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A Review on Therapeutic and Prophylactic Importance of Moringa Oleifera

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Abstract – A pan-tropical plant known as benzolive, drumstick tree, kelor, marango, mulangay, nébéday, saijan, and sajna is Moringa oleifera or horseradish tree. Many studies on its nutritional and medicinal properties have appeared over the past two decades in popular medical journal publications. It has also been defined in detail, although it is not mentioned in this text, its usefulness as a non-food commodity (e.g. wood, charcoal, water clarification, lubricating oil). There is a very high level of "healthy" feed providers who now promote, like other studies on a natural product's nutritional or medicinal value. As a panacea, oleifera although much of this new enthusiasm seems justified, strict scientific evidence must be separated from anecdotes. It is essential. The best available evidence should be offered in regions where there is a shorter hope so that false expectations are not raised and the use of limited research resources is promoted to the most fruitful.

Key Words – Therapeutic, Prophylactic, Moringa Oleifera, Moringa spp.

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INTRODUCTION

Moringa oleifera is one of India, Pakistan, Bangladesh and Afghanistan's most widely cultivated monogenic family species, native to the Sub-Himalayas. It has been cultivated and naturalized by ancient Romans, Greeks and Egyzes in several locations in the tropics. This rapidly-growing plant is now widely cultivated and naturalized in many parts of the tropics (also referred to as horsera, drum stick trees, benzolive tree and marango, mulangea, nebeda, saijan and ben oil tree). The plant is also used by the old Greek and Egyptian romans.It has been advocated for mainstream medical and industrial applications for decades, as an everlasting softwood tree with poor timber. The plant is essential and is cultivated on the North, East and Southern Africa coasts, tropical Asia, Latin America, Caribbean and the Pacific islands. It is cultivated in India, Ethiopia, Philippines and Sudan. Both Moringa tree pieces are edible, eaten for a long time by people [1]. In Moringa there are other uses such as: animal (leaves, grain), biogas (leaf), home purifiers, blue colouring (wood), fertilizer (seed-cake), foliar nutrients (leaf juice), green manure (leaf juices), gum, honey and sugar cane (safe-cutting) and so on. Sweet non-stick, non-drying oil resistant to rancidity is moringa oil. It is used in salads, in the lubrication of fine machinery and in the production of perfumes and hair treatments [2]. In the West, powdered seed for the flocculation and purification of drinking water is one recognized application for Moringa, but it is eaten white, roasting, polished and powdered for tea or also for curries. Recently this tree is an excellent source of easily digestible protein in the native area (Ca, Fe, Vitamin C and carotenoids) where undernourishment is a main concern, in many of the so-called "developer" parts of the world [3].

Nutrition

Moringa trees, particularly in infants and nursing moms, used for malnutrition. Three NGOs challenged Moringa, Trees for Life, the World Service of the Church and the Hungarian Organization of Education for "natural, tropical" foods. The leaves may be eaten freshly, cooked and conserved as dried powder for months without any cooling and seem to be free of nutritional loss [4]. Moringa in the tropics is promising, as the tree is totally green, usually with little extra fruit at the end of the dry season. A wide range of nutritional qualities studies on Moringa are now both available in scientific and mainstream literature. Many of Moringa's readers have concluded that the 'Moringa leaves' have more vitamin A than carrots, more calcium than milk, iron than spinach and vitamin C than oranges, more potash than bananas and the Life Organization Trees' frequently-repeated idea that Moringa leavens its protein content to equal humans, to that of thousands of people.In many cultures around the tropics (such as bark, berries,

leaves, nuts , seeds, tubers, roots and flowers), the distinction between foods and medicinal use of plants is very complicated because plants exist in the two categories and are strongly integrated into traditional and community structure [5]. Therefore, the study identifies nutritional and medicinal products related to Moringa and thus prevents many of this plant from having more known applications in agroforestry and in water purification. The interested reader also participates in a detailed review of the nutrient characteristics of Moringa by the abovementioned NGOs.

Nutritive properties

Each of M. Oleifera is an essential nutrient and nutrient storage plant. The M.Oleifers are rich in minerals like calcium, potassium, zinc, magnesium, iron and copper. Often found are vitamins including folic acid, pyridoxin, nicotinic acid, C, D and E, such as beta-carotene vitamin A. Plant chemicals such as glucosinolates, isothiocyanate, glycosides and glycerol- 1-9-octadecanoate including tannins, sterols, terpenoids , flavonoids, saponins, anthraquinones or a sugar-reducting agent are available. The moringa leaves can also be used in the obese diet with low calorific value [22-24]. The goblets are fibrous and useful for the treatment of stomach disorders and colon cancer. Research indicates that immaturity can contain about 46.78% fiber and about 20.66% protein. The podium contains 30% amino acid, 44% of the flower and 31% of the flowers. In immature caps and flowers is also the same volume of seed, linolenic, linoleic and oleic acids. Moringa has a variety of minerals, including calcium, which can be considered one of the main minerals required for human growth and development [6]. While 8 oz. of milk can supply between 300 and 400 mg, moringa leaves may supply over 1000 mg. As a substitute for the iron pill, moringa powder can also be used as an anemia. Rind is just iron 2 mg, while the moringa leaf powder is iron 28 mg. It has been reported that Moringa has more iron than spinach.The proper dietary supply of zinc is essential for sperm cell growth and for DNA and RNA synthesis. The oleifer leaves have a zinc requirement of around 25.5 to 31.03 mg / kg in the diet.[15]

Table 1- The leaves, leaf powder, seeds and vats compose nuterient

Such PUFAs are linoleic acid; cholesterol can be regulated by these PUFAs. Research indicates that moringa seed oil contains some 76% PUFA and is therefore suitable for use as an olive oil substitute. The nutrient composition varies according to the area. It should be noted. Fug-lie showed that the nutrient content was determined by seasons [7]. Throughout the warm wet season, vitamin A was found to be plentiful and vitamin C and iron were more abundant during the cold dry season. The difference in the results can also be explained by the significant effect on the region, climate and environmental factors of the tree nutrient material. A complete list of nutrients in leaves, pods and seeds will be given in Table1.

Moringa care

When processed, most plants lose their nutrient characteristics. The nutrient content of raw seeds and amino acid was higher in fermented grain meals compared to fresh or germinated grains. However, the moringa leaves maintain their nutrient content by boiling, sprinkling, and whitening has been examined. Ironically, boiling has been more efficient than the other two techniques, since it lowers cyanide, oxalate and phytate rates. The presence of phytate and other anti-nutrients could lessen certain nutrients' bioavailability and can therefore be used to maximize use of the necessary nutrients in seeds and leaves. Yang et al.[16] reported that boiling increased the availability of iron and antioxidant content. It allows seed meal to be used to treat problems in malnutrition. Hence, the processed moringa seed flour can be used to treat malnutrition problems. However, some studies have shown that children refuse to take in moringa due to its slight bitter taste [17]. Kiranawati et al. [12] designed moringa noodles by three methods of cooking noodles, sautéing, steaming and boiling. These noodles were tested on rats and the effects on mammary glands were studied. Interestingly, the sautéed noodles had a better effect on the mammary glands of rats and improved milk production. The effect of sautéing on the noodles improved lactogogum values, because the oil used was rich in sterols. M. oleifera have also been incorporated into chocolates. A recent report tested different percentages of moringa in the chocolate fortification and found that, 20% moringa incorporation in cocoa powder was ideal. Similarly, Moringa incorporation in halawa tahinia also increased the nutrient value of the delicacy. Such studies have shown the potential for developing protein and minerals-rich chocolate and halawa tahinia [20]. Several such moringa fortifications are possible to ensure intake of adequate amounts of nutrients in children.

NUTRITIONAL AND PHARMACOLOGICAL IMPORTANCE

Moringa oleifera, originally from India, is found in the world's tropical and sub-tropical regions. This

is also called "drumstick tree." Every part of the tree has a high nutritional value for farming or trade purposes. Moringa represents a rapidly growing wood with a diameter of up to 10-12 meters (32-40 ft) in tall and up to 45 cm (1.5 ft.) in diameter.

Fig-1 Moringa Plant

The flora is scented and asexual, with five disproportionate white-yellow, slightly poisonous petals around it. The first six months following planting start to bloom [11]. The flora grows in seasonally cool regions only once a year between April and June. Flowering in stable seasonal temperatures and stable rainfall can take place twice or even during the year. It contains brown globular seeds of approx. 1 cm of diameter and a suspended, brown capsule with a size of 20-45 cm. The seed has three white wings in ink in wind and water. Once grown, they are frequently reduced to 1-2 m (3-6 ft) annually and are permitted to expand again to avoid coverings and leaves. All parts of the morninga are rich in essential minerals such as calcium, potassium, zinc, magnesium, iron and copper, and are a store for essential nutrient and antinutrient substances [25]. Vitamin A beta carotene, vitamin B, for example folic acids, pyridoxine and nicotinic acid , vitamin C , D and E are found in vegetables. Phytochemicals such as tannins, sterols, terpenoids, flavonoids, saponins and alkaloids, and sugars are present in conjunction with anti-cancer agents, such as glucosinolates, isothiocyanates, and glycosides [26]. Moringa leaves can also be used in a low-calorific obese diet. The pods are fibrous and useful in the treatment of colon cancer and digestive diseases. Research shows that immature pods contain about 46.7% fiber and 20.6% protein. The pods consist of 30% amino acid, 44% leaf and 31% seed [12].

Fig: 2 Moringa Plant with Drumstick

Caps and flowers of immature palm, linolene and and oleic acids were found to be equal in quantity. Moringa contains a number of minerals, including calcium, which is considered one of human growth and development's most important minerals [27]. While 8 milk units can produce between 300 and 400 mg, moringa leaves can produce over 1,000 mg of moringa powder. The iron tablet will replace the iron tablet with iron powder and anemia. Rind has iron just 2 mg, while the powder is iron 28 mg in the morning leaf. Moringa has more iron than spinach; it has been reported [28]. The optimal growth of sperm cells requires an adequate dietary intake of zinc which is also needed to synthesize DNA and RNA. The Zinc requirement for Moringa leaves is approximately 25.5-31.03mg / kg in the diet per day. The cholesterol regulates such PUFAs are linoleic acid and oleic acid. Studies show that the grain oil of moringa contains about 76% of PUFA and can be used to supplement the olive oil[10]. The composition of the nutrient is different depending on the location of the drug. Fuglie showed that the composition of the nutrients depends on the seasons. During the warm wet season, vitamin A was found to be plentiful, and during the cool dry season, vitamin C and iron were more regular. Due to its location, climate and environmental influences, the variability of the results can be attributed to the significant impact of tree nutrient content.

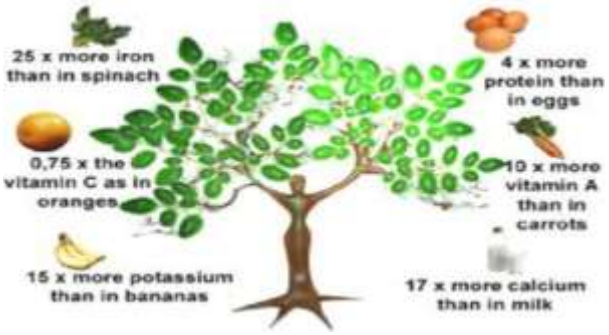

Fig: 3 Vitamin, mineral and protein contents in moringa

A plant rich in various protein, fibers, and minerals that play a significant role in human nutrition, Moringa Plant is a vine. Several studies have shown that morning leaves, compared with other leaven foods, are extremely rich in protein [29]. Moringa leaves can vary in their nutritional value with cultivar and source. Such authors estimate protein levels of the leaves to be comparable to those recorded in Brazil (28%) and South Africa (approximately 30%). The calcium, iron and potassium content of the leaves have also been slightly different.

Fig: 4 Pharmacological/medicinal uses of Moringa

Yang et al., (2006) [16], The maximum amount of ascorbic acid (vitamin C), α-tocophherol (vitamin E) and iron found in the work with four moring cultivars. Significant concentrations of carotenoids such as trans-Lutein (approx. 37 mg/100 g), Trans β carotene (approx. 18 mg/100 g) and trans-zeaxants (approx. 6 mg/100 g) have been found in new morning leaves. The fresh-moringa leashing showed large quantities of essential amino acid and alpha linoleic acid, relative concentrations of ascorbic acid (271 mg) and tocopherols (36.9 mg/100 g). The leaves provide a wide variety of dietary antioxidants regarded as an excellent source. Moringa leaves are considerably more antioxidant ingredients in contrast to those noted for high antioxidant levels of fruits.The antioxidant abilities of moringa leaves have also been stated by other authors. Further investigations have shown that moringa can be utilized in the livestock sector to improve the quality of meat in terms of chemical composition, color and lipid stability. A recent research showed that moringal iron can resolve iron deficiency and modulate better than traditional iron supplements the expression of iron-responsive genes [11]. Similarly, the relative bioavailability of folate from moringa leaves (approximately 82 percent), which suggests a possible source of dietary folate, was found to be very high. Moringic leaves, flowers and tender vats, however, can constitute sources of polyinsaturated fatty acids, which can affect moringa products positively.

MEDICINAL PROPERTIES

Moringa Oleifera is generally considered a panacea and over 300 diseases can be cured. Moringa has long been used in herbal medicine by the Indians and the Africans. The effect of moringa on conditions like diabetes and cancer is discussed in this section.

1. Anti-diabetic properties

Moringa has been shown to cure both Type 1 and Type 2 diabetes.Type 1 diabetes is one that does not produce insulin in patients; a hormone that keeps blood glucose levels normal at the required level.The resistance to insulin is one of diabetes type 2. Diabetes type 2 may also come from beta cell dysfunction that does not feel glucose level, Reduces the insulin signal leading to high glucose in the blood. A number of studies show that the anti-diabetic agent may be the moringa [7]. The Moringa water extracts were seen in a report. The rats will look for medicines for type 1 diabetes and even for type 2 diabetes resistant to insulin. Scientists fed Moringa seed powder to STZ-induced diabetes rats in an additional test, and rapid glucose fall. STZ induces dephosphorylation of ATP, which enables xanthine oxide to be formed in beta cells. Beta cells are killed in hyperglycemic patients (Fig.5). Excessive glucose thus enters the mitochondria and releases reactive species of oxygen. Because of the low rates of antioxidant in beta cells, beta cell apoptosis actually happens. This increases insulin production and causes diabetes and hyperglycemia. The ROS scavenging triggered related antioxidants such as quercitin and the phenolics.

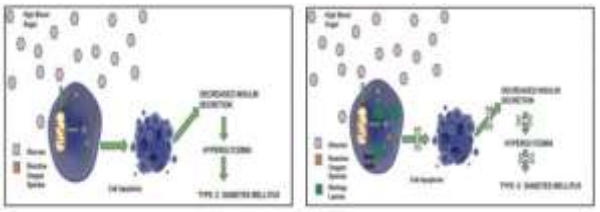

Fig. 5. Mechanism of high glucose leading to diabetes and the effect of moringa on progression of diabetes

Diabetes causes various complications, including retinopathy, atherosclerosis or nephropathy. To avoid these illnesses, moringa can be used. Blood glucose interacts with proteins when the patient has hyperglycemia and induces advanced glycemia (AGE). These AGEs are attached to RAGE that is expressed on the immune cell surfaces. This interaction induces increased cytokines such as interleukin-6 and interferon transcription. Apparently, on the arterial surface the cell adhesion molecules are released. This is allowed to pass trans-endothelially leading to Artery and atherosclerosis inflammation (Fig. 6). The anti-atherosclerotic agent is Moringa. The antiatherogensis character of the moringa can be explained by the antioxidants.

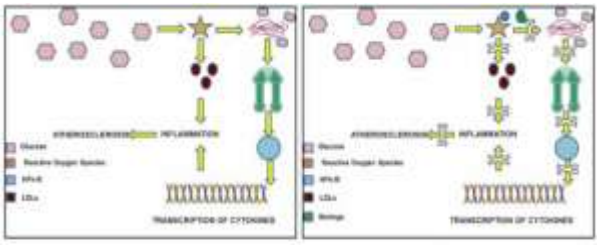

Fig. 6. Mechanism of diabetes leading to atherosclerosis and effect of moringa on the progression of atherosclerosis

2. Properties of anti-cancer

In India, around 2.4 million cases exist, though no known causes of cancer are present. Various factors, including the disease is contributing to smoking, lack of practice and exposure to radiation. Cancer treatments such as Operation, chemotherapy and radiation are expensive and costly are detrimental to the effects Moringa Oleifera can be used at proven concentrations as a naturally stable and effective anti-cancer agent. Work has shown moringa can be used to prevent the growth of cancer cells as an anti-neoproliferative agent. As anti-cancer agents, solvent and soluble extracts have proven their effectiveness. More evidence shows that antiproliferative effects of cancer may be associated with the ability of the cancer cell to cause reactive species of oxygen. Work demonstrated that apoptosis is caused by the reactive oxygen released in cells [8]. The upward regulation of the apoptotic trajectory was further illustrated. Moreover, ROS moringa development is selective and only targets cancer cells, making it an ideal cancer agent. Anticancer agents that target cancers with ROS induction are popular but even antioxidant enzymes should be targeted. Moringa leaf extracts, however, have shown that they are antioxidants and cancer causing ROS [14]. There is no inquiry into the exact nature of the two opposite characteristics of the leaves. Glucosinolates, niazimicin and benzyl isothiocyanate are the compounds that are considered responsible for the anti-cancer effect.

3. Other diseases

A strong neuroprotector can be used as the Moringa. Blood flow blockage to the brain causes cerebral ischemia. It results in lipid reperfusion and peroxidation, resulting in reactive oxygen sources.Species of reactive oxygen may be reduced with its antioxidants and thereby protect the brain. M. Oleifera is used as a visual memory booster for the treatment of dementia.

Table 2. Nutritional and medicinal compositions of various areas of Moringa

The leaf extracts showed that the activity of acetylcholine esterase was decreased, thereby enhancing memory and cholinergic functions. For gastric ulcers, Moringa has reduced acidity by 86.15% and 85.13% at 500 mg and 350 mg, and can also be used as an antiulcer[4]. Patients with AIDS should obtain Moringa from herbal practitioners. In order to improve the immune system of HIV positive people, Moringa is recommended to include in the diet. In order to check the effects of moringa on anti-retroviral drugs, more work is therefore essential [1]. Microbial diseases are common and antimicrobial agents are essential. As a strong antimicrobial agent, oleifera has been proved [6]. Bacteria such as bacillus subtilis, staphylococcus aureus and vibrio cholera may also be cured by oleiferas. Pterygospermine, moringine and benzylisothiocyanate contributes to the antibacterial properties of seeds [7]. Nutrition and medicinal usage of different parts of Moringa are listed in Table 2.

Phytochemistry [21]

Phytochemicals are chemicals produced by plants in the strictest sense of the term. Can affect plants' health or taste, texture, odor or colour.An analysis of Moringa species phytochemicals provides the ability to investigate a variety of relatively uncommon compounds. This family of plants is especially rich in sugar compounds, rhamnose, and rich in a very special category of glucosinolates and isothiocyanates called compounds.

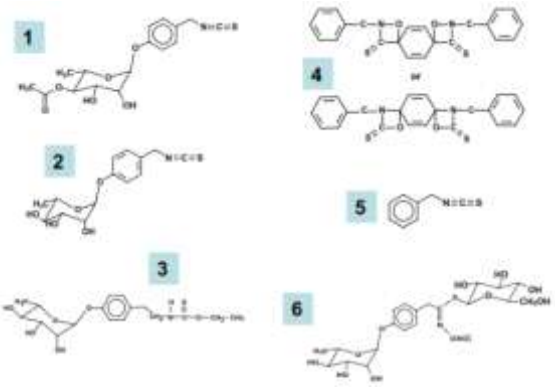

Figure 7. Structures of selected phytochemicals from Moringa spp.: 4-(4'-O-acetyl-α-L-rhamnopyranosyloxy)benzyl isothiocyanate [1], 4-(α-L-rhamnopyranosyloxy)benzyl isothiocyanate [2], niazimicin [3], pterygospermin [4], benzyl isothiocyanate [5], and 4-(α-L-rhamnopyranosyloxy)benzyl glucosinolate [6]

Involve, for example, 4-(O-acetil-after-L-rhamnopyranosylo-cyanate) benzyl isothiocyanide[1], 4-(α-L-rhamnopyranosyloxine)benzylisothiocyanate[2], niazimicin[3], different preparements stated to be hypotensive, anticancerous and antimicrobial activity. [4]. These products are found in the Moringa family relatively exclusively, however, they do contain various vitamins and minerals and other more frequently identified herbal chemicals (including β-carotene and pro-vitama A) such as carotenoids.

Disease Treatment and Prevention

The advices of dietary or topical administration of the moringas are not generally recognized for disease or infection treatment or prevention (for example, extracts, decoction, poulticides, creams, oil, emollients; rough, powder, porridge). While oral history is still significant here, empirical review was much less intense, so it is useful to analyze the arguments made so assess the validity of more comprehensive statements. The reader is encouraged to review two recent papers, which contrasted with the presumption of proof needed for sound science on the effectiveness of certain conventional remedies, the equilibrium problem between alternative and complementary medicines (e.g., Tribal folklore, oral history and anecdotes Traditional Medicine) [9]. Clearly there is still much more work to be done, but in the next decade both fundamental and applied researchers will be very productive. It was recommended to explore some options on the suggestions for medical efficacy for the Moringa tree preparations. There are a number of references to traditional medicine to the healing power of these common uses and scientific validation at least supports some of the claims [10]. The scientific literature cites Moringa preparation with antibiotic, antitrypanosoma, hypotensive and antispasmodic activities, anti-ulcer, anti-inflammatory and hypoglycemic activities, with significant water purification efficacy through flocculation, sedimentation, anti-biosis and even reduction of schistosome scercariae titer.

Unfortunately, many of those human effectiveness studies have not been published in high-profile journals or supported in random clinical trials managed by placebo. For example, a reporter who has published almost 25 year ago without reference (no controls) appears like Moringa a potent cure for urinary tract infection on the surface. [13]. The publisher also offers a degree of mechanical support for in-vitro (cropped cells) and in-vivo (animal) research from traditional medicines.Several researches, for instance, now point to an improvement in the use of Moringa therapy and phytochema derived from Moringa in a number of detoxifications and antioxidant enzymes and biomarkers.

CONCLUSION

Nowadays specific value-added items are produced using moringa leaves, bean (drumstick) and seeds. In India, demand for Moringa leaves has been increased and is being increased in a wide range of preparations. To make it sustainably consumable, moringa leaves are still needed for the culinary use of breastfeeding. Moreover, the moringa relating to the belief of people against such food also requires more socialisation.The prosecution of M. Oleifera has yet to become relevant in India. In various reasons, nutrients from this wonderful tree will be used. M. Oleifera's anti-diabetic and cancer properties are fantastic. Double-blind studies are however less common in order to further validate this moringa characteristic. More research to support the primary mechanisms for anti-diabetics and contraception of moringa are needed. There are a variety of questions unanswered. Another analysis of the antioxidant nature of water extracts in cancer cells is needed. Research showed that ROS triggers moringa, leading to apoptosis or necrosis, in cancer cells. But also antioxidants are found in the aqueous extracts. It is still necessary to study the exact mechanism. The impact of environmental factors affecting leaf and other parts of M nutrient levels. Oleipheres cultivated worldwide need to be investigated further. The best available evidence should be offered in regions where there is a shorter hope so that false expectations are not raised and the use of limited research resources is promoted to the most fruitful.

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