



Health benefits of moringa oleifera (Drumstick)

Sayali Surve , Ankita Khopade , Ragini Salunke

Navashydari institute of Pharmacy , Naigaon , Pune Tal Bhone-412213

Abstract

A significant crop in Asia and Africa is Moringa Oleifera (MO), a member of the Moringaceae family of plants. Because MO is found in substantial quantities in a variety of plant components, including vitamins, phenolic acids, flavonoids, isothiocyanates, tannins, and saponins, it has been investigated for its potential health benefits. The most extensively researched leaves of the Moringa oleifera plant have been found to be effective in treating a number of chronic illnesses, such as cancer, non-alcoholic liver disease, diabetes, high blood pressure, hypercholesterolemia, insulin resistance, and general inflammation. In this review, we summarize the positive outcomes that have been documented for the treatment and prevention of these long-term illnesses in a variety of animal models and in cell research. Additionally discussed is the scant data that is currently available on human research with Moringa oleifera leaves. Overall, the benefits of Moringa oleifera leaves for illnesses like cancer, diabetes, heart disease, and fatty liver have been extensively studied.

Keywords

Moringa oleifera, medicinal use, antitumor, antioxidant, anti-inflammatory.

INTRODUCTION

Drumstick (moringa oleifera) is a multipurpose tree belonging to family moringaceae. the tree is mainly native to Sub Himalayan region of north India. But also grown all over the India because they rich source of protein, vitamins and minerals.

(1)

Protein	6.7 gm
Vitamin c	220 mg
Iron (Fe)	7 mg
Calcium (Ca)	440 mg

The moringa pods (drumstick) production in India is 1.1 to 1.3 million tonnes which is largest in the world. The largest producer and the largest area both are in Andhra Pradesh followed by Karnataka and Tamil Nadu. It is a continual plant and the pod production can be started after one year. In the first year of cultivation moringa pods are readily edible, but in the

successive year's moringa also bear nonedible bitter pods. It is commercially cultivated plant having big advantages and medicinal values, and therefore now a day it is cultivated under Agroforestry . (2)

History

Moringa tree is known from 150 B.C. Uses of moringa pods as a vegetable by ancient king and queens to make their skin beautiful. Studies have revealed that there is evidence of Moringa consumption in eighty countries and is known in 200 languages. Not only in India, Moringa is widely used in other cultures like Roman, Greek, Egyptian etc. In ancient times there is reference that the Maurian warriors of India were given the Drumstick leaf juice also known as the Elixer drink. They believed that this juice adds extra energy and is a stress releaser along with a pain reliever which was occurred during the war. (3)

Description of drumstick

- Taxonomic classification of moringa oleifera (4)

Kingdom	Plantae
Subkingdom	Tracheobionta
Super division	Supermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Dileniidae
Order	Capparales
Family	Moringaceae
Genus	Moringa
Species	Oleifera

Medicinal use :

1) moringa oleifera leaves

Moringa oleifera leaves treat or prevent mala nutrition.(5) It has been observed that flavonoids including kaempferol and quercetin are the main bioactive components of the phenolic groups found in drumstick leaves . According to reports, clarified butter is prepared in South India using drumstick leaves to extend the product's shelf life. Drumstick leaves include antioxidant chemicals that may contribute to this extension of the clarified butter's shelf life. (6)

Chronic disease

1) hypolipidemic effect

Moringa oleifera leaves have a wide range of bioactive substances that may affect lipid balance. Flavonoids and phenolic chemicals both have significant roles in the control of lipids. They contribute to the reduction and delay of cholesterol by inhibiting the activity of pancreatic cholesterol esterase. binding and absorbing bile acids, creating insoluble complexes, and accelerating their elimination in the feces, which lowers plasma cholesterol levels. (7)

2) Antihypertensive effect

Blood pressure is found to stabilize after drinking moringa leaf juice (The Wealth of India, 1962; Dahot, 1988). blood pressure-lowering action of Moringa leaves was caused by mustard oil glycosides and thiocarbamate glycosides, which were extracted from the plant (Faizi et al., 1994a; 1994b; 1995). The majority of these substances are completely acetylated glycosides, which are extremely uncommon in nature and contain thiocarbamate, carbamate, or nitrile groups (Faizi et al., 1995). Four pure compounds, niazinin A , niazinin B , niazimicin , and niazinin A + B, were isolated from the active ethanol extract of Moringa leaves using bioassay-guided fractionation. These compounds demonstrated a lowering effect on blood pressure in rats, possibly via a calcium antagonist effect (Gilani).(8)

3) anti -tumor and anti -cancer effect

Moringa leaves were discovered to be a possible source of anticancer action by Makonnen et al. [1997]. [α -L-rhamnosyloxy] benzyl carbamate, O-Ethyl-4 in addition to 3-O-[6'-O-oleoyl- α -D-glucopyranosyl], niazimicin, and 4[α -L-rhamnosyloxy]-benzyl isothiocyanateAn in vitro assay was used to assess β -sitosterol's potential antitumor promoting action, and the results demonstrated a strong inhibitory effect on the Epstein-Barr virus early antigen. It has been suggested that niazimicin is a powerful chemopreventive agent in chemical carcinogenesis. (9) the anticancer activity of moringa olifera leaves is observed showed a reduction of Hela cancer cell viability. (10)

4) Anti -inflammatory and immunomodulatory effect

In immunodeficient mice produced by cyclophosphamide, extracts from MO leaves enhanced both cellular and humoral immune responses by increasing the percentage of neutrophils, white blood cells, and serum immunoglobulins. (11) Tobacco smoke and lipopolysaccharide (LPS) both stimulated the synthesis of human macrophage cytokines, such as tumor necrosis factor alpha (TNF- α), interleukin-6 (IL-6), and IL-8, which were reduced by the extract of MO leaves. (12)



Fig no. 1 Moringa oleifera leaves

2) moringa oleifera roots use

1) antispasmodic, anticancer activity

Moringa oleifera roots used as antispasmodic activity (13). The antiplasmodic effect give when the calcium channel bloked (14) the effects of plant root sections on sensitive and resistant colorectal malignant cells, as well as their ability to combat various cancer kinds. (15)

2) antibacterial and antifungal activity

The roots of moringa oleifera also gives the antibacterial activity. (16) are said to be abundant in antibacterial substances. According to reports, these include pterygospermin, an active antibiotic principle with potent antimicrobial and antifungal properties. (17) Moreover, the root extract has antibacterial properties since it contains 4- α -L-rhamnosyloxybenzyl isothiocyanate. (18)

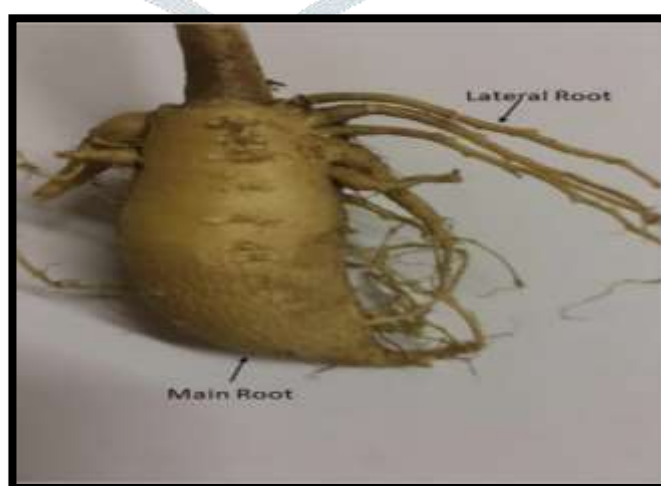


Fig. no. 2 moringa oleifera roots

3) moringa oleifera seeds use

1) moringa oleifera seeds as coagulant

The moringa oleifera seeds best natural coagulant (19) the crushed seeds mainly replaced synthetic coagulant (20) M. oleifera's ability to coagulate varies with the initial turbidity; it has been suggested that M. oleifera could lessen the turbidity by 92% to 99% (21)

2) moringa seeds biosorbents

A less costly biosorbent for removing cadmium [Cd] from aqueous medium would be moringa seeds. (22) The aqueous solution of Moringa seed is a heterogeneous complex mixture is functional groups, mainly low molecular weight organic acids. (23)

3) anti – fibrotic

Now a days that moringa oleifera seeds extract exhibited anti fibrotic effect on liver fibrosis in rats (hamza ,2010) , showed protective effect against CCl₄ induced liver fibrosis in rats . Moringa was found to stimulate hepatoprotective effects against hepatocellular injury by blocking the increase of two serums, aspartate aminotransferase (AST) and alanine aminotransferase (ALT), which are indicators of liver health conditions. (24)

4) anti hyperglycemic effects

The anti -hyperglycemic effect on seeds due to the presence of terpenoids, which appears the stimulation of the beta cell and subsequent secretion of preformed insulin. (25)



Fig. no.3 Moringa oleifera seeds

Conclusion

Some people utilize the leaves, root, and seeds of Moringa oleifera to treat and prevent malnutrition, but it is also used to treat common medical ailments. Existence of Phytochemicals suggest that M. oleifera leaves, root, seeds may have therapeutic and preventative qualities. Further pharmacological research is required to bolster M. oleifera's potential utility as a therapeutic herb.

References

- 1) Dr. L. Rajamony, Dr. I. sreelathakumary, Dr. K. B. Soni. characterisation of landraces of drumstick (*Moringa oleifera* lam.). Department of olericulture, faculty of agriculture kerala agriculture university, Thrissur ,2004.
- 2) – Ruchita Haldar, Sharda Kosankar, *moringa oleifera* : the miracle tree, international journal of advance research , ideas and innovation in technology ISSN:2454 -134X , volume 3 , issue 6 page no 966
- 3) Ruchita Haldar, Sharda Kosankar, *moringa oleifera* : the miracle tree, international journal of advance research , ideas and innovation in technology ISSN:2454 -134X , volume 3 , issue 6 page no 967.
- 4) Nishant kumar, sunil pareek , Pratibha , bioactive compounds of *moringa* species , chapter January 2021, page no 2.
- 5) Josephine N. kasola, Gabriel s. Bimenya, lonzy ojok, joseph Ochieng, and josper w. ogwal okeng , phytochemicals and use of *moringa* leaves in Ugandan rural communities , journal of medicinal plant research vol . 4 (9) , 4 may 2010 .
- 6) saeedh arabshahi – delouee , Mehran aalami , asna urooj , drumstick (*moringa oleifera*) leaves : potential source of natural lipid and antioxidant , accepted for publication august 17 , 2009
- 7) marcela Vergara – jimenez , manal mused almatafi , maria luz fenandez , bioactive components in *moringa oleifera* leaves protect against chronic disease , received 20 october 2017 , accepted 15 november 2017 , published 16 November 2017.
- 8)Farooq anwar , sajid Latif , Muhammad ashraf , and anwarul hassan Gilani , *moringa oleifera*: a food plant with multiple medicinal use, *phytother Res.* 21, 17 – 25 (2007) published 6 November 2006 in wiley inter science page no :20
- 9) p. Sudhir kumar , debasis Mishra , goutam ghosh , Chandra s. panda , medicinal use of pharmacological properties of *moringa oleifera* , international journal of phytomedicine 2 (2010) , page no 212.
- 10) Muhammad Zahid Mumtaz, fareeda Kausar, Mubashir hassan , shaisita Javaid , arif malik ,research of anticancer activity of phenolic compounds from *moringa oleifera* leaves :in vitro and silico mechanistic study page no. 7 .
- 11) Sudha p., asdeq s.m., dhaminigi s.s , Chandrakala , G. K. immunomodulatory activity of methanolic leaf extract *moringa oleifera* in animals . *Indian j. physiol . pharmacol* 2010, 54, 133 - 140
- 12) Kooltheat, N.; Sranujit, R.P.; Chumark, P.; Potup, P.; Laytragoon-Lewin, N.; Usuwanthim, K. An ethyl acetate fraction of *Moringa oleifera* Lam. Inhibits human macrophage cytokine production induced by cigarette smoke. *Nutrients* 2014, 6, 697–710.
- 13) Gilani AH, Aftab K, Shaheen F et al. 1992. Antispasmodic activity of active principle from *Moringa oleifera*. In *Natural Drugs and the Digestive Tract*, Capasso F, Mascolo N [eds]. EMSI: Rome, 60–63.
- 14) p . Sudhir kumar , debasis Mishra , goutam ghosh , Chandra s. panda , medicinal use of pharmacological properties of *moringa oleifera* , international journal of phytomedicine 2 (2010) , page no 211.
- 15) Ahmed a abd- rabou , Aboelfetoh M . Abdalla , Naglaa A.Aali and khiairy MA zoheir , *moringa oleifera* roots induced cancer apoptosis more effectively then leaves nanocomposites and its free counterpart , *Asian pacific journal of cancer prevention* 2017, 18 (8) 2141-2149 .
- 16) Rao VA, Devi PU, Kamath R. 2001. In vivo radioprotective effect of *Moringa*.
- 17) Das BR, Kurup PA, Rao PL, Narasimha Rao PL. 1957. Antibiotic principle from *Moringa pterygosperma*. VII. Antibacterial activity and chemical structure of compounds related to pterygospermin. *Indian J Med Res* 45: 191–196.
- 18) Eilert U, Wolters B, Nadrtdt A. 1981. The antibiotic principle of seeds of *Moringa oleifera* and *Moringa stenopetala*. *PlantaMed* 42: 55–61.
- 19) Ndabigengesere A, Narasiah KS, Talbot BG. 1995. Active agents and mechanism of coagulation of turbid waters using *Moringa oleifera*. *Water Res* 29: 703–710.
- 20) Kalogo Y, Rosillon F, Hammes F, Verstraete W. 2000. Effect of a water extract of *Moringa oleifera* seeds on the hydrolytic microbial species diversity of a UASB reactor treating domestic wastewater. *Lett Appl Microbiol* 31: 259–264.

- 21) Muyibi SA, Evison LM. 1995b. Optimizing physical parameters affecting coagulation of turbid water with *Moringa oleifera* seeds. *Water Res* 29: 2689–2695.
- 22) Sharma P, Kumari P, Srivastava MM, Srivastava S. 2006. Removal of cadmium from aqueous system by shelled *Moringa oleifera* Lam. seed powder. *Bioresour Technol* 97: 299–305.
- 23) Brostlap AC, Schuurmans J. 1988. Kinetics of valine uptake in tobacco leaf disc. Comparison of wild types the digenic mutant and its monogenic derivatives. *Planta* 176: 42- 50
- 24) Ahmad Faizal abdull razis , Muhammad din Ibrahim , saie brindha kntayya , mini review of health benefits of moringa oleifera , page no 8572 .
- 25) Ahmad Faizal abdull razis , Muhammad din Ibrahim , saie brindha kntayya , mini review of health benefits of moringa oleifera , page no 8573

