eye health and prevent vitamin A deficiency.

2. **Strengthens Bones and Teeth** - The leaves of agathi plant are one of the best sources of calcium and phosphorus, Both important elements necessary for the proper functioning of bones and teeth. Sufficient calcium consumption is helpful in avoiding osteoporosis and other bone problems. Consuming agathi leaves is beneficial in building up bones among children and bone health maintenance among adults.

3. **Enhances Immune Function** - Since Agathi leaves have high amounts of vitamin C, they help improve the immune system of the body. Vitamin C aids in the formation of white blood cells and makes the body stronger against any infections or attacks on the body. The antioxidants found in the leaves also help improve immunity by fighting off free radicals.

4. **Prevents Iron-Deficiency Anemia** - Iron deficiency is considered one of the commonest nutritional disorders around the world. The agathi leaves

have a high content of iron. This is because iron is necessary for the formation of haemoglobin and red blood cells. This may help reduce cases of anemia, particularly among women and children.

5. Supports Digestive Health - Fiber is an important nutrient for proper functioning of the digestive system. Agathi leaves contain adequate amounts of dietary fiber that ensure good bowel movements without getting constipated. Fiber helps grow the right kind of gut microbes that ensure good digestive health.

6. Exhibits Antioxidant Activity - Oxidative stress is related to aging and the formation of diseases like heart disease, diabetes, and cancer. Flavonoids, phenolic compounds, and Vitamin C in the leaves of Agathi have excellent antioxidant activity. They aid in scavenging the free radicals that cause cell damage due to oxidative stress. The proteins of Agathi leaf show high levels of antioxidant and cytoprotective activity.

7. Anti-inflammatory and Antimicrobial Properties - The traditional medical practice had been using agathi leaves for their anti-inflammatory properties and infection

control. Some scientific research has proven the presence of antimicrobial effects on many pathogenic micro-organisms. The presence of anti-inflammatory agents in the leaves can play a significant role in decreasing inflammation.

8. Supports Cardiovascular Health - The contribution of potassium, fibers, and antioxidants in Agathi leaves enhances cardiovascular well-being since potassium regulates blood pressure, antioxidants guard the blood vessels against oxidative damage, and fibers play an essential role in reducing cholesterol levels in the blood.

9. Potential Role in Diabetes Management - Studies have shown that there may be some phytonutrients in agathi leaves that could help in blood glucose regulation. These include the fiber which could help reduce glucose absorption rate and antioxidants that could promote metabolic well-being. Further research is still needed but the plant holds great promise for diabetic patients.

Traditional Medicinal Uses

Agathi plays a vital role in traditional medicines. In Ayurveda and Siddha medicine, the leaves of the tree are used to cure fever, coughs, digestive problems, headache, and

skin diseases. The leaves are said to be detoxifying in nature and are often taken after fasting to regulate digestion.

Role in Food and Nutrition Security

However, the problem of food and nutritional insecurity continues to be a significant issue in many developing nations. The micronutrient deficiency is one such nutritional challenge, also known as "hidden hunger," faced by many people around the world. The agathi leaves can provide an affordable and locally available food source that can help overcome such problems.

Conclusion

The Agathi leaves contain high amounts of protein, vitamins, minerals, dietary fibers, and antioxidants, which provide health benefits such as improved immunity, healthy bones, good eyesight, prevention of anemia, and protection from oxidative stress. Given their flexibility, cost-effectiveness, and high nutrient content, the Agathi leaves are an essential source for solving food and nutrition insecurity challenges.

References

1. Bhokre, C., Gadhe, K., & Joshi, A. (2022). Assessment of nutritional and phytochemical properties of *Sesbania grandiflora* flower and leaves. *The pharma innovation*, 11(6), 90-94.
2. Duke, J. A. (2002). *Handbook of medicinal herbs* (2nd ed.). Florida: CRC Press.
3. Kirtikar, K. R., & Basu, B. D. (2006). *Indian medicinal plants*. Dehradun: International book distributors.
4. Mesa, A., & Araveti, S. (2017). Functional quality, Sensorial and shelf life characteristics of agathi leaf fortified bread. *Functional Foods in Health and Disease*, 7(7), 549-563.
5. Mohiuddin, A. K. (2019). Medicinal properties of the *Sesbania grandiflora* leaves. *International healthcare research journal*, 3(6), 181-187.
6. Peter, K. V. (2008). *Underutilized and underexploited horticultural crops*. New delhi: New india publishing agency.
7. Zarena, A. S., & Sankar, K. U. (2014). Antioxidant, Antibacterial and Cytoprotective Activity of Agathi Leaf Protein from *Sesbania grandiflora*. *Food science and biotechnology*, 23(5), 1499-1507.