A review on *Moringa oleifera* as an Important Medicinal Plant

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Abstract:

Moringa oleifera, native to India, grows in the tropical and subtropical regions of the world. It is commonly known as 'drumstick tree' or 'horseradish tree'. Moringa can withstand both severe drought and mild frost conditions and hence widely cultivated across the world. With its highnutritive values, every part of the tree is suitable for either nutritional or commercial purposes. The leaves are rich in minerals, vitamins and other essential phytochemicals. Extracts from the leaves are used to treat malnutrition, augment breast milk in lactating mothers. It is used as potential antioxidant, anticancer, anti-inflammatory, antidiabetic and antimicrobial agent. *Moringa oleifera* seed, a natural coagulant is extensively used in water treatment. The scientific effort of this research provides insights on the use of Moringa as a cure for diabetes and cancer and fortification of moringain commercial products. This review explores the use of Moringa across disciplines for its medicinal value and deals with cultivation, nutrition, commercial and prominent pharmacological properties of this "Miracle Tree".

Key words: *Moringa oleifera*, Antimicrobial Agent, Phytochemicals

Introduction:

Moringa oleifera is one of the species of family Moringaceae. *Moringa oleifera* has been naturalized in many tropic and subtropics regions worldwide, the plant is referred to number of names such as horseradish tree, drumstick tree, Ben oil tree, miracle tree, and "Mothers best friend". *Moringa oleifera* is commonly known as "Drumstick". It is a small or medium sized tree, about 10m height, found in the sub-Himalayan tract. *Moringa oleifera* is a small, fast-growing evergreen or deciduous tree that usually grows up to 10 to 12m in its height, open crown of drooping fragile branches, feathery foliage of trip innate leaves and thick corky, whitish bark. The *Moringa* plant provides a rich and rare combination of zeatin, quercetin, kaempferom and many other phytochemicals . The leaves are outstanding as a source of vitamins A when raw as a source of vitamin C. They are also good sources of vitamin B and are among the best plant sources of minerals. Ethanolic extract of *Moringa oleifera* leaves contain niazirin, niazirinin, niazininins A and B .Benzoic acid, Gallic acid, beta benzaldehyde have been isolated from methanolic extract of *Moringa oleifera* leaves .Leaves of this plant are reported to possess various biological activities, including hypocholesterolemic, antidiabetic, hypertensive agent and regulate thyroid hormone, central nervous system, digestive system, nutrition and metabolism eye, ear nose throat genito-urinary system , to treat gastric ulcers and scurvy . Reports have also described the plant to be highly potent anti-inflammatory agent and antitumor activity. The plant has also been reported to be hepato

protective against antitubercular drug such as isoniazid and rifampicin. Moringa oleifera is also being studied for its antiinflammatory, antimicrobial, diuretic , antibiotic , hypotensive and antimicrobial properties . An immune enhancing polysaccharide and niaziminin, having structural requirement to inhibit tumour promoter induced Epstein Barr virus activation have been reported from the leaves. The alcoholic extract of leaves of *Moringa oleifera* were reported to have analgesic activity. Traditionally, the plant is used as antispasmodic, stimulant, expectorant and diuretic. *Moringa oleifera* is used as drug many ayurvedic practitioners for the treatment of asthma and evaluate the anthelmintic activity of methanolic extract of *Moringa oleifera* in adult Indian earthworms pheretima posithuma at different dose (pinal patel *et al*., 2014).

Classification of *Moringa oleifera*:

Kingdom: Plantae

Divison: Angiosperm

Class: Dicotyledons

Subclass: Polypetalae

Series: Disciflorae

Order: Sapindales

Family: Moringaceae

Genus: *Moringa*

Species: *oleifera* (According to Bentham and Hoocker)

Pharmacological effects of *Moringa oleifera*:

Antioxidant activity: Aqueous and alcoholic extracts (methanolic & Ethanolic) of leaves and roots of *Moringa Oleifera* exhibit strong in-vitro anti-oxidant and radical scavenging activity. Its leaves are rich source of antioxi-dant compounds; they could protect the animals against diseases induced by oxidative stress. Administration Moringa oleifera leaves extract seems to prevent oxidative damage caused by high-fat diet (Sharma *et al.,* 2011).

Antiepileptic activity: Methanolic extract of *Moringa oleifera* leaves exhibit potent anti-convulsant activity against pentylenetetrazole and maximal electroshock induced convulsions at the dose levels of 200 mg/kg and 400 mg/kg administered in traperitonially. Diazepam and phenytoin were used as reference standard. Methanolic extract sig nificantly delayed the onset of seizures in Ptz induced con- vulsions and significantly reduced duration of hind limb extension in MES test at both the dose levels. This may be because of the presence of alkaloids, flavonoids and tannins present in the extract (Amrutia J *et al.,* 2011).

Anti-diabetic activity: Aqueous extract of Moringa oleifera leaves shows anti-diabetic activity and controls diabetes and thus exhibit glycemic control (Ndong M *et al.,* 2007).

Anti-fertility activity: Aqueous extract of Moringa oleifera roots was found to be effective as anti-fertility in presence or absence of estradiol dipropionate and progesterone. The in-vivo antifertility activity and histopathology study was done using aqueous extract to investigate the effect on histoarchitecture of the uterus during pre and post–im-plantation stages (Shukla S *et al.,* 19980).

Anti–cancer activity: Ethanolic extracts of leaves and seeds of Moringa oleifera shows potent anti–tumor activity. Thiocarbamate and isothiocynate related compounds were isolated and which act as inhibitor of tumor promoter. The in-vivo antitumor potential was due the presence of three known thiocarbamate and isothiocynate related compounds which act as inhibitors of tumor promoter teeocidin B-4-induced Epstein–barr virus, interestingly (Nadkarni KM *et al* .,1994).

Anti-microbial activity: Leaves, roots, bark and seeds of Moringa oleifera show anti-microbial activity against bacteria and fungi. The plant shows in vitro activity against Bacteria, yeast, dermatophytes and helminthes by disc- diffusion method. The fresh leaves and aqueous extract from the seeds inhibit the growth of Pseudomonas aeruginosa and staphylococcus aureus (Caceres A *et al*., 1991).

Anthelmintic activity: *In-vitro* study assessed the efficacy of macerated and infused aqueous extract as well ethanol-ic extract of Moringa oleifera against fresh eggs, embryo-nated eggs, L1and L2 larvae of Haemonchus contortus. Five different concentrations of extracts were prepared (0.625, 1.25, 2.5, 3.75 and 5 mg/mL). Fresh eggs were exposed to hese different concentrations for 48 hours, while embry-onated eggs and larvae were exposed for 6 and 24 hours respectively. Distilled water and 1.5% DMSO were used as negative control. Results revealed that Ethanolic leaf ex-tract of Moringa oleifera was most efficient on eggs by in-hibiting 60.3% ± 8.2% and 92.8% ± 6.2% eggs embryo nation at 3.75 and 5 mg/mL respectively (Tayo GM *et al.,2014).*

Different Plant parts uses :

Food: Fruits Called 'drumsticks' or 'bâtonsmouroungue'. Young green fruits used as a vegetable in southern Asia.

Seeds: Seeds eaten fried, or added to sauces. Seed oil used as cooking oil.

Leaves: Eaten raw as a salad, or cooked in soups or sauces. In la Réunion, they are called 'brède mouroungue' or 'brède médaille'. Leaf powder promoted in Africa as a protein-rich ingredient.

Flowers: eaten as a vegetable, in sauces or in a tea.

Roots: Grated roots are a substitute of horseradish.

Medicine:"Almost all parts have traditional medicinal applications. Especially the uses as an anodyne, anthelmintic, antispasmodic and disinfectant (bactericidal, fungicidal) are widespread."

Forage: Leaves eaten by livestock. Flowers visited by bees.

Technical uses: Pounded seeds and seed cake used as a flocculent to purify water. Seed oil used as a lubricant, for perfumes, to make soap. Gum from the bark used for tanning. Wood used for fuel.

Environment: Tree grown as a living fence, an ornamental and in alley-cropping.(Ramachandran, C *et al*.,2016).

Conclusion:

Moringa oleifera is one of medicinal plant. The different parts of the plant for medicinal purposes for anti-oxidant, antiepileptic,anti-diabetic,anthelminitic activity,anti-microbial,anti cancer,anti-fertility due to that pharmaceutical studies uses Moringa oleifera for processing of medicines. It is useful in water purification and is edible food.

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