



## The Effects of Drugs on Moringa Oleifera

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### ABSTRACT

With its distinct active components, moringa oleifera is a kind of medicinal plant that has long been used to cure a wide range of ailments. The species is acknowledged as a source of nutrients and is also utilized to filter water.<sup>1</sup> This study aims to present the biological properties, traditional usage, and medicinal potential of Moringa oleifera. Moringa oleifera is well known for its anti-inflammatory, anticancer, and antioxidant qualities. The bulk of its natural activity is activated by the substantial amounts of flavonoids, glucosides, and glucosinolates. Moringa oleifera is a plant that thrives in hot, dry climates and humid tropical regions.<sup>2</sup> It is also resilient to drought and can withstand poor soil conditions. 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 carotenoids. 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. Moringa oleifera has both nutritional and multimedicinal activity.<sup>3</sup>

**Keyword:** Moringa oleifera, Miracle Tree

### Introduction:

Known as the "miracle tree," moleifera is widely distributed throughout tropical and subtropical areas of the world. It is said to have originated in Asia, specifically in Afghanistan, Bangladesh, India, and Pakistan. The family Moringa contains thirteen species. The moringa plant has a special resistance to drought. M. oleifera is a very cost-effective and reliable choice for reaching optimum nutrition.<sup>4</sup> For their vital nutrients, almost every component of the tree is used. M. oleifera leaves are abundant in minerals, calcium, potassium, and  $\beta$ -carotene. Dried leaves with a about 70% oleic acid content that are used in moisturizer formulations The powdered leaves are used to treat a number of illnesses, including hypertension, toothaches, and ulcers. Paralysis, helminthiasis, and toothaches can all be treated with roots.<sup>5</sup>

Moringa blossoms are used to cure ulcers, enlarged spleens, and to make chemicals that stimulate arousal. Herbal medicine is the practice of treating medical conditions with herbs. Leaves, stems, flowers, fruits, seeds, roots, rhizomes, and bark are all included in the phrase "herb." Both conventional and alternative medicine, which is practiced in both the developed and developing worlds, primarily uses herbal therapy and herbal medications.<sup>6,7</sup> Due to concerns on the safety of allopathic treatments and the sharp rise in their price in recent years, herbal remedies have become much more popular. People utilize herbal items frequently, particularly in rural areas where they are more readily available, affordable, and accessible. Because herbal remedies are naturally derived from plants, they are safer, harmless, and free of any negative side effects<sup>8</sup> The genus's variety of applications is well known. All parts of the plant can be used medicinally; the seeds are used to purify water, the leaves are used as nutritional supplements, the oil is used as biofuel, the trunks are used as gum, the flowers are used as honey, and so on. As the "Miracle Tree" and "Mother's Best Friend," Moringa oleifera has been recognized as the plant with the highest nutritious content. Numerous studies have been carried out to investigate the biological characteristics of this genus, particularly on Moringa oleifera, which has been the subject of research since the 1970s. As of right now, the plant's anti-inflammatory, antioxidant, anticancer, and antidiabetic properties are well established. More study has recently been done on many species, including M. stenopetala, M. concanensis, and M. peregrin.<sup>9,10</sup>



**Fig Moringa oleifera Plant**

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### Processing of moringa:

When plants are treated, most of their nutritional value is lost. When the nutritional contents of raw, germinated, and fermented moringa seed flour were compared, it was discovered that the raw seed flour had more phytochemicals and that the fermented and germinated seed flour had the highest amount of amino acids. The microbial activity during fermentation and the biochemical activity during germination may be the cause of this. Nonetheless, a study examined the effects of blanching, simmering, and boiling to see how much of the nutrients in moringa leaves were retained. It's interesting to note that boiling was the most successful strategy overall because it greatly decreased the amounts of cyanide, oxalate, and phytate compared to the other two procedures.<sup>12</sup>

It has been found that boiling enhanced the availability of iron and antioxidant content in the seeds and leaves. The presence of phytate and other anti-minerals can lower the bioavailability of some elements, thus processing can be done to maximize usage of needed nutrients. For this reason, nutritional issues can be addressed using processed moringa seed flour. However, other research indicates that kids reject moringa because of its mildly bitter flavor. Moringa noodles are made using three different cooking techniques: sautéing, steaming, and boiling.<sup>13</sup>

Rats were used in the testing of these noodles, and the effects on the mammary glands were examined. It's interesting to note that the rats' mammary glands responded better to the sautéed noodles, increasing milk output. Because the oil used for sautéing was high in sterols, the effect on the noodles' lactogogum levels was improved. Additionally, *M. oleifera* has been added to chocolate. A recent study that examined various moringa percentages in chocolate fortification discovered that 20% moringa incorporation in cocoa powder was optimal.<sup>14</sup>

Similarly, adding moringa to halawa tahinia raised the snack's nutritional content. Such research has demonstrated the possibility of creating chocolate and halawa tahinia that are high in protein and minerals. There are a number of these moringa fortifications that can be used to guarantee that kids are getting enough nutrients.

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### An explanation of the medical uses of *Moringa Oleifera*:

#### Root:

Laxative, abortifacient, used to cure rheumatism, articular pain, lower back or kidney discomfort, constipation, antilithic, rubefacient, vesicant, carminative, antifertility, anti-inflammatory, stimulant, function as cardiac/circulatory tonic. Gastric mucosal lesions and ulcers are treated and cured with root of M.O. It also has antiulcer properties and is used to lessen acidity.

#### Leaf:

Leaf juice is believed to manage glucose levels and is applied to minimize glandular swelling. Leaves: Purgative; used as a plaster to wounds; rubbed on the temples for headaches; used for piles, fevers, sore throats, bronchitis, eye and ear infections, scurvy, and catarrh. The plant's leaves are dark green in color and can reach a length of 7 to 60 centimeters. The plant's leaves are different sizes and forms, with opposite pairs having elliptical shapes.

#### Flowers:

High therapeutic value as an aphrodisiac, stimulant, cholagogue, and abortifacient; used to treat tumors, hysteria, inflammations, muscle diseases, and spleen enlargement; lower serum cholesterol to phospholipid and triglyceride; decrease lipid profile of liver, heart, and aorta in hypercholesterolemic rabbits; and increased faecal cholesterol extraction. The M.O. plant has yellow-white, long flower petals that can reach 1.0–1.5 cm in length and 2.0 cm in width. M.O. with fragrant flowers that are bisexual and have five uneven petals with thin veins surrounding them.<sup>15</sup>

#### Bark:

Rubefacient and vesicant, it is used to treat delirious people, cure eye disorders, stop spleen expansion, stop the development of tuberculous glands in the neck, remove tumors, and heal ulcers. The juice from the root bark is applied to the teeth cavity as a pain reliever and has anti-tubercular properties. It is also used in ears to treat earaches. Smooth and dark brown/yellowish green in color, M.O. bark

#### Seed:

The acetate phase of the ethanolic extract of Moringa pods contains the antihypertensive chemicals thiocarbamate and isothiocyanate glycosids, which have been shown to have a protective impact on liver lipid peroxides. Numerous studies reveal that the fully developed seed of the drumstick plant contains 20–40% crude fat and is rich in oil. An estimation of the chemical structure of seed oil showed that it contains more oleic acid and other monounsaturated fatty acids (MUFA). M.O. seed extract works well for pest management in agriculture areas, seed oil works well for making biodiesel, and the seed juice has anti-malarial properties. Some mosquito vectors can also prevent inflammation with the use of the seed.

## PHARMACOLOGICAL ACTIVITY OF MORINGA OLEIFERA



**Fig Health Benefit of Moringa**

### Hepatoprotective activity

Because it is a flavonoid and shares a similar composition with quercetin, the methanolic extract of leaves exhibits hepatoprotective activity due to the presence of quercetin. Similarly, the aqueous extract of flowers possesses hepatoprotective characteristics. The administration of *Moringa oleifera* leaf extract in rats has been shown in several studies to result in the inhibition of serum AST, ALT, ALP, and creatinine. The leaves of the plant also help to lower **urinary tract infection**

the levels of plasma aspartate aminotransferase, alanine aminotransferase, and creatinine. They are also beneficial for the decline of lipids and lipid peroxidation in the rat liver. Conversely, non-alcoholic fatty liver disease is avoided in guinea pigs when leaf extracts are given to them. The ethanolic extract of *Moringa oleifera* seeds and leaves has been shown in several investigations to exhibit hepatoprotective properties. Antihepatotoxic action was also demonstrated by the root and flower extract. The hepatic membrane injury or necrosis is represented by the enzyme that is seeping out of injured liver cells into the bloodstream. Chronic hepatitis and cirrhosis cause a considerable increase in AST, which is mostly located in liver mitochondria; obstructive jaundice, cirrhosis, and hepatitis all cause increases in ALT. Animals treated to CCl<sub>4</sub> had higher serum bilirubin levels but lower serum total protein contents. Stem bark from *Moringa oleifera* is useful for treating the majority of the classic symptoms of urinary tract infections. To precisely understand their mode of action, more research is necessary. Over the course of the clinical trial, the medication was well tolerated and did not have any negative side effects. The medication also aids in the elimination of urinary pathogens that cause UTIs, such as *E. coli*.<sup>16</sup>

### Potential Anticancer Effects

A few *in vitro* investigations have been conducted to assess *Moringa oleifera*'s potential as an anticancer agent. The available data point to *M. oleifera*'s possible anticancer qualities. Compounds from *M. oleifera*'s ethanol seed extract were used in one of the earliest investigations into the plant's anticancer activity. With no detrimental effects on human fibroblasts, dichloromethane and methanolic *M. oleifera* leaf extract exhibit *in vitro* anticancer efficacy against human hepatocellular carcinoma, colorectal adenocarcinoma, and breast adenocarcinoma. The M.O.'s antitumor effect compensated for the property harm the enzymes had produced. Higher concentrations of cytochrome p450 and cytochrome b5, which are found to function as obstructive agents, were also detected in the extract from the pods of *Moringa oleifera*. These enzymes are the main line of defense against the harmful effects of carcinogens. A different study found that feeding mice fruit and leaf extract could shield them from tumor development. Furthermore, it was mentioned that because *Moringa oleifera* is a common, dependable, and safe meditation herb, it may be used as an anticancer substance. According to studies, M.O. can be used as an anti-neuron proliferative component, a drug that inhibits the growth of cancer cells.

### Cardioprotective Intent

An extract from *M. oleifera* in the model of myocardial infraction produced by isoproterenol (ISP). Hemodynamic perturbations caused by ISP were shown to be mitigated by long-term *M. oleifera* treatment. When compared to the ISP control group, a prolonged *M. oleifera* treatment significantly improved the biochemical enzymes but had no discernible impact on reduced glutathione. Treatment with moringa greatly reduced the increase in lipid peroxidation in heart tissue.

### Antispasmodic and Antiulcer activity

Ethanolic extract of leaves of M.O. has antispasmodic properties and the extract has an o-methyl thiocarbamate, because of the incidence of this composite it is utilized customarily in the cure of diarrhea. Moreover, the occurrence of dissimilar chemical composites they have an antispasmodic property, and the plant is also customarily beneficial in gastrointestinal motility diseases.

The plant's roots contain antispasmodic qualities. Numerous studies have shown that the methanolic extract of plant leaves exhibits the plant's broadly dispersed anti-ulcer properties. The presence of phyto-apparatuses such as flavonoids, tannins, terpenoids, sterols, alkaloids, and phenols in the leaf extract of *M. oxygena* may be the cause of the gastro-guard by *M. O.* extract. These compounds have been reported to exist in the extract and have demonstrated positive results in tests for their antiulcer and gastroprotective qualities. The promotion of wound healing, cellular renewal, and cytoprotection are said to be the main antiulcer dynamics of flavonoids.

M.O. contains phenols and flavonoids that have antioxidant properties. Leaf extract may have something to do with the observed antiulcer effect. Furthermore, the antibacterial properties of the leaf extract of *Moringa oleifera* may indicate a different mechanism of antiulcer properties to inhibit the proliferation of *Helicobacter pylori*. Gastric Ulcer Prevention Exercises Water extract of *Moringa* has antiulcer properties in two ulcer animal models. In the animal control group, both models resulted in moderate to severe ulcers. *Moringa oleifera*'s antiulcer impact was shown to be on par with the usual medication when used in pylorus ligation and ibuprofen-induced ulcer techniques. The free acidity and total acidity of gastric juice were dramatically decreased by fumotidine and *M. oleifera* extract. The ulcer index mean was used to evaluate the degree of stomach ulceration in both models. When used in conjunction with standard medications in the pylorus ligation and ibuprofen-induced ulcer techniques, *M. oleifera*'s antiulcer impact was equivalent.<sup>17</sup>

### Eye Conditions

Pores from the *Moringa oleifera* plant are rich in vitamins and minerals, and the powdered leaves of the plant contain a significant quantity of vitamin A, which is beneficial for treating eye conditions including night blindness. Another study found that using oil-infused plant leaves can help prevent cataracts by advancing the effects of vitamin A deficiency. According to another study, the M.O. seed has a range of nutrients and proteins required for skin and hair care products. Purist M.O. seed peptides have been found in certain investigations. Protecting the skin from environmental hazards is advantageous, and M.O. seed extract has anti-contamination and hair-firming properties. The reasons of blindness are numerous. A lack of vitamin A results in poor dark adaptation and night blindness. Consuming *Moringa* leaves, pods, and leaf powder—which has a high vitamin A content—can help shield kids' eyes from night blindness and other vision issues. Eating drumstick leaves (which contain leutin and beta-carotene) with oil enhances vitamin A nutrition and may postpone the development of cataracts. Additionally, in cases of conjunctivities, the juice can be injected into the eyes.

### Antiviral Action

The capacity of the plant's aqueous extract to inhibit herpes simplex virus types one and two was evaluated, and the results indicated that it has inhibitory properties of 21.4% and 43.2%, respectively. These results demonstrate that viral infections can be treated with *Moringa oleifera* either on its own or in combination with antiviral drugs. The use of *moringa oleifera* increased antibody titers against the infectious bronchitis virus and The development of higher antibody titers against the Newcastle disease virus and infectious bronchitis (IB) was a noteworthy reaction to the M.O. The bioactive ingredients in the M.O. may boost the quantity of B lymphocytes, which are responsible for making antibodies.

### Action Reducing Cholesterol

A high-fat diet's serum cholesterol levels can be significantly lowered by using the M.O. plant's leaf extract. The M.O. plant fruit has lipid profile-lowering properties such as low triglycerides, phospholipids, cholesterol, low lipid density lipoprotein, and very low lipid density lipoprotein, indicating the plant's potential to lower liver lipid levels (Farooq, 2007). The phytosterols included in the extract of *Moringa oleifera* leaves, such as  $\beta$ -sitosterol, reduce intestinal cholesterol absorption, which lowers plasma cholesterol and raises fecal cholesterol. Strong diuretic components found in *moringa* leaf extract can lower blood levels of bad cholesterol and help the body eliminate these harmful substances more quickly and easily.

### Utilized as a cosmetic for skincare

This plant's seed oil includes a variety of bioactive compounds, including flavonoids, zeatin, tannins, and saponins, which are vital for healthy skin. The chemical has several beneficial pharmacological properties for the skin, such as antioxidant and anti-inflammatory properties as well as antiseptic properties. M.O. seed oil contains minerals required for hair products in addition to a number of dietary components.<sup>18</sup>

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## RESULT

It has also been shown that *Moringa oleifera* is a very potent therapeutic plant in terms of pharmacology. A profile of significant phytochemical elements found in various plant parts is primarily responsible for the biological action of the plant. The pharmacological characteristics of *Moriga oleifera*'s leaf, seed, flower, bark, pod, and root are demonstrated. The results showed that the majority of the components evaluated in this study had alkaloids, tannins, flavonoids, anthraquinone, cardiac glycoside, carbohydrates, and saponin in their aqueous and ethanol extracts. Flowers contained all seven of the phytochemicals that were assessed in the aqueous extract; the remaining phytochemicals were devoid of flavonoids. Using the ethanol extract, seven phytochemicals were extracted from the leaf, seed, and flower; the bark tested positive for all but alkaloid, while the root was devoid of cardiac glycoside, tannin, and alkaloid. Only the flower (aqueous and ethanol), leaf (ethanol), and bark (ethanol) extracts contained the seven phytochemical components. A superior solvent for removing both organic and inorganic materials from plants is ethanol. The order of phytoconstituents in the various plant parts was, in general, flower, seed, leaf, root, and bark. The order of the percentage yields—Flower>Bark>Seed>Root or Leaf—did not precisely match this.

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## Conclusion

*Moringa oleifera*, one of the most extensively grown species in the Moringaceae family, is a significant medicinal plant. For a variety of human illnesses, leaves, bark, roots, stems, buds, flowers, etc. have been employed. Antibacterial, antifungal, anti-inflammatory and analgesic, antioxidant, hypotensive, anti-ulcer, anesthetic, cardioprotective, and wound healing activities are among the pharmacological effects. Only a few of *Moringa oleifera*'s pharmacological actions are covered in this review.

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