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Moringa oleifera: A weapon to combat malnutrition and malnourishment

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Abstract
Moringa oleifera is referred as a miracle tree due to its rich source of macro and micro nutrients which are used to enhance health of an individual. It is widely cultivated throughout India and used as a nutritive herb and possesses various beneficial properties which can be used to combat the malnutrition and malnourishment. Moringa have rich source of vitamin and protein, it also have pharmacological properties to fight against numerous diseases such as anticancer, hypotensive, antimicrobial, anti-inflammatory, antidiabetic, antihelmentic and many more. This review gives information about Moringa oleifera, its history, medicinal benefits and international world recognition of tree and also the future perspectives which serve for the humans as well as animals.

Keywords: moringa oleifera, malnourishment

Introduction
In the present era malnutrition and malnourishments has casts its shadows globally and affecting millions of peoples, mostly children, and nursing mothers. To combat the malnutrition and malnourishment "Moringa" tree is used, they contains all essential amino acids, proteins and minerals and phytochemicals constituents within them. The nutritional properties of Moringa are now so well known that there seems to have little or no doubt about its nutritional benefits (J.W. Fahey, 2017) [12]. Therefore moringa trees have been used to combat malnutrition and also malnourishments especially among infants and nursing mothers (Sujatha B.K., 2017).
Moringa oleifera is universally referred to as miracle tree or the tree of life, drumstick, belonging to family Moringaceae is an effective remedy for the malnutrition and malnourishment. Moringa oleifera is native of the western and sub-Himalayan regions and also widely distributed in the America, Africa, Europe and the Asia. It has a great potential to serve as a high value food crop, medicinal plant, as well as fodder for animals, particularly in developing countries, has been used to improve nutrition and boost security (K. Gandji, 2018). Moringa is rich in various nutrition such as vitamins, proteins and variety of essential phytochemicals which are present almost every parts of the plant such as leaves, stem, flower, fruits, seeds, roots and bark etc which is edible. There are about 13 species of Moringa tree these are Moringa oleifera, Moringa arborea, Moringa borziana, M. drouhardii, M. stenopetala, M. hildebrandtii, M. peregrine, M. rivae, M. ruspoliana, M. pygmaea, M. longlituba, M. ovalifolia, M. concanensis (Voster Muchenje, 2018). The other names of Moringa include horseradish tree, ben oil tree or benzoil tree etc (Mohmoud Aragawany, 2018). Moringa has the pliant adaptive features, such as have the ability to grow faster, survive in extreme drought condition and attain the height up to 5 m to 10 m in favorable environmental conditions.

Scientific Classification of Plant (Ahmad Abdul Razis, 2016).
Kingdom: Plantae
Division: Mangoliophyta
Class: Mangnoliopsida
Order: Brassicales
Family: Moringaceae
Genus: Moringa
Species: Moringa oleifera
Binomial name: Moringa oleifera Lam.

Different vernacular name (Mohammad Abu Taher, 2017).
Bengali: Sajina, Sajna, Sajne
Urdu: Sehjan
Hindi: Shajoma, Mungna
Gujarati: Sargavo, Sekato, Saragavo Parna
Kan.: Neegge, Nugge ele

Tamil: Murungai, Murungai Iali
Marathi: Sevaga, Segata, Segata pana, Shewgachi pane
Orissa: Sajana, Munga, Munika
Punjabi: Sohanjana
Telugu: Munaga Aku
Philippines: Malunggay
French: Acacia Blanc, Neverdie, Moringa ailé, Ben ailé, Pois quenique
German: Pferderettichßaum, Meerrettichßau
Indonesian: Kelor
Malay: Sajina, Merunggai
Nepali: Shobhanjan, Sohij

Benefits of Moringa

Moringa oleifera is the most nutrient-rich plant yet discovered. This humble plant has been making strides in less-developed societies for thousands of years, and significant nutritional research has been conducted since the 1970s. Moringa provides a rich and rare combination of nutrients, amino acids, antioxidants, antiaging and anti-inflammatory properties used for nutrition and healing. Moringa is sometimes called "Mother's Best Friend" and Khawaja Tahir Mahmood *et al* /J. Pharm. Sci. & Res. Vol.2 (11), 2010,775-781 776 "Miracle Tree." Since 1998, the World Health Organization has promoted Moringa as an alternative to imported food supplies to treat malnutrition [27, 32, 43, 44, 45].

Nutritional Uses

A large number of reports on the nutritional qualities of Moringa now exist in both the scientific and the popular literature. Moringa has been in use since centuries for nutritional as well medicinal purposes. These include vitamin C, which fights a host of illnesses including colds and flu; vitamin A, which acts as a shield against eye disease, skin disease, heart ailments, diarrhea, and many other diseases; Calcium, which builds strong bones and teeth and helps prevent osteoporosis; Potassium, which is essential for the functioning of the brain and nerves, and Proteins, the basic building blocks of all our body cells. Another important point is that Moringa leaves contain all of the essential amino acids, which are the building blocks of proteins. It is very rare for a vegetable to contain all of these amino acids. And Moringa contains these amino acids in a good proportion, so that they are very useful to our bodies. These leaves could be a great boon to people who do not get protein from meat. Moringa even contains argenine and histidine two amino acids especially important for infants. Argenine and histidine, are especially important for infants who are unable to make enough protein for their growth requirements. Experts tell us that 30% of children in subSaharan Africa are protein deficient. Moringa could be an extremely valuable food source [2, 8, 15, 16, 17, 30, 32, 35]. Given its nutritional value, it can be utilized in fortifying sauces, juices, spices, milk, bread, and most importantly, instant noodles. Many commercial products like Zija soft drink, tea, and neutroceuticals are available all over the globe. A comparative study of Moringa fresh leaves gram for gram with other foodstuffs puts Moringa on top.{Table.1} It contains {seven times the vitamin C of oranges}; {four times the vitamin A of carrots}, {four times the calcium of milk}, {three times the potassium of banana} and {two times the protein of yogurt}.But the micro-nutrient content is even more in dried leaves; {ten times the vitamin A of carrots}, {17 times the calcium of milk}, {15 times the potassium of bananas}, {25 times the iron of spinach} and {nine times the protein of yogurt}. However, Vitamin C drops to half that of oranges [23, 31, 32, 33, 44].

Nutritional Value

Moringa compared with other food Content of Moringa other food Vitamin A 6,780 mg caroot: 1,890 mg Vitamin C 220 mg Orange: 30 mg Calcium 440 mg cow milk: 120 mg Potassium 259 mg Banana: 88 mg Protein 6. 6 g Cow milk: 3, 2 g Moringa is an alternative to imported food supplies to treat malnutrition in poor countries. Moringa trees have been used to combat malnutrition, especially among infants and nursing mothers. Three non-governmental organizations in particular—Trees for Life, Church World Service and Educational Concerns for Hunger Organization—have advocated Moringa as “natural nutrition for the tropics.” Leaves can be eaten fresh, cooked, or stored as dried powder for many months without refrigeration, and reportedly without loss of nutritional value. Moringa is especially promising as a food source in the tropics because the tree is in full leaf at the end of the dry season when other foods are typically scarce. Leaves were also used for food fortification [15, 16, 17, 30, 31, 44]. In 1997-98, Alternative Action for African Development {AGADA} and Church World Service tested the ability of Moringa leaf powder to prevent or cure malnutrition in pregnant or breast-feeding women and their children in southwestern Senegal. Malnutrition was a major problem in this area, with more than 600 malnourished infants treated every year. During the test, doctors, nurses, and midwives were trained in preparing and using Moringa leaf powder for treating malnutrition. Village women were also trained in the Khawaja Tahir Mahmood *et al* /J. Pharm. Sci. & Res. Vol.2 (11), 2010,775-781 777 preparation and use of Moringa leaf powder in foods. Result had indicated that children maintained or increased their weight and improved overall health, pregnant women recovered from anemia and had babies with higher birth weights and breast-feeding women increased their production of milk [17,41]. Therapeutic uses/ benefit “Phytochemicals refers to only those chemicals which may have an impact on health, or on flavor, texture, smell, or color of the plants,

but are not required by humans as essential nutrients. Moringa contains a range of fairly unique phytochemicals. Containing the simple sugar, rhamnose, and it is rich in a fairly unique group of compounds called glucosinolates and isothiocyanates. Six such phytochemicals have been reported to have hypotensive, anticancer, and antibacterial activity include benzyl isothiocyanate, niazimicin, pterygospermin, benzyl isothiocyanate, and 4-{a-Lrhamnopyranosyloxy} benzyl glucosinolate [4,10 11, 15, 16, 17]. Numerous studies now point to the elevation of a variety of detoxication and antioxidant enzymes and biomarkers as a result of treatment with Moringa or with phytochemicals isolated from Moringa have shown, antiulcer, effect on immune response, spasmolytic activities, hypocholesterolemic effects, antibacterial activity. Sympatholytic activity and antiviral activity against herpes simplex virus type-1 [18, 19, 21, 22, 24, 25]. Antioxidants play an important role in inhibiting and scavenging free radicals, thus providing protection to human against infections and degenerative diseases. The data obtained in suggests that the extracts of Moringa oleifera both mature and tender leaves have potent antioxidant activity against free radicals, prevent oxidative damage to major biomolecules and afford significant protection against oxidative damage [43, 46]. Animal feed fortification; Moringa leaves added to cattle feed increased their daily weight gain by up to 32 percent. Feed of milk cows was supplemented with 15 to 17 kilograms of fresh Moringa leaves daily, and the cattle's milk production increased by 43 percent. Feed supplemented with 2 kg dry matter and milk production increased by 58 percent. Then feed supplemented with 3 kg dry matter per day, and milk production increased by 65 percent. Imagine what would be possible if milk production in developing countries could be increased in this way. It could prevent untold suffering of people with protein deficiency [13, 14]. Plant growth enhancer; Lab experimentation had shown that Moringa spray had a wide range of beneficial effects on plant crops. Effects of spray indicated accelerated growth of young plants. Plants were firmer, more resistant to pests and disease. longer life-span, heavier roots, stems and leaves, produced more fruit, larger fruit, increase in yield 20-35% Water purification: A billion people across Asia, Africa, and Latin America are estimated to rely on untreated surface water sources for their daily water needs. Of these, some two million are thought to die from diseases caught from contaminated water every year, with the majority of these deaths occurring among children under five years of age. If even a fraction of these results could be reproduced in the field, it could be a great help in increasing food supplies for millions of hungry people [13]. Powdered seed act as a natural flocculent, able to clarify even the most turbid water Seed powder can be used as a quick and simple method for cleaning dirty water. The powder joins with the solids in the water and sinks to the bottom. This treatment also removes 90- 99% of bacteria contained in water, water purification by flocculation, sedimentation, antibiosis and even reduction of Schistosome cercariae titer. Using Moringa to purify water replaces chemicals such as aluminum sulphate, which are dangerous to people and the environment, and are expensive. Twenty litres of water may be purified by adding 2 grams of powder to one cup of clean water, pour into a bottle and shake for 5 minutes. Filter the solution through a clean cloth into the bucket of dirty water that is to be treated. Stir the water quickly for 2 minutes and slowly for 10 to 15 minutes {do not use metal implements}. Leave Khawaja Tahir Mahmood *et al* /J. Pharm. Sci. & Res. Vol.2 (11), 2010,775-781 778 the bucket undisturbed for one hour or until the water becomes clear and the impurities have sunk to the bottom. Filter the water through a clean cloth Boil the water before drinking [20, 26, 28, 42, 46]. Moringa oil: Moringa Oleifera is the best known of the 13 species of the genus Moringaceae. It 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 the 19th century, plantations of Moringa in the West Indies exported the oil to Europe for perfumes and lubricants for machinery. A study was done in Pakistan to examine the physicochemical characteristics of Moringa oleifera seeds and seed oil from a wild provenance of Pakistan. The Moringa seeds harvested from the forests of Kohat district of NWFP exhibited an oil yield of 34.80%. Protein, fiber, moisture and ash contents were 31.65, 7.54, 8.90 and 6.53%, respectively. The extracted M.oleifera seed oil revealed an iodine value of 68.63; refractive index {40°C}, 1.4571; density {24°C},0.9032 g cm-3; saponification value, 181.4; unsaponifiable matter, 0.74%; acidity {as oleic acid} 0.81% and color {1-in. cell} 1.28 R + 31.00 Y. Determinations of oxidation parameters like induction period {Rancimat 20 L/h, 120°C}, specific extinctions at 232 and 270 nm, peroxide- and p-anisidine values demonstrated a good oxidative stability of the investigated M. oleifera oil. Tocopherols {α, γ and δ} contents of the oil amounted to 140.5, 63.18 and 61.70 mg kg-1, respectively and were reduced considerably after degumming. The major sterol components of theoil were βsitosterol {46.16%}, campesterol {17.59%}, stigmasterol {18.80%} and Δ5, avenasterol {9.26%}. The wild M. oleifera seed oil was found to contain oleic acid up to 73.22%, followed by palmitic, stearic, behenic and arachidic acids 6.45, 5.50, 6.16 and 4.08%, respectively and fell in the category of higholeic oils. The results of different quality attributes of M. oleifera oil from a wild provenance of Pakistan reveal that it could be employed for edible and commerce [1, 5, 12, 17, 33, 44].

Conclusion

The Moringa Oleifera plant is the most inexpensive and credible alternative to not only providing good nutrition, but also the cure and prevention of a lot of diseases. Moringa tree could easily and cheaply be cultivated and grown in Pakistan. We need to design and develop strategy on war footing in order to explore and utilize full benefits of this miracle tree. The research project should be made for commercial production of food product, neutroceuticals, Moringa oil {edible as well as cosmetics}, fortified feed for cattle, biogas, and plant fertilizer. The plants for water purification by moringa should be designed. The clinical studies with human subjects should be taken to investigate: nutrient bio-availability and bio-toxicity, positive effects on the immune system in fighting diseases, such as: malnutrition, HIV/AIDS, and sexually transmitted infections tuberculosis effects

claimed by traditional medicine in regard to diseases, such as: hypertension, diabetes and high blood pressure, antioxidant properties in fighting diseases, such as: heart disease, cancer and Alzheimer's disease. The poor countries should promote planting and use of Moringa instead of waiting for bounties of food relief from the rich west. Pakistan could easily fight against the problems of malnutrition, hunger, poverty, diseases, unemployment, and edible oil export by utilizing its full benefits. The lot foreign exchange could be earned by exporting product of Moringa instead spending foreign exchange on imports. Moringa truly appears to be a "Miracle" plant having countless benefits for humanity and thus should be taken as a high-quality gift of nature at very low price.

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