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## MORINGA OLIFERA (SHIGRU): A MIRACLE TREE FOR ITS NUTRITIONAL, ETHNOMEDICINAL AND THERAPEUTIC IMPORTANCE

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### ABSTRACT

Traditional medicinal plants have long been used to treat various ailments in the primary health care system. Shigru (*Moringa oleifera*) is the most widely cultivated species, fast-growing, drought-resistant, native to the southern foothills of the Himalayas in north western India, and widely cultivated in tropical and subtropical areas. It has an impressive range of medicinal uses with high nutritional value. Different parts of this plant are being employed for the treatment of different ailments in the indigenous system of medicine. The leaves are an excellent source of vitamins (especially Vitamin A, B and C), minerals (calcium, iron) and protein. The different parts of this plant are used for the cure of arthritis and joints disorders, malnutrition, blindness, diabetes, high blood pressure, anemia, urinary tract problems, kidney stones, to induce lactation in nursing women and related ailments. The various health and nutritional benefits acquired by the use of shigru have been reviewed and discussed in this article.

## INTRODUCTION

There are ample evidences of herbs being used in the treatment of diseases and for revitalising body system in almost all ancient civilizations (Sivarajan et al., 1994) In India, drugs of herbal origin have been used since ancient times in traditional systems of medicine such as Siddha and Ayurveda (Ballabh, 2007). In the last few decades there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin and lesser side effects (Brahmachari, 1992).

It has been estimated by WHO that 80% of the people living in the developing countries rely upon the traditional health practices for their primary health care needs (Austin et al., 1992). *Moringa oleifera*, Lam (*M. oleifera*) is a member of the Moringaceae family of perennial angiosperm plants, which includes 13 other species (Anwar et al., 2007). This plant is native to the Indian subcontinent and has become naturalized in the tropical and subtropical areas around the world. It can grow well in the humid tropics or hot dry lands and can survive in less fertile soils and it is also little affected by drought (Anwar et al., 2005). It is found wild and cultivated throughout the plains, especially in hedges and in house yards,

thrives best under the tropical insular climate, and is plentiful near the sandy beds of rivers and streams (Rai, 2005). It has been introduced in many parts of the world, like Afghanistan, Bangladesh, Sri Lanka, Africa, West Asia and in the Americas, from Mexico to Peru, Caribbean Islands, Paraguay and Brazil (Oliveira *et al.*, 1999). It is believed that the moringa tree originated in northern India and was being used in Indian medicine around 5, 000 years ago, and there are also accounts of it being utilized by the ancient Greeks, Romans, and Egyptians (Fahey, 2005). The plant is referred to by a number of names such as horseradish tree, drumstick tree, ben oil tree, miracle tree, and "Mother's Best Friend" (Shindano *et al.*, 2008). It is drought-tolerant, fast-growing, multi-purpose and one of most useful tree due to its medicinal and nutritional properties in world and therefore described as a 'miracle tree' (Ashfaq *et al.*, 2012).

This 'Miracle tree' is very impressive and amazing plant due to its tested, trusted and high potential benefits from nutritional and medicinal point of view (Iqbal *et al.*, 2006). The plant was introduced to Africa from India at the turn of the twentieth century where it was to be used as a health supplement (Muluvi *et al.*, 1999). The roots from young plants can also be dried and ground for use as a hot seasoning base with a flavour similar to that of horseradish. This is why the Moringa tree has been given the name "Horseradish Tree" (Delaveau *et al.*, 1980). *Moringa oleifera* is sometimes called "Mother Best Friend" and "Miracle Tree". Since 1998, the World Health Organisation (WHO) has promoted this tree as an alternative to imported food supplies to treat malnutrition in poor countries (Johnson, 2005).

In the West, one of the best known uses for Moringa is the use of powdered seeds to flocculate contaminants and purify drinking water (Wealth of India, 1962). The different parts of this plant has analgesic, diuretic, antihypertensive, antispasmodic, antitumor, anticancer, antiulcer, cholesterol lowering effect, hepato protective, and hypoglycemic effect and also effective in skin and mucosal diseases (Guevara *et al.*, 1999). Leaf extracts have been used to treat hyperthyroidism and act as an anti-Herpes Simplex Virus Type-1 (Lipipun *et al.*, 2003, Tahiliani *et al.*, 2000). The seeds of this plant show antimicrobial activity against bacteria (Eilert *et al.*, 1981) and fungus (Donli *et al.*, 2003), anti-inflammatory, antispasmodic, diuretic (Carceres *et al.*, 1992) and larvicidal activity against the mosquito that transmits dengue and yellow fever (Ferreira, 2004).

#### Scientific Classification (Wealth of India, 1948-76)

Kingdom: Plantae  
Order: Brassicales  
Family: Moringaceae  
Genus: Moringa  
Species: oleifera

#### Vernacular names

Classical Name: Shigru  
Sanskrit name: Shigru, Shobhanjana, Tikshnagandha, Mochaka.  
Hindi: Sahijan, Munaga  
English: Horse-raddish tree, Drum-stick plant  
Bengali: Shajina  
Punjabi: Sohanjana  
Gujarat: Saragavo, Sekato

**Marathi:** Shevaga, Shegata

**Telugu:** Munaga

**Malayalam:** Sahajano

**Oriya:** Sujuna

**Nepali:** Sajiwan

**Thai:** Ma rum

**Indonesian:** Kelor

#### Sanskrit Synonyms

**Shobhanjana** – Very auspicious tree

**Shigru** – has strong, piercing qualities

**Teekshnagandha** – Strong and pungent odor

**Aksheeva** – relieves intoxication

**Mochaka** – helps to cure diseases

#### Classical categorization (in Ayurveda)

##### Charaka Samhita –

**Krimighna** – group of herbs that are used to treat worm infestation.

**Svedopaga** – Ayurvedic plants that are used in Svedana (preparatory procedure for Panchakarma)

**Shirovirechanopaga** – group of herbs that are used as nasal snuff in Nasya treatment

**Katuka Skandha** – group of herbs that have pungent taste.

**Sushruta and Vagbhata** – It is categorized in Varunadi Group of herbs which are effective in urinary system. In India, around 20, 000 medicinal plants have been recorded. *Moringa oleifera* is also one of the plant in human health management. The present review reveals the medicinal profile of this important plant.

#### NUTRITIONAL IMPORTANCE

Moringa trees have been used to combat malnutrition, especially among infants and nursing mothers. Leaves can be eaten fresh, cooked, or stored as dried powder for many months without refrigeration, and reportedly without loss of nutritional value. A large number of reports on the nutritional qualities of Moringa now exist in both the scientific and the popular literature. Moringa was used extensively in Ayurveda, where virtually all parts were considered useful with a plethora of healing attributes (Hebbar *et al.*, 2014). The leaves have an extremely high nutrient value (Duke, 2014). The leaves are rich in minerals like calcium, potassium, zinc, magnesium, iron and copper (Barminas *et al.*, 1998). Vitamins like beta-carotene of vitamin A, vitamin B such as folic acid, pyridoxine and nicotinic acid, vitamin C, D and E also present in *M. Oleifera* and 10 essential amino acids (Mibikay, 2012). Moringa is rich in nutrition owing to the presence of a variety of essential phytochemicals present in its leaves, pods and seeds.

In fact, moringa leaves is said to provide 7 times more vitamin C than oranges, 10 times more vitamin A than carrots, 17 times more calcium than milk, 9 times more protein than yoghurt, 15 times more potassium than bananas and 25 times more iron than spinach (Rockwood *et al.*, 2013). This plant includes vitamin C, which effective in colds and flu; vitamin A, which is effective for eye, skin disease, heart ailments, diarrhea etc., Calcium, which builds strong bones and teeth and helps prevent osteoporosis; Potassium, which is essential

for the functioning of the brain and nerves, and Proteins, the basic building blocks of all our body cells. It contains arginine and histidine two amino acids especially important for infants. Experts tell us that 30% of children in sub Saharan Africa are protein deficient (Oliveira et al., 1999). The leaves, fruit, flowers and immature pods of this tree are used as a highly nutri-tive vegetable in many countries, particularly in India, Pakistan, Philippines, Hawaii and many parts of Africa (Anwar et al., 2003). Moringa leaves have been reported to be a rich source of  $\beta$ -carotene, protein, vitamin C, calcium and potassium and act as a good source of natural antioxidants; and thus enhance the shelf-life of fat containing foods due to the presence of various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolics and carotinoids (Dillard et al., 2000). In the Philippines, it is known as 'mother's best friend' because of its utilization to increase woman's milk production and is sometimes prescribed for anemia (Siddhuraja et al., 2003). With the leaves being rich in nutrients, pregnant women and lactating mothers use the powdered leaves to enhance their child's or children's nourishment, especially in under developed countries suffering from malnutrition (McBurney et al., 2004). The World Health Organization (WHO) has been promoting the use of this the plant to help those countries suffering from malnutrition, which is one of the major causes of death worldwide. United Nations Food and Agriculture reported that one in twelve people worldwide is malnourished, including 160 million children under the age of 5 (United Nations Food and Agriculture Statistics, 2008).

## THERAPEUTIC VALUE

Moringa tree is used as a part of diet and also as traditional medicine in India since ages. People all over the world, including traditional healers have utilized different parts of the plant as traditional medicine. The medicinal uses are numerous and have been long recognized in the Ayurvedic and Unani systems of Medicine (Kumar et al., 2010). Almost all parts of this plant: root, bark, gum, leaf, fruit (pods), flowers, seed and seed oil have been used for treating various ailments such as skin infections, inflammation, swelling, anemia, bronchitis, asthma, diarrhoea, headache, gout, joint pain, rheumatism, hysteria, cholera, heart complaints, fevers, respiratory disorders, digestive disorders, intestinal worms, and diabetes in the indigenous system of medicine (Chopra et al., 1994).

## Literature Review (As per Ayurveda)

The ancient texts like Rig Veda (4500-1600 BC) and Atharva Veda mentioned the use of several plants as medicine. The books on Ayurvedic medicine such as Charaka Samhita and Susruta Samhita refer to the use of more than 700 plants in different ailments.

*Moringa oleifera* leaves, seeds, bark, roots, sap, and flowers are widely used through different processing like juice, powder, decoction etc. in Ayurveda to cure the diseases..

**Properties of *Moringa oleifera* in Ayurveda** (Dravyaguna Vijnana, 2006).

Rasa: Katu (Kshariya), Tikta; Guna: Laghu, Ruksha, Tikshna; Virya: Ushna; Vipaka: Katu ;Doshakarma: Kaphavatashamaka. The different uses of this plant are applied

through different kalpanas (processings) which are listed below:

**In Charak Samhita (1000 BC- 4 th Cent. AD)** (Charak, 1997).

**Powder**– worm manifestation, headache (C.S.Su. 2/2)

Paste is applied locally in edema, piles and skin diseases (Ci. 14/45); edema (Ci. 12/70); ascites (Ci.13/107)

**Decoction**– Hiccough and asthma (C. S.Ci 14/45), deafness, tinnitus in Ear (C. S.Ci. 26/225), worm manifestation, skin diseases (C. S.Si. 3/60)

**Sushruta Samhita (1000 BC- 5 th Cent.AD)** (Sushruta, 1997).

Decoction- Ascites (S. S. Ci.14/13), calculus (S. S.Ci. 7/24), splenic disorder (S. S.Ci. 16/36). Local application- skin diseases, wound (S. S.Ci. 9/10), and abscess (S. S.Ci. 16/35)

As collyrium in Conjunctivitis and itching in eyes (S. S.U. 11/9)

oil- Epilepsy (S. S.U. 61/23)

**Ashtanga Hridaya (7th Cent. AD):** (Astanga Hridaya, 2011).

**Locally**- Piles (A.H.Ci. 8/23), goitre, cyst (A.H.U. 30/16)

**Kvatha**- calculus (A.H.Ci. 11/31)

oil– Ear ache, deafness, tinnitus in ear ( A.H.U. 18/23)

**Kashyapa Samhita (6-7 th Cent AD):** (Kashyap, 2010).

Decoction- Puerperal disorders. (Ka.Ci. 3/25), Sleeplessness (Ka.Khil. 4/59) Yavagu - Cough, worm manifestation (Ka.Khil. 4/83) Oil-Edema (Ka.Khil. 17/93)

**Harita Samhita (10-12th Cent AD):** (Harita, 2010).

Extract juice of leaves- Different eye diseases (H.S. 3/45/13)

Paste- worm manifestation (H.S. 3/5/30) As nasal snuff- Headache (H.S. 3/40/21)

**Sharangadhara Samhita (13 Cent. AD.):** (Tripathi, 2008).

Locally- Edema (SA.S.U.Kh. 11/3), abscess (SA.S.U.Kh. 11/93 ), goitre (SA.S.U.Kh. 11/97). Decoction-Conjunctivitis (SA.S.U.Kh. 13/17)

**Yogaratanakara (17th Cent. A.D.):** (Sastri, 2015).

Decoction- Enlargement of spleen (pg. No. 115), worm, edema, ascites (pg. No. 116), fever, abscess, edema (pg. No. 166). As vegetable-Fistula in ano ( pg. No. 199), measles, pox (pg. No. 268)

## ETHNOMEDICINAL IMPORTANCE

Almost all the parts of this plant have been used for various ailments in the indigenous medicine of South Asia, including the treatment of inflammation and infectious diseases and cardiovascular, gastrointestinal, hematological and hepatorenal disorders (Wealth of India, 1962). It is used in folk medicine in Pakistan, India, Afghanistan and Bangladesh and all over the world. Different parts and preparations of this plant have been

reported to be used in ethnomedicine for treatment of various diseases (Bakre *et al.*, 2013).

According to Hartwell (1967-1971), the leaves were used in traditional remedies for tumors (Faizi *et al.*, 1995). and extensively used as a natural sleep aid, applied as a poultice to sores, rubbed on forehead for headaches, and as a purgative cleanser (Fuglie, 1999). Moringa tree is an effective remedy for malnutrition, especially among infants and nursing mothers. Village women of southwestern Senegal were trained in the preparation and use of Moringa leaf powder in foods for development of growth and improving overall health in children, pregnant women recovered from anemia and had babies with higher birth weights and breast-feeding women increased their production of milk (Sambou, 2001). The uses of *M. oleifera* leaves in Ugandan rural communities established that the leaves are used for treatment of twenty-four medical conditions such as diabetes mellitus, malaria/fever, hypertension, syphilis and skin disease (Kasolo *et al.*, 2010).

Ethno-medicinal uses of Moringa in Nigeria as documented for curing of fever (78.7%), treatment of ear infections (71.8%), lowering of blood sugar (diabetes mellitus) (65.2%) and blood pressure (64.7%) (Farooq *et al.*, 2012). Leaves extract is drunk as diarrhoea medicine and teeth washed with root decoction as remedy for toothache by people in Nhema communal area, Zimbabwe (Maroyi, 2011). Leaves extract drunk in Digestive disorders and HIV positive patients in Zimbabwe (Monera *et al.*, 2012). The leaf of Moringa oleifera Lam. is used for treatment of diabetes in rural villages of Chuadanga district, Bangladesh (Rahman *et al.*, 2013). Moringa oil has tremendous cosmetic value and is used in body and hair care as a moisturizer and skin conditioner. Moringa oil has been used in skin preparations and ointments since Egyptian times (Fuglie *et al.*, 2001).

## Conclusion

In India, the first recorded use of plants for human welfare is seen in Veda. The Moringa oleifera Lam. is not only providing very good nutrition but also the cure and prevention of a lot of diseases in human being. Due to its multipurpose unlimited benefits for humanity, supports the fact that it is often referred to as both “miracle tree” and “gift of nature”. India could easily fight against the problems of malnutrition and diseases through plantation in unutilized areas to build up socio-economic importance. The study revealed that almost various parts of this plant have immense nutritional and medicinal importance.

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