

Review Article

A Review on *Moringa Oleifera* and its Medicinal Uses



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Abstract:

Moringa Oleifera is commonly known as drumstick tree, horseradish tree which belongs to the family Moringaceae. Drumstick tree is rich in protein, calcium, iron, and polyphenols. It has antioxidant property by removing free radicals. *Moringa Oleifera* is used to treat liver diseases, kidney stones, diabetes and constipation. It also acts as a source of health beneficial food ingredients. Usually the fruits are used as diaphoretic, splenomegaly, anthelmintic, Antiurolithiatic, diuretic and also useful in bronchitis, asthmatic conditions, and haemorrhoid. *Moringa Oleifera* extract of various parts is used for the treatment of heart disease, asthma, bronchitis, and for treatment of liver disease. The present review showed an overview on its pharmacological behaviour that are reported in the literature.

Keywords: Phytochemical, *Moringa Oleifera*, drumstick tree, and pharmacological activity.

Introduction:

Moringa oleifera is a most useful tree of the family Moringaceae. Common names include drumstick tree, horseradish tree, and Moringa tree. *M. oleifera* is a fast-growing tree that can reach a height of 12–15 metres and stem diameter of 40 centimetres. Shoots have greenish-white or purplish, hairy bark. The bark of Moringa plant has a whitish-grey colour. The tree has fragile branches and the leaves of Moringa plant seen as

tripinnate leaves by build-up a feathery foliage¹. The flowers having yellowish-white petals which showing fragrant nature with five unequal, thinly veined. The flowers of plant are of about 0.8–1.2 cm long and 2.2 cm wide. Flowers grow on stalks which is hairy in nature. Flowers are found as flower bunch which showing 12–20 cm a length. After planting within the first eight months flowering begins. Flowering occurs between April and June month once in a year.²

The fruits of plant are a elongated capsule hanging three-sided which holds seeds of brown colour. Diameter of elongated capsule is of around 1.2 cm. The seeds are filled in capsule which having three wings and are distributed by air and running water.

Cultivation of plant: The *Moringa oleifera* tree is mainly found in tropical and subtropical areas including India, Pakistan, Afghanistan and the United States. It tolerate a broad variety of soil environment, but prefer a unbiased to slightly acidic, loamy soil. In soaked soil, the roots have a propensity to rot. *Moringa* is a sun generated heat-loving tree. *Moringa* is chiefly appropriate for dry region, as it can be full-grown using rainfall.³

Morphological distinctiveness:

M. oleifera is a fast-growing tree. It can reach a height of 35–45 ft and the stem can reach a diameter of about 48 cm. The bark has a whitish-grey colour and is surrounded by thick cork. Immature shoots have hairy bark with purplish colour. The tree has an open crown of drooping, fragile branches and the leaves build up feathery foliage of tripinnate leaves. The flowers are fragrant and bisexual, surrounded by five unequal, thinly veined, yellowish-white petals. The flowers are fragrant and bisexual, surrounded by five unequal, thinly veined, yellowish-white petals. The flowers are about 1.0-1.5 cm (1/2") long and 2.0 cm (3/4") broad.⁴

Phytoconstituents of plant *Moringa oleifera*

Beta- sitosterone, octacosonic acid, p-cymene, moringinine, 1,3-dibenzyl urea, Moringine, spirachin, alpha- phellandrene, 4-hydroxyl mellein, vanillin, and beta- sitosterol⁵.

Medicinal Uses

Liver protective Activity

Agatha N, *et al.* (2023) investigated a valuable insight into recent advances in medicinal uses and pharmacological activities of *Moringa oleifera*.⁶

Ashutosh P, Malvika P, Madan M., G., Pushpa K., *et al.* (2023) Reviewed on an Updated Comprehensive Pharmacological Activities, Ethnomedicinal, Phytopharmaceutical Formulation, Clinical, Phytochemical, and Toxicological Aspects.⁷

Satish V., Bhavana V., Kiran R., (2022) *et al.* investigated Nutritional and Industrial Potential of *Moringa olifera*.⁸

Eldaim MA, *et al.* (2017) investigated an aqueous extract from *Moringa oleifera* leaves ameliorates hepatotoxicity in alloxan-induced diabetic rats⁹.

Patel RK, *et al.* (2010) investigated, *In vitro* hepatoprotective activity of *Moringa oleifera* Lam. They used leaves of plant on isolated rat hepatocytes¹⁰.

Umaya SR, *et al.* (2009) investigated Efficacy of *Moringa oleifera* and aloe vera on aflatoxin b1-induced hepatotoxicity in rats¹¹.

Fakurazi S, *et al.* (2008) investigated *Moringa oleifera* Lam. prevents acetaminophen induced

liver injury through restoration of glutathione level¹².

Pari L, *et al.* (2002) investigated Hepatoprotective activity of *Moringa oleifera* on antitubercular drug-induced liver damage in rats¹³.

Ruckmani K, *et al.* (1998) investigated Effect of *Moringa oleifera* Lam. on paracetamol induced hepatotoxicity¹⁴.

Gilani AH, *et al.* (1997) investigated the Quercetin exhibits hepatoprotective activity in rats¹⁵.

Antiulcer Activity

Devaraj VC, *et al.* (2007) investigated Effect of leaves and fruits of *Moringa oleifera* on gastric and duodenal ulcers¹⁶.

Antidiarrheal Activity

Choudhury S, *et al.* (2013) investigated Anti-diarrhoeal potentiality of leaf extracts of *Moringa oleifera*¹⁷.

Lakshminarayana M, *et al.* (2011) investigated Antidiarrhoeal activity of leaf extract of *Moringa oleifera* in experimentally induced diarrhoea in rats¹⁸.

Saralaya MG, *et al.* (2010) investigated Antidiarrheal activity of methanolic extract of *Moringa oleifera* Lam. roots in experimental animal models¹⁹.

Anti-pyretic, Anti-inflammatory and Analgesic activity

Bhattacharya A, *et al.* (2014) investigated Anti-pyretic, anti-inflammatory, and analgesic effects of leaf extract of drumstick tree²⁰.

Saini RK, *et al.* (2014) investigated Effect of dehydration methods on retention of carotenoids, tocopherols, ascorbic acid and antioxidant activity in *Moringa oleifera* leaves and preparation of a RTE product²¹.

Bhattacharya A, *et al.* (2014) investigated Anti-inflammatory effect of ethanolic extract of *Moringa oleifera* leaves on albino rats²².

McKnight M, *et al.* (2014) investigated *Moringa* tea blocks acute lung inflammation induced by swine confinement dust through a mechanism involving TNF- α expression, c-Jun N-terminal kinase activation and neutrophil regulation²³.

Bhattacharya A, *et al.* (2014) investigated Antipyretic effect of ethanolic extract of *Moringa oleifera* leaves on albino rats²⁴.

Jurairat K, *et al.* (2012) investigated *Moringa oleifera* leaves extract attenuates neuropathic pain induced by chronic constriction injury²⁵.

Gurvinder PS, *et al.* (2012) investigated Anti-inflammatory evaluation of leaf extract of *Moringa oleifera*²⁶.

Kumbhare M, *et al.* (2011) investigated Anti-inflammatory and analgesic activity of stem bark of *Moringa oleifera*²⁷.

Manaheji H, *et al.* (2011) investigated Analgesic effects of methanolic extracts of the leaf or root

of *Moringa oleifera* on complete Freund's adjuvant-induced arthritis in rats²⁸.

Sharma R, *et al.* (2011) investigated Anti-inflammatory activity of *Moringa oleifera* leaf and pod extracts against carrageenan induced paw edema in albino albino rats. Kanchan PU, *et al.* (2012) investigated Antimigraine activity study of *Moringa oleifera* leaf juice²⁹.

Ndiaye M, *et al.* (2002) investigated the anti-inflammatory activity of *Moringa oleifera* (Moringaceae)³⁰.

Venkateshwara KN, *et al.* (1999) investigated Antiinflammatory action of *Moringa oleifera* Lam³¹.

Ezeamuzie IC, *et al.* (1996) investigated Anti-inflammatory effects of *Moringa oleifera* root extract³².

Medhi HN, *et al.* (1996) investigated Analgesic, anti-inflammatory and local anesthetic activity of *Moringa* in laboratory animals³³.

Anticancer Activity

Pachava VR, *et al.* (2017) investigated Anti-angiogenic potential of ethyl acetate extract of *Moringa oleifera* Lam leaves in chick chorioallantoic membrane (CAM) assay³⁴.

Jung IL, *et al.* (2015) investigated A potential oral anticancer drug candidate, *Moringa oleifera* leaf extract, induces the apoptosis of human hepatocellular carcinoma cells³⁵.

Al-Asmari AK, *et al.* (2015) investigated The *Moringa oleifera* as an anti-cancer agent against breast and colorectal cancer cell lines³⁶.

Bhattacharya A, *et al.* (2014) investigated Analgesic effect of ethanolic leaf extract of *Moringa oleifera* on albino albino rats³⁷.

Charoensin S. (2014) investigated Antioxidant and anticancer activities of *Moringa oleifera* leaves³⁸.

Tiloke C, *et al.* (2013) investigated the antiproliferative effect of *Moringa oleifera* crude aqueous leaf extract on cancerous human alveolar epithelial cells³⁹.

Budda S, *et al.* (2011) investigated Suppressive effects of *Moringa oleifera* Lam pod against mouse colon carcinogenesis induced by azoxymethane and dextran sodium sulfate⁴⁰.

Sreelatha S, *et al.* (2011) investigated Antiproliferation and induction of apoptosis by *Moringa oleifera* leaf extract on human cancer cells⁴¹.

Purwal L, *et al.* (2010) investigated Anti-tumour activity of crude extracts of leaves of *Moringa oleifera* (Moringaceae)⁴².

Mojzis J, *et al.* (2008) investigated Antiangiogenic effects of flavonoids and chalcones⁴³.

Bose CK. (2007) investigated possible role of *Moringa oleifera* Lam. root in epithelial ovarian cancer⁴⁴.

Guevara AP, *et al.* (1999) investigated an antitumor promoter from *Moringa oleifera* Lam⁴⁵.

Antioxidant Activity

He TB, *et al.* (2018) investigated Structural elucidation and antioxidant activity of an arabinogalactan from the leaves of *Moringa oleifera*⁴⁶.

Aa AB, *et al.* (2017) investigated Preliminary phytochemical screening, antioxidant and antihyperglycaemic activity of *Moringa oleifera* leaf extracts⁴⁷.

Vergara-Jimenez M, *et al.* (2017) investigated Antioxidants effect of bioactive components in *Moringa oleifera* leaves that protect against chronic disease⁴⁸.

Karthivashan G, *et al.* (2016) investigated the modulatory effect of *Moringa oleifera* leaf extract on endogenous antioxidant systems and inflammatory markers in an acetaminophen-induced nephrotoxic albino rat's model⁴⁹.

Satish A, *et al.* (2014) investigated Antioxidative effect and DNA protecting property of *Moringa oleifera* root extracts⁵⁰.

Luqman S, *et al.* (2012) investigated Experimental assessment of *Moringa oleifera* leaf and fruit for its antistress, antioxidant, and scavenging potential using *in vivo* and *in vitro*⁵¹.

Sinha M, *et al.* (2011) investigated Leaf extract of *Moringa oleifera* prevents ionizing radiation-induced oxidative stress in albino rats⁵².

Paliwal R, *et al.* (2011) investigated Elucidation of free radical scavenging and antioxidant activity of aqueous and hydro-ethanolic extracts of *Moringa oleifera* pods⁵³.

Wangcharoen W, *et al.* (2011) investigated Antioxidant capacity and total phenolic content of *Moringa oleifera*⁵⁴.

Atawodi SE, *et al.* (2010) investigated Evaluation of the polyphenol content and antioxidant properties of methanol extracts of the leaves, stem, and root barks of *Moringa oleifera* Lam⁵⁵.

Singh BN, *et al.* (2009) investigated Oxidative DNA damage protective activity, antioxidant and anti-quorum sensing potentials of *Moringa oleifera*⁵⁶.

Ganguly R, and Guha D. (2008) investigated Alteration of brain monoamines and EEG wave pattern in rat model of Alzheimer's disease and protection by *Moringa oleifera*⁵⁷.

Ranira G, *et al.* (2005) investigated Effect of *Moringa oleifera* in experimental model of Alzheimer's disease: role of antioxidants⁵⁸.

Siddhuraju P, *et al.* (2003) investigated Antioxidant properties of various solvent extracts of total phenolic constituents from three different agro climatic origins of drumstick tree (*Moringa oleifera* Lam.) leaves⁵⁹.

Memory Enhancer activity

Mohan M, *et al.* (2005) investigated Nootropic activity of *Moringa oleifera* leaves⁶⁰.

Cardio protective activity

Randriamboavonjy JI, *et al.* (2016) investigated Cardiac protective effects of *Moringa oleifera* seeds in spontaneous hypertensive rats⁶¹.

Nandave M, *et al.* (2009) investigated *Moringa oleifera* leaf extract prevents isoproterenol-induced myocardial damage in rats⁶².

Dangi SY, *et al.* (2002) investigated Antihypertensive activity of the total alkaloids from the leaves of *Moringa oleifera*⁶³.

Faizi S, *et al.* (1998) investigated Hypotensive constituents from the pods of *Moringa oleifera*⁶⁴.

Gilani AH, *et al.* (1994) investigated Pharmacological studies on hypotensive and spasmolytic activities of pure compounds from *Moringa oleifera*⁶⁵.

Antiobesity Activity

Metwally FM, *et al.* (2017) investigated Molecular mechanisms of the anti-obesity potential effect of *Moringa oleifera* in the experimental model⁶⁶.

Nahar S, *et al.* (2016) investigated Antiobesity activity of *Moringa oleifera* leaves against high fat diet-induced obesity in rats⁶⁷

Bais S, *et al.* (2014) investigated Anti-obesity and hypolipidemic activity of *Moringa oleifera* leaves against high fat diet-induced obesity in rats⁶⁸.

Antiasthmatic

Anita M, and Babita A., *et al.* (2008) investigated Investigation into the mechanism of action of *Moringa oleifera* for its anti-asthmatic activity⁶⁹.

Anticonvulsant activity

Amrutia JN, *et al.* (2011) investigated Anticonvulsant activity of *Moringa oleifera* leaf⁷⁰.

Ray K, and Guha D., *et al.* (2005) investigated Effect of *Moringa oleifera* root extract on penicillin-induced epileptic rats⁷¹.

CNS depressant and muscle relaxant Activity

Kaur G, *et al.* (2015) investigated Evaluation of the antidepressant activity of *Moringa oleifera* alone and in combination with fluoxetine⁷².

Bhattacharya A, *et al.* (2014) investigated CNS depressant and muscle relaxant effect of ethanoic leaf extract of *Moringa oleifera* on albino rats⁷³.

Anti-anxiety activity

Bhattacharya A, *et al.* (2016) investigated anxiolytic effect of ethanolic extract of drumstick tree leaves on albino albino rats in a basic neuropharmacology laboratory of a postgraduate teaching institute⁷⁴.

Lakshmi BV, *et al.* (2014) investigated Anti-anxiety activity of *Moringa oleifera* assessed using different experimental anxiety models in albino rats⁷⁵.

Antimicrobial Activity

Dasgupta S, *et al.* (2016) investigated Evaluation of antimicrobial activity of *Moringa oleifera* seed extract as a sustainable solution for portable water⁷⁶.

Abdallah AM, *et al.* (2016) investigated Evaluation of antimicrobial activity of *Moringa oleifera* leaf extracts against pathogenic bacteria isolated from urinary tract infected patients⁷⁷.

Zaffer M, *et al.* (2015) investigated Antifungal efficacy of *Moringa oleifera* Lam⁷⁸.

Alozie YE, and Sonye CU., *et al.* (2015) investigated Antimicrobial activity of *Moringa oleifera* leaf against isolates of beef offal⁷⁹.

Patel P, *et al.* (2014) investigated phytochemical analysis and antifungal activity of *Moringa oleifera*⁸⁰.

Elangovan M, *et al.* (2014) investigated Analysis of phytochemicals, antibacterial and antioxidant activities of *Moringa oleifera* Lam. leaf extract—an *in vitro* study⁸¹.

Kaur A, *et al.* (2014) investigated Antileishmanial compounds from *Moringa oleifera* Lam⁸².

Singh K, and Tafida GM., *et al.* (2014) investigated Antibacterial activity of *Moringa oleifera* (Lam) leaves extracts against some selected bacteria⁸³.

Conclusion:

Drugs made from natural sources are safer to use than drugs made from other sources. *Moringa Oleifera* is an important source of bioactive and nutritive compounds for as a potent health benefits such as phenolic compounds and fibers. It has high levels of antioxidant and radical scavenging activities. *Moringa Oleifera* showed a source of plenty nutrients with huge potential and health profit. There is a need to examine these plants carefully to ensure that they are safe and effective, especially for humans. Consequently, these medicinal plants could be recommended either alone or in combination with current medications for herpetological problems. Alternatively, synergistic studies can be designed to develop combinations of botanicals and modern medications. Antioxidant activity is one of the most significant functions of medicinal plants in hepatoprotection. The active components of these medicinal plants are principally responsible for their hepatoprotective properties.

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