



# IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals

ISSN 2349-7203



Human Journals

**Review Article**

May 2023 Vol.:27, Issue:2

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## *Moringa oleifera*: Nutrient Values and Health Benefits



**IJPPR**  
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals



ISSN 2349-7203

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**Submitted:** 27 April 2023  
**Accepted:** 02 May 2023  
**Published:** 30 May 2023

**Keywords:** *Moringa oleifera*, Nutrient Values, Health Benefits

### ABSTRACT

The moringa plant (*Moringa oleifera* Lam.) This is a brief review of the scientific data on Moringa from several investigations. The purpose of this study is to identify the ancillary features of the underutilised plant Moringa and the verified health claims. However, due to constraints and folklore ideas from the past, it was important to bring attention to the findings that were backed by science in order to provide consumers who care about their health with concise information, as well as researchers in the field of supplementary foods and nutrition. Of course, the entire Moringa plant is utilised, including the bloom, seed, and leaves. The leaves' biochemical properties include effects that are anti-oxidative, anti-inflammatory, anti-cancer, anti-asthmatic, and that lower blood pressure. They are also used to cure a variety of illnesses. It also contains the vitamins A, B1, B2, B3, C, and E in addition to the vital minerals calcium and iron. According to Ayurveda, moringa can enhance your intake of nutrients, is a source of antioxidants, improves regulation of blood sugar levels, decreases inflammation, and is good for your bones and joints. This leaves room for more study. The paper looks at how *Moringa Oleifera* is used as a food, nutritional supplement, and for therapeutic purposes. Among its many nutrients, *Moringa oleifera* is a good source of zinc, magnesium, iron, copper, and beta-carotenes, an antioxidant called quercetin that may help decrease blood pressure. The primary anti-inflammatory ingredient in morning glory leaves, seeds, and pods is an isothiocyanate. Finding the research gaps and potential areas for future work from a nutritional and medicinal standpoint was the method used to gather information. Understanding the nutritional and therapeutic potential of *Moringa oleifera* through scientific studies may have a positive impact on both the work areas and consumers.



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## INTRODUCTION

*Moringa* (*Moringa oleifera* Lam.) is native to the Indian subcontinent and has become naturalised across the world's tropical and subtropical regions. Regional names for the tree include Benzolive, Drumstick tree, Horseradish tree, Kelor, Marango, Mlonge, Mulangay, Saijihan, and Sajna (Fahey, 2005). The plant grows best in a tropical insular climate. It grows well in the humid tropics or hot dry areas, can live in less rich soils, and is drought tolerant (Anwar et al., 2007). It is regarded as one of the most beneficial trees in the world since practically every component of the *Moringa* tree may be utilised for food, medicine, and industrial applications (Khalafalla et al., 2010). People make use of its leaves, blossoms, and Fresh fruit. (1)



*Moringa oleifera* was already recommended in ancient Ayurvedic writings. *Moringa oleifera* was used externally as poultices and ointments on wounds to cure infections and abscesses in ancient Indian medicine.

*Moringa oleifera* was previously recommended in ancient Ayurveda writings. *Moringa oleifera* was used topically as poultices and ointments on wounds to cure infections and abscesses in ancient Indian medicine. Consuming the protein-rich leaves promotes adequate intake of various amino acids, including essential amino acids. *Moringa oleifera* has yielded at least 110 distinct chemicals. Vitamins A, B1, B2, B3, C, and E are among them, as are minerals such as calcium and iron, as well as many flavonoids, glucosinolates, terpenes, alkaloids, saponins, sterols, fatty acids, and phenolic compounds (Abd Rani et al., 2018).

Since the 1940s this so-called ‘miracle tree’ has drawn attention from scientific researchers (Spruijt et al., 1940; Jamieson et al., 1939; Rao et al., 1946). (2)

## **PARTS OF MORINGA OLEIFERA:**

### **Leaves-**

Drumstick tree leaves are packed with nutritional properties and are 100% edible. They are a rich source of nutrients like protein, carbohydrate, fiber, Beta carotene, vitamin C and minerals like calcium, potassium, iron and phosphorous [6]. The protein content of various pulses, viz., is equal to that of the dried *Moringa oleifera* leaf powder. moth beans, soybeans, kidney beans etc., which contain (22 - 24%) protein, thus used in food. Leaves contain essential amino acids such as methionine, cysteine, tryptophan and lysine, are thus ideal for regular diet [7]. The leaves contain various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolic compounds and carotenoids and act as a natural antioxidant. (3)

Moringa leaves are an excellent source of many vitamins and minerals. One cup of fresh, chopped leaves (21 grams) contains:

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Protein: 2 grams

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Vitamin B6: 19% of the RDA

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Vitamin C: 12% of the RDA

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Iron: 11% of the RDA

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Riboflavin (B2): 11% of the RDA

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Vitamin A (from beta-carotene): 9% of the RDA

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Magnesium: 8% of the RDA

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In Western countries, the dried leaves are sold as dietary supplements, either in powder or capsule form. Compared to the leaves, the pods are generally lower in vitamins and minerals. However, they are exceptionally rich in vitamin C. One cup of fresh, sliced pods (100 grams) contains 157% of your daily requirement. The diet of people in developing nations sometimes lacks vitamins, minerals and protein. In these countries, *Moringa oleifera* can be an important source of many essential nutrients. However, there is one downside: Moringa leaves may also contain high levels of antinutrients, which can reduce the absorption of minerals and protein. (4)

## **SEEDS:**

Vitamins A and B1 are also present in *M. oleifera* seeds, in addition to the intriguing presence of proteins, lipids, and carbs (Mbah, Eme, & Ogbusu, 2012). Additionally, they include minerals, micronutrients, and bioactive substances such as phytates, flavonoids, saponins, sterols, and trypsin inhibitors. The seed's lipid content, which ranges from 13% to 46%, qualifies it as an oilseed. This suggests that *M. oleifera* seeds can serve as a source of fibre and lipids in addition to protein.

Protein is found in *Moringa oleifera* seeds, and after lipids, it is the second most important element in these seeds. Between 18.6% (Kawo et al., 2009) to 37.2% (Bridgemohan, Bridgemohan, & Mohamed, 2014), according to recent research, protein content varied.

Between 9.17% and 53.36% of the *Moringa oleifera* seed's weight is carbohydrates (Compaoré, Nikièma). (5)

## **FLOWERS:**

The crude protein content of the dried *Moringa oleifera* flower was 25.16%, the carbohydrate content was 53.67%, and the Ash content was 6.01%. The proximal values found in this study for the flower are equivalent to those found by Moyo et al. (2013) for the leaves. The outcomes obtained demonstrate the presence of nutritive components in *Moringa oleifera* flower. It is noteworthy that the crude protein content is comparable to that of other legumes including cowpea, bambara groundnut, and pigeon pea, despite being lower than that of sunflower and soy beans (Mapiye et al., 2010; Hillocks et al., 2012; Adegbola and Bamishaiye, 2011). This level of crude protein concentration is particularly significant nutritionally since it may meet newborn protein requirements and strengthen the immune system against illnesses (Moyo et al., 2013). (6)

## **HEALTH BENEFITS OF MORINGA OLEIFERA:**

### **1) CANCER PREVENTION AND TREATMENT**

Cancer-preventive qualities are present in moringa. For instance, it contains niazimicin, a substance that inhibits the growth of cancer cells.

Some experts claim that extracts from the moringa plant's leaves, bark, and other parts may have the ability to kill cancer cells. They may be effective in treating breast, liver, colorectal, and other cancers if future study supports this. (7)

## **2) TREATMENT OF STOMACH DISCOMFORT**

Moringa extracts may be useful in treating certain stomach ailments.

For example, fibrous pods can improve digestive health and may help prevent colon cancer. Moringa leaves have a laxative action, making moringa a potential treatment for constipation. Moringa lowered stomach acidity by roughly 85% in one research, implying that it could help prevent peptic ulcers. Moringa's antibiotic and antibacterial characteristics may aid in the prevention of pathogen growth that can cause illnesses. Moringa's anti-inflammatory properties may protect the digestive system from injury, which may help avoid ulcerative colitis. (8)

## **3) PROTECTING THE LIVER**

Moringa may offer liver protection against nonalcoholic fatty liver disease.

Researchers gave guinea pigs a meal that included *Moringa oleifera* leaves in one trial to investigate the plant's potential for treating liver or other bodily issues. People who ingested more moringa had reduced cholesterol and triglyceride levels as well as decreased liver inflammation. (9)

## **4) SKIN AND HAIR PROTECTION AND NOURISHMENT**

Moringa seed oil has been shown in animal studies to help heal skin lesions faster. One way it might accomplish this is by lowering oxidative stress.

According to some experts Trusted Source, moringa seed oil may also be beneficial to hair health. More research, particularly involving humans, is required. (10)

## **5) COMBATING BACTERIAL ILLNESSES CAUSED BY FOOD**

According to research Trusted Source, moringa includes compounds that may act against some foodborne pathogens such as *Staphylococcus aureus* (*S. aureus*) and *Escherichia coli* (*E. coli*). (11)

S. aureus can be found in sliced meats, sandwiches, and other items that have not been cooked between handling and eating,(12) whereas E.coli can pass Trusted Source through contaminated water or food. Both forms of bacteria can cause diarrhoea and other food poisoning symptoms. (13)

#### **6) EDEMA TREATMENT**

Edema occurs when fluid accumulates in body tissues, for example, as a result of inflammation. Ear edema is caused by tissue swelling around the ear, which is usually caused by an infection.

In one study, administering moringa seed oil to animals with ear edema reduced skin inflammation. This shows that moringa's anti-inflammatory effects may help treat ear edema, while additional research is needed. (14)

#### **7) RHEUMATOID ARTHRITIS PREVENTION**

According to the authors of a rat study, moringa extract possesses anti-inflammatory effects that may help prevent rheumatoid arthritis. (15)

#### **8) MOOD AND NERVOUS SYSTEM DISORDERS ARE TREATED.**

Moringa's antioxidant action may protect against nervous system ailments such as multiple sclerosis (MS), Alzheimer's disease, neuropathic pain, and depression.

Scientists believe it has neuroprotective characteristics, although they are unsure how they function.(16)

#### **9) ASTHMATIC TREATMENT**

Moringa includes compounds that may aid in the treatment and prevention of asthma, bronchial constriction, and airway inflammation. One study discovered that giving guinea pigs a moringa extract enhanced their lung function. (17)

#### **10) LOWERING BLOOD PRESSURE**

Moringa includes compounds that may aid with blood pressure management.

A group of healthy volunteers in one study consumed 120 grammes of cooked moringa leaves for a week, while another group did not.

Those who took moringa had lower blood pressure two hours after eating than those who did not. (18)

### **11) KIDNEY STONE PREVENTION**

To prevent kidney stones, several traditional medicines propose consuming moringa. Moringa can treat a variety of diseases.

Laboratory investigations have revealed indications that moringa extracts may prevent minerals from accumulating and creating kidney stones.

More research, however, is required to substantiate its application. (19)

### **12) ENHANCING EYE HEALTH**

Moringa includes the antioxidant beta carotene, which is necessary for preserving eye health and avoiding eye illnesses. (20)

### **13) ANAEMIA AND SICKLE CELL DISEASE TREATMENT**

Moringa has long been used to treat and prevent anaemia in several regions of the world.

Laboratory experiments have shown that consuming moringa as a meal or pill may help control sickle cell illness. (21)

### **14. DIABETES**

The majority of research on the impact of moringa on diabetes management has been conducted using animal models. This indicates that the researchers researched moringa in animals other than humans, such as rats. Animal studies alone are insufficient to draw any conclusions on the usage of moringa.

However, in one tiny human investigation, researchers investigated the effects of moringa leaf powder on blood sugar response in diabetics. The study comprised 17 people with diabetes and 10 healthy people.

Overall, moringa leaf powder lowered post-meal blood sugar rises in diabetic patients by up to 40 milligrammes per deciliter. Moringa had no effect on blood sugar levels in people who did not have diabetes. (22)

More study on the benefits of moringa on diabetes management is required.

## 1) WHAT ARE THE MORINGA SIDE EFFECTS?

Although few human trials have been conducted, those that have shown moringa to be well tolerated with no documented negative effects.

Some experts believe that consuming a lot of moringa might produce an increase in iron in the blood, which can lead to gastrointestinal troubles and hemochromatosis. It is not advised to consume more than 70 gm each day.(23)

The term studies refer to Before using any dietary or herbal supplements, consult with your healthcare professional and chemist.

When used orally, the leaves, fruit, and seeds of moringa are probably harmless. When administered as medicine for a brief period of time, moringa seeds and leaves may be harmless. Products made with moringa leaf have a maximum six-month shelf life. Products made using moringa seed have a three-week shelf life. The root and bark of the moringa tree may be dangerous. Toxic chemicals are present in the root bark and roots.

When skin-contact is made: There isn't enough trustworthy data to determine whether moringa is safe or what potential adverse effects there may be. (24)

During pregnancy, Breast-feeding and to children *Moringa oleifera* may be cause side effects more research study on it required .

## 2) PRECAUTIONS

Because not enough study has been done in these groups, pregnant women and children should avoid taking *Moringa oleifera* in any form. Before beginning any supplement, consult with your healthcare physician.

*Moringa oleifera* has traditionally been used in Asia as a galactagogue (something that enhances milk flow). Several studies, however, have found that it is unlikely to help increase milk production.(25)

If you want to use *Moringa oleifera* while breastfeeding, you should check with your healthcare professional or a lactation expert beforehand.

### 3) INTERACTIONS

More study on the interactions between *Moringa oleifera*, medicines, and herbal supplements is required. Some evidence suggests that the following drugs may interact with *Moringa oleifera*:

**Rifampin**, combined with other drugs, is used to treat TB. (26)

**Januvia** (sitagliptin), a type 2 diabetes anti-diabetic drug. (27)

It is critical to thoroughly study the ingredient list and nutrition information panel of a supplement to see which components are included and how much of each ingredient is included. Please discuss potential interactions with foods, other supplements, and medicines with your healthcare professional after reviewing the supplement label.

#### **Medications changed by the liver (Cytochrome P450 3A4 (CYP3A4) substrates) interacts with MORINGA OLEIFERA**

The liver modifies and breaks down several drugs. *Moringa oleifera* may slow down the liver's ability to break down certain drugs. The results and side effects of certain drugs may alter as a result.

#### **Levothyroxine (Synthroid, others) interacts with MORINGA OLEIFERA**

The body's absorption of levothyroxine may be reduced by *Moringa oleifera*. Levothyroxine's effects can be lessened if you take moringa at the same time.

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