

MORINGA OLEIFERA

Family: Moringaceae

Range: Native to the Indian sub-continent and naturalized in tropical and sub-tropical areas around the world

Description: Deciduous tree or shrub, fast-growing, drought resistant, average height of 12 meters at maturity

Other twelve (12) varieties of Moringa species

- *Moringa Arborea*
- *Moringa Borziana*
- *Moringa Concanensis*
- *Moringa Drouhardii*
- *Moringa Hildebrandtii*
- *Moringa Longituba*
- *Moringa Ovalifolia*
- *Moringa Peregrina*
- *Moringa Pygmaea*
- *Moringa Rivae*
- *Moringa Ruspoliana*
- *Moringa Stenopetala*

Common Name of Moringa Oleifera: Benzolive, Drumstick Tree, Kelor, Marango, Mlonge, Mulangay, Saijhan and Sajna

HISTORY:

Moringa Oleifera is the best known of the thirteen species of the genus Moringaceae. Moringa was highly valued in the ancient world. The Romans, Greeks and Egyptians extracted edible oil from the seeds and used it for perfume and skin lotion.

In 19th century, plantations of Moringa in the West Indies exported the oil to Europe for perfumes and lubricants for machinery. People in the Indian sub-continent have long used Moringa pods for food. The edible leaves are eaten throughout West Africa and parts of Asia.

TRADITIONAL USES:

For centuries, people in many countries have used Moringa leaves as traditional medicine for common ailments. Clinical studies have begun to suggest that at least some of these claims are valid. With such great medicinal value being suggested by traditional medicine, further clinical testing is very much needed.

India: Traditionally used for anemia, anxiety, asthma, blackheads, blood impurities, bronchitis, catarrh, chest congestion, cholera, conjunctivitis, cough, diarrhea, eye & ear infections, fever, glandular swelling, headaches, abnormal blood pressure, hysteria, pain in joints, pimples, psoriasis, respiratory disorders, scurvy, semen deficiency, sore throat, sprain, tuberculosis

Malaysia: Traditionally used for intestinal worms

Guatemala: Traditionally used for skin infections and sores

Puerto Rico: Traditionally used for intestinal worms

Philippines: Traditionally used for anemia, glandular swelling and lactating

MODERN USES:

Over the past two decades, many reports have appeared in mainstream scientific journals describing its nutritional and medicinal properties. Its utility as a non-food product has also been extensively described.

Every part of Moringa tree is said to have beneficial properties that can serve humanity. People in societies around the world have made use of these properties.

NUTRITIONAL VALUES OF MORINGA LEAVES

Nutritional analysis indicates that Moringa leaves contain a wealth of essential, disease preventing nutrients. They even contain all of the essential amino acids, which is unusual for a plant source. Since the dried leaves are concentrated, they contain higher amounts of many of these nutrients except Vitamin C.

Vitamin A is obtained from vegetables in the form of its precursor, carotene. The intestine only absorbs a fraction of the carotene in foods. Thus, there are differing views on how to calculate the amount of carotene that is absorbed and converted to Vitamin A. Thus the charts below simply give the figures for carotene or beta-carotene. The most commonly accepted conversion factor of carotene to Vitamin A (retinol) is 6:1

Nutritional Analysis of Moringa pods, fresh raw leaves, and dried leaf powder have shown to contain the following per 100 grams of edible portion

Nutritional Analysis	Pods (per 100 grams)	Fresh Raw Leaves (Per 100 grams)	Dried Leaf Powder (Per 100 grams)
Moisture (%)	86.9%	75%	7.5%
Calories	26.0	92.0	205.0
Protein (g)	2.5	6.7	27.1
Fat (g)	0.1	1.7	2.3
Carbohydrate (g)	3.7	13.4	38.2
Fiber (g)	4.8	0.9	19.2
Minerals (g)	2.0	2.3	-
Calcium (mg)	30.0	440.0	2003.0
Magnesium (mg)	24.0	24.0	368.0
Phosphorous (mg)	110.0	70.0	204.0
Potassium (mg)	259.0	259.0	1324.0
Copper (mg)	3.1	1.1	0.6
Iron (mg)	5.3	0.7	28.2
Oxalic acid (mg)	10.0	101.0	0.0
Sulphur	137	137	870
<u>VITAMINS CONTENTS</u>			
Vitamin A - B carotene (mg)	0.1	6.8	16.3
Vitamin B - Choline (mg)	423.0	423.0	-
Vitamin B1 – Thiamin (mg)	0.05	0.21	2.6
Vitamin B2 – Riboflavin (mg)	0.07	0.05	20.5
Vitamin B3 – Nicotinic Acid (mg)	0.2	0.8	8.2

Vitamin C – Ascorbic Acid (mg)	120	220.0	17.3
Vitamin E – Tocopherols Acetate (mg)	-	-	113.0
AMINO ACIDS CONTENTS			
Arginine (mg)	360	406.6	1325
Histidine (mg)	110	149.8	613
Lysine (mg)	150	342.4	1325
Tryptophan (mg)	80	107	425
Phenylalanine (mg)	430	310.3	1388
Methionine (mg)	140	117.7	350
Threonine (mg)	390	117.7	1188
Leucine (mg)	650	492.2	1950
Isoleucine (mg)	440	299.6	825
Valine (mg)	540	374.5	1063

**Amino Acid contents are expressed per “g N (Nitrogen)”, in this specification it has been converted into “mg” for clarity

MORINGA LEAVES COMPARED TO COMMON LEAVES

Vitamin A content (per 100 grams of edible portions)

Carrots	Fresh Leaves	Dried Leaf Powder
18 mg	6.8 mg	16.3 mg

Vitamin C content (per 100 grams of edible portions)

Oranges	Fresh Leaves	Dried Leaf Powder
30 mg	220 mg	17.3 mg

Calcium content (per 100 grams of edible portions)

Milk	Fresh Leaves	Dried Leaf Powder
120 mg	440 mg	2003 mg

Iron content (per 100 grams of edible portions)

Spinach	Fresh Leaves	Dried Leaf Powder
1.14 mg	0.7 mg	28.2 mg

Potassium content (per 100 grams of edible portions)

Banana	Fresh Leaves	Dried Leaf Powder
88 mg	259 mg	1324 mg

Protein content (per 100 grams of edible portions)

Yogurt	Fresh Leaves	Dried Leaf Powder
3.1 g	6.7 g	27.1 g

Comparison

FRESH LEAVES	DRIED LEAF POWDER
4 times Vitamin A of Carrots	10 times Vitamin A of Carrots
7 times Vitamin C of Oranges	½ times Vitamin C of Oranges
4 times Calcium of Milk	17 times Calcium of Milk
3 times Potassium of Bananas	15 times Potassium of Bananas
¾ times Iron of Spinach	25 times Iron of Spinach
2 times Protein of Yogurt	9 times Protein of Yogurt

Many of the listed vitamins, minerals and amino acids are very important for a healthy diet. An individual needs sufficient levels of certain vitamins, minerals, proteins and other nutrients for his physical development and well-being. Actual need for different vitamins, etc, will vary depending on an individual’s metabolism, age, sex, occupation and where he/she is residing. Recommendations for daily allowances (RDA) also vary according to whom is doing the study. WHO/FAO recommend the following daily allowances for a child aged 1-3 years old and a woman during lactation

RDA	Child 1-3 years old	Nursing Woman
Vitamin A – Beta Carotene	1.5 mg	5.7 mg
Vitamin B1 – Thiamin	0.5 mg	1.6 mg
Vitamin B2 – Riboflavin	0.8 mg	1.8 mg
Vitamin B3 – Niacin	9 mg	20 mg
Vitamin C – Ascorbic Acid	20 mg	95 mg
Protein (in grams)	16 g	65 g
Calcium	400 mg	1200 mg
Copper	0.8 mg	2 mg
Iron	10 mg	15 mg
Potassium	800 mg	3000 mg
Magnesium	150 mg	340 mg
Phosphorous	800 mg	1200 mg

The following list the composition of Moringa pods, fresh leaves and dried leaf powder and what this represents in terms of recommendation daily intake for **children 1-3**.

	Pods (100 grams)	Fresh Leaves (100 grams)	Dried Leaf Powder (100 grams)
Protein	15.60%	41.9%	170%
Calcium	7.5%	110%	500%
Magnesium	16%	16%	257.5%
Phosphorous	13.8%	8.7%	25.5%
Potassium	32.4%	32.4%	165.5%
Copper	388%	138%	75%
Iron	53%	70%	282%
Sulfur	137%	137%	870%

The following list the composition of Moringa pods, fresh leaves and dried leaf powder and what this represents in terms of recommendation daily intake for **women in lactation**.

	Pods (100 grams)	Fresh Leaves (100 grams)	Dried Leaf Powder (100 grams)
Protein	3.8%	10.3%	41.25%
Calcium	2.5%	36.7%	167.5%
Magnesium	7.1%	7.1%	108.75%
Phosphorous	9.2%	5.8%	17.5%
Potassium	8.6%	8.6%	43.75%
Copper	155%	55%	28.75%
Iron	35.3%	46.7%	188%
Sulfur	137%	137%	870%

CONCLUSION

Leaves and pods of Moringa Oleifera can be an extremely valuable source of nutrition for people of all ages. Moringa Leaves can be dried and made into a powder by rubbing them over a sieve. Drying should be done indoors and the leaf powder stored in opaque, well-sealed plastic container since sunlight will destroy Vitamin A. It is estimated that only 20-40% of Vitamin A content will be retained if leaves are dried under direct sunlight, but that 50-70% will be retained if leaves are dried in the shade. This powder can be used in place of fresh leaves to make lead sauces, or few spoonfuls of the powder can be added to other sauces just before serving. Addition of small amounts of leaf powder will have no discernible effect on the taste of a sauce. In this way, Moringa leaves will be ready available to improve nutritional intake on a daily basis.