

Value Addition in Moringa: Use, Health Benefits And Their Side Effects

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Abstract

Moringa tree is also known as the ‘miracle tree’ and there is a good reason why. The leaves, fruit, sap, oil, roots, bark, seeds, pod and flowers of the tree have medicinal properties. The products from the tree have many uses. It is also known as the ‘drumstick tree’. It is found mostly in Asia, Africa, and South America *Moringa oleifera* belonging to the monogeneric family, Moringaceae. It contains high protein content in the leaves, twigs, stems and seeds. They are an exceptionally good source of provitamin A, vitamins B and C, minerals (particularly Iron) and sulphur containing amino acids methionine and cysteine. It is commonly said that moringa leaves contain more Vitamin A than carrots, more calcium than milk, more iron than spinach, more Vitamin C than oranges, and more potassium than bananas,” and that the protein quality of Moringa leaves rivals that of milk and eggs. However, the leaves and stem of *M. oleifera* are known to have large amounts of their calcium bound in calcium oxalate crystals. This article aims to know value added products are prepared from different parts of plant for maximum utilization of available nutrients in moringa.



Introduction

Moringa oleifera is a fast-growing, drought-resistant tree of the family Moringaceae, native to the Indian subcontinent and used extensively in South and Southeast Asia. Common names include moringa, drumstick tree (from the long, slender, triangular seed-pods). It is widely cultivated for its young seed pods and



leaves, used as vegetables and for traditional herbal medicine. It is also used for water purification. Moringa is a plant native to India and other countries. It contains proteins, vitamins and minerals, making it useful to fight malnutrition. Moringa is an important food source in some parts of the world. It can be grown cheaply and easily, and retains much of its nutritional value when dried. As an antioxidant, it seems to help protect cells from damage. Moringa might also help decrease inflammation and reduce pain. Moringa is used for asthma, diabetes, breast-feeding, and many other purposes, but there is no good scientific evidence to support these uses.

1. Preparation from leaf

- **Moringa leaf powder:** The leaves after harvest should be stripped off the stems, washed and dried in shade (sunlight can destroy vitamin A). The dried leaves are made into fine powder which can be stored in an air-tight containers. Vitamin A retention is enhanced if the leaves are blanched before drying. (Subadra et al., 1997). As a nutritional additive, 2 or 3 spoonful of the powder can be added to soups or sauces. Moringa leaf powder can be stored for up to 6 months when protected from light and humidity.
- **Moringa juice:** Fresh leaves are crushed and pounded in a mortar with a small amount of water. For larger production, hammer mill is used to pound young moringa shoots (not more than 40 days old) together with little water (about one liter per 10 kg fresh material). Then it is filtered and diluted with water and sugar is added for taste. Alternatively, spoonful of more moringa leaf powder can be added to a litre of water. Then it is stirred together, strained and sugar is added. Juice or juice concentrate is stored in a refrigerator.
- **c). Moringa leaf sauce:** Two cups of fresh leaves are steamed for a few minutes in one cup of water. Chopped onions, salt, butter and any other seasonings are according to taste (Meitzner and Price, 1996).

2. Preparations from flowers

The flowers are a good source of calcium and potassium and should be cooked and consumed. Fried alone or with a batter they have a taste reminiscent of mushrooms. Moringa flowers can be mixed with any leaf recipes or steamed and eaten as a salad.

3. Preparations from pods

The entire young and pliable pod is cooked and eaten or used in the preparation of curries. In older pods which develop tough exterior, the pulp and immature seeds remain edible just before ripening begins. A dish is made by slicing pods into 5 cm lengths and boiled in water along with lentils. The flesh inside the pod sections is eaten. Alternatively, pods can be opened and the flesh and young immature seeds scraped out pods are boiled



in water for a few minutes. The seeds of edible pods should be white in color. The seeds should be scraped out with the winged shells intact and as much of the soft white flesh as possible. It is rinsed with water to remove the sticky, bitter film. It is mixed with rice or roasted or fried in oil to give a taste like sweet groundnuts. The flesh can be cut into strips and steamed or fried, used to make a soup or be added to other sauces. Salads are also prepared from moringa pods. Very young moringa pods (should be less than 1 cm thick and snap easily) are selected and they are cut into 3 cm lengths. It should be steamed for 10 minutes and then marinated in a mixture of oil, vinegar, salt, pepper, garlic and parsley. A recipe called moringa beans is prepared using very young moringa pods (should be less than 1 cm thick and snap easily). The pods are sliced into pieces of any length and steamed or boiled until tender.

4. Preparations from seeds

The seeds can be boiled for few minutes to remove the fine transparent hull and the water should be drained. Seeds should be eaten green before they change colour to yellow. The dry seeds can be ground to a powder and used for seasoning sauces.

5. Root preparations

The moringa tree has been called the “horseradish tree” because a similar-tasting condiment can be made with from its pungent roots. Even when the plant is only 60 cm tall, it can be pulled up and the roots harvested. The roots from young plants can also be dried and ground for use as a hot seasoning base with a flavour similar to horse radish. A tasty hot sauce from the roots can also be prepared by cooking them in vinegar. The root bark (which contains two alkaloids as well as the toxic moringinine) must be scraped off. The interior flesh is pounded, then mixed with salt and vinegar. However, it can be dangerous to consume the roots too often or in large amounts. Even when toxic root bark is removed, the flesh has been found to contain the alkaloid spirochin, a nerve paralyzant (Morton, 1991).

6. Moringa oil: Moringa oil is obtained by pressing the seeds. The oil content of de-hulled seed (kernel) is approximately 42 %, which is brilliant yellow coloured. It is used as a lubricant for fine machinery such as timepieces because it has little tendency to deteriorate and become rancid and sticky (Ferrao and Ferrao, 1970; Ramachandran et al., 1980). It is also useful as a vegetable cooking oil. The free fatty acid content varies from 0.5 to 3 %. Indian Ayurveda claims that moringa oil also possess antitumor, antipyretic, antiepileptic, anti-inflammatory, antiulcer, antispasmodic, diuretic, antihypertensive, cholesterol lowering, antioxidant, antibacterial and antifungal activities, and are being employed for the treatment of different ailments in the indigenous system of medicine, particularly in South Asia.

Cosmetic products

Moringa oil has tremendous cosmetic value and is used in body and hair care. Moringa oil has been used in skin preparations and ointments. It has nourishing and emollient properties, making it an excellent massage oil due to the presence of palmitoleic, oleic and linoleic acids, vitamins A and C and unsaturated fatty acid. This moringa oil is in demand because it is so stable and resistant to rancidity and it has long been valued for its enflourage property by the perfume industry. It is useful in the manufacture of perfume and hair dressings. The oil is known for its capacity to absorb and retain volatile substances and is therefore valuable in the perfume industry for stabilizing scents and the oil has been used in skin preparations and ointments since Egyptian times.

Moringa health benefits

- 1. Rich in Vitamins and Minerals:** Moringa leaves are rich in vitamins A, C, B1 (thiamin), B2 (riboflavin), B3 (niacin), B6, and Folate. They are also rich in magnesium, iron, calcium, phosphorus, and zinc. One cup of moringa leaves will contain 2 grams of protein, magnesium (8 percent of the RDA), Vitamin B6 (19 percent of the RDA), Iron (11 percent of the RDA), Riboflavin (11 percent of the RDA), and Vitamin A (9 percent of the RDA).
- 2. Rich in Amino Acids:** Moringa leaves are rich in amino acids, the building blocks of proteins. 18 types of amino acids are found in them and each of them makes an important contribution to our wellbeing.
- 3. Fight Inflammation:** Inflammation is how a body naturally responds to pain and injury. Moringa leaves are anti-inflammatory in nature due to the presence of isothiocyanates. They have niazimicin which is known to reign in the development of

cancer cells. Inflammation is the root cause of many diseases like cancer, arthritis, rheumatoid arthritis, and many autoimmune diseases. When we suffer an injury or infection, the body suffers increased inflammation. Basically, it is a protective mechanism against trauma but because of a wrong lifestyle and an unhealthy diet, inflammation can increase in the body. Long-term inflammation leads to chronic health issues. Eating moringa leaves helps to reduce inflammation.

- 4. Rich in Antioxidants:** Moringa leaves have anti-oxidative properties and protect against the damaging effects of free radicals present in the environment. The damage caused by free radicals is responsible for many chronic diseases like type 2 diabetes, heart problems, and Alzheimer's. Moringa leaves are rich in vitamin C and beta-carotene that act against free radicals. They also have Quercetin which is an antioxidant that helps to lower blood pressure. Another antioxidant that is present in moringa leaves is Chlorogenic acid which helps to stabilize blood sugar levels post meals.
- 5. Lower Blood Sugar Levels:** Sustained high blood sugar levels lead to the development of diabetes in individuals. Diabetes, in turn, can cause heart problems and organ damage in the body. To avoid this, it is good to keep the blood sugar levels in check. Moringa leaves are a perfect resource for that as they stabilize the blood sugar levels due to the presence of isothiocyanates. Regular consumption of Moringa oleifera leaves, either as whole leaves or in powdered form, can provide the essential vitamin A needed to support healthy eyes.
- 6. Lowers Cholesterol:** Apart from oats, flaxseeds and almonds, moringa leaves are a dependable remedy against high cholesterol. Cholesterol is the major reason why people suffer from heart diseases and eating moringa leaves has been known to show considerable improvement against high cholesterol levels. Moringa leaves can certainly be included in the diet for gestational diabetes.
- 7. Protects the Liver:** Those who have tuberculosis can benefit greatly from moringa leaves as they reduce the negative effects of anti-tubercular drugs. The leaves accelerate the repair of the liver cells. The leaves have a high concentration of polyphenols that protect against oxidative damage to the liver and may even reduce it. They increase the protein levels in the liver. The liver is the site of blood detoxification, fat metabolism,

and nutrient absorption and it can function properly only if the liver enzymes are normal. Moringa leaves stabilize these liver enzymes.

- 8. Protects Against Arsenic Toxicity:** In many parts of the world, arsenic contamination is a common problem. Arsenic has found its way in our systems through many food items, particularly rice. Long-term exposure to this element can lead to the development of cancer and heart disease. Research on lab animals has shown that moringa leaves combat the effects of arsenic toxicity.
- 9. Good for the Stomach:** Moringa leaves are beneficial against digestive disorders. Those who suffer from constipation, bloating, gas, gastritis, and ulcerative colitis should add Moringa leaves to their diet. The leaves have antibiotic and antimicrobial properties which make them an ideal remedy against digestive disorders. Even the high amount of B vitamins in the leaves helps in improving digestion.
- 10. Improves Bone Health:** Moringa leaves are rich sources of calcium and phosphorus. Both of these elements are needed for good bone health. Since moringa leaves have an anti-inflammatory nature, they help combat arthritis and may even heal bones that are damaged. Moringa oleifera also fights against osteoporosis and keeps bones and teeth strong
- 11. An Antiseptic:** Moringa leaves are antiseptic and fight off many bacterial infections. They are even beneficial towards wound healing and help to heal bruises, minor cuts, and burns quickly as they reduce the clotting time.
- 12. Improve Lactation:** In traditional Ayurvedic medicine, moringa leaves were used to increase lactation in nursing mothers. Since they are a rich source of protein, important vitamins, and essential nutrients, consuming moringa leaves is very good for the health of the mother and the baby.
- 13. Helps in Weight Management:** Moringa leaves increase fat burning in the body. They slim down the person without depleting energy reserves. This keeps the person feeling buoyant and nourished. They reduce cravings for food and boost metabolism. They also lower cholesterol.
- 14. Good for Skin and Hair:** Due to an abundance of antioxidants and nutrients, moringa leaves improve the health and appearance of skin and hair. They add suppleness to the skin and shine to the hair. The antioxidants present in moringa leaves reduce the

appearance of fine lines and wrinkles on the skin. They have about 30 antioxidants present. Not just this, a paste of moringa leaves for hair. When applied to the scalp reduces dandruff and adds life and bounce to dull, lifeless hair. The leaves also strengthen the hair follicles. Moringa leaves for skin also have proven to be beneficial for acne-prone skin, however, more research is required. This is why moringa leaves are part of many cosmetics. They improve the skin tone and add a glow due to their purifying nature and therapeutic properties.

15. Good for Nervous System: Many nervous disorders have been known to show positive results with the moringa leaves uses. They support brain health and work as neuro-enhancers. The high concentration of vitamins E and C combat neural degeneration and help improve brain function. Those who have a migraine or suffer from recurring headaches must eat moringa leaves regularly. These leaves also work as mood balancers as they stabilize the production of neurotransmitters like serotonin, dopamine, and noradrenaline which are important for memory, mood, and for stimulus-response.

16. Good for Detoxification: Moringa leaves are natural cleansers and help to detoxify the system. This helps to keep the body and increases immunity against various infections. They also increase the energy levels in the body.

Side Effects

Moringa leaves, seeds, pods, flowers are perfectly safe for consumption, however, large quantities of pod and seeds may exhibit certain side effects.

- Moringa roots and root extracts are unsafe when taken by mouth as the root contain spirochin a toxic substance.
- Eating drumsticks in huge amounts may lower blood pressure and slow heart rate due to an abundance of alkaloids.
- Consuming the bark of drumstick may induce uterine contraction.
- It also not advisable to take drumstick with thyroid medication.
- Moringa in large amounts might also interfere with blood sugar level, hence watch for any symptom of hypoglycaemia.
- Moreover, it is not recommended to take drumstick supplements with hypertensive drugs as it may lower blood pressure.

Conclusion:

Moringa value added products provide a powerful punch of nutrition and have an anti-inflammatory nature. Their antioxidative properties combined with their cellular-health protective properties make them a new ‘Superfood’. They suppress the production of inflammatory enzymes and lower sugar levels. Make these a regular part of your diet to reap rich health benefits. However, large quantities of pod and seeds may exhibit certain side effects.

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