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"A short review on medicinal benefits of Moringa oleifera"

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Abstract:- Moringa oleifera is a fast growing short lived tree commonly known as moringa, drum stick is very important dish in food of Indians. It belongs to family Moringaceae Apart from the food Moringa oleifera is used for controlling or prevention of many diseases. Leaves, flowers, seeds, and roots of this plant are used as a medicine from many centuries. Moringa oleifera is a rich source of many important vitamins and minerals. The leaves B vitamins, vitamin C, provitamin A as beta-carotene, vitamin K, manganese, and protein. moringa seed is suitable as a fortification ingredient to increase the protein, iron and calcium content of wheat flours. It also rich source of iron, calcium, protein, amin acid etc. This is important for healing of body and to build muscle. Antioxidants also found in abundant quantity that can protect cell from damage and also boost the immune system. Moringa trees have been also used to combat malnutrition, especially among infants and nursing mothers Traditional use of Moringa oleifera is beneficial for preventing or treating various disorders to avoid some side effects of chemically synthesized drug with beneficial output. This article provides short review on the medicinal use of Moringa oleifera.

Key Words: - Moringa oleifera, Insulin, beta-carotene, polyphenols, DM etc.

Introduction:-

Moringa oleifera is a short-lived,fast-growing, drought-resistant tree of the family Moringaceae, native to Northern India and used extensively in South and Southeast Asia. Common names include moringa, drumstick tree (from the long, slender, triangular seed-pods), horseradish tree (from the taste of the roots, which resembles horseradish), or malunggay (as known in maritime or archipelagic areas in Asia).It is widely cultivated for its young seed pods and leaves, used as vegetables and for traditional herbal medicine. It is also used for water purification[1]. There are a wide range of health benefits of moringa leaves, ranging from faster wound healing to managing blood glucose levels. Some of the banefits are discussed below.

Protecting and nourishing skin and hair: Moringa or drumstick leaves contain an abundance of antioxidants and essential nutrients that help improve the health and appearance of the skin as well as the hair. By reducing oxidative stress, moringa benefits the skin by making it appear supple and adding shine, along with reducing wrinkles and fine lines. Additionally, moringa leaves may also help to reduce dandruff and add bounce to hair, along with strengthening the hair follicles and making hair stronger. Moringa leaf oil may also help to work effectively on acne and is a prominent component of various acne-controlling cosmetic products. They add a healthy glow to the skin by purifying the skin from within[2].

Treating diabetes: Sustained high blood glucose level eventually leads to diabetes, which, in turn, can damage organs in the body and lead to various health complications. Eating moringa leaves has been found to be effective in keeping the blood sugar level in check[2]. several polyphenols are found in Moringa oleifera. Amongst the most important are the flavonoids quercetin and kaempferol, and the phenolic acids chlorogenic acid and caffeoylquinic acid. These compounds seem to confer antihyperglycemic properties, acting as competitive inhibitors of the sodium-glucose linked transporter type 1 (SGLT1) in the mucosa of small intestine (duodenum and jejunum), thus reducing the intestinal absorption of glucose . however, glucose absorption involves other mechanisms such as the glucose transporter 2 (GLUT2), which can be recruited towards small intestine basolateral membrane due to circulating glucose stimulation. In DM, the capacity of the small intestine to uptake glucose is augmented, due to an increase in the expression of GLUT2 and SGLT1 . This produces an extra burden on the patients suffering from DM, further complicated by the fact that most common antidiabetic drugs such as sulfonylureas, biguanides or thiazolidinediones, have primary targets on organs other than the intestines . MO has been studied as an antidiabetic agent due to its effects on the reduction of glucose levels. One of the proposed mechanisms involves quercetin, as this substance can act as an apical inhibitor of GLUT2 , although it has no

effect on GLUT5 or SGLT1 . Nevertheless, quercetin has also been shown to activate adenosine monophosphate-activated protein kinase (AMPK), to increase glucose uptake through stimulation of GLUT4 in skeletal muscle, and to decrease the production of glucose through down regulation of phosphoenolpyruvate carboxykinase (PEPCK) and glucose-6-phosphatase (G6Pase) in liver[3].

Improving Eye Health: Moringa or drumstick leaves contain important antioxidants, among which beta-carotene is essential in maintaining and promoting good eye health by preventing early macular degeneration along with other eye problems. One of the key benefits of Moringa for eye health is its high antioxidant content. Antioxidants help to protect the eyes from damage caused by free radicals. These nasty little critters can cause inflammation, oxidative stress, and age-related vision problems. Moringa contains vitamins A and C, both of which are powerful antioxidants, as well as other compounds that help shield the eyes from oxidative stress[2].

Preventing liver diseases: Moringa leaves are also beneficial for people with liver diseases such as tuberculosis, fatty liver, etc. Consuming drumstick leaves has been found to greatly reduce the negative effects of tuberculosis medicines while also speeding up the repair of cells. Containing numerous antioxidants, moringa leaves protect the lungs against oxidative stress and oxidative

Preventing rheumatoid arthritis: Due to the anti-inflammatory properties of drumstick leaves, the occurrence and progression of rheumatoid arthritis can be prevented. Moringa leaves also help to improve bone health by providing ample calcium and iron. This also helps to make the teeth strong[2].

Managing Asthma: Drumstick leaves also help to manage as well as prevent respiratory disorders such as asthma and bronchial constrictions. Due to their anti-inflammatory properties, moringa leaves also help to prevent inflammation in the airways. Research has suggested that moringa leaves may also help to improve lung capacity and function[2]. clinical study on M. oleifera suggest that there was appreciable decrease in severity of symptoms of asthma and also simultaneous improvement in lung function parameters.The effect of M. oleifera on four basic symptoms of bronchial asthma (dyspnoea, wheezing, chest tightness, and cough) revealed that score of all symptoms was reduced significantly. According to Unani medical theory, obstructive breathing may be due to a phlegmatic (thick sticky sputum) condition and it is produced mainly in those patients who have phlegmatic temperament. Moringa oleifera fruit is reported to cure kapha. The results support the effectiveness of M. oleifera in ameliorating the symptoms of bronchial asthma[4].

Preventing nervous system disorders: The presence of Vitamin C and E in high concentrations in moringa leaves has been known to combat neural degeneration while improving brain and cognitive function. In addition to that, drumstick leaves also help to provide relief from recurring headaches[2]. Another one of the advantages of moringa leaves is that they also enhance the production of neurotransmitters such as serotonin, dopamine, and noradrenalin, thus acting as mood balancers. These neurotransmitters also improve stimulus-response. Moringa is rich in nutrition owing to the presence of variety of phytochemicals present in barks, leaves, seeds, flowers, roots and immature pods. Moringa contains phytochemicals such as tannins, sterols, terpenoids, flavonoids, saponins, and anthraquinones. Flavonoids present in M. oleifera leaves are kaempferol, quercetin, isorhamnetin and apigenin are the most common flavonoids which exist in abundance as glycosides attached to a wide spectrum of sugar moieties (e.g., acetyl dihexose, hexose, and rutinoside). Alkaloids and reducing sugar present include glucosinolates, isothiocyanates, glycoside compounds and glycerol-1-9-octadecanoate.Different type of phytochemicals found in various parts of the plant.. Moringa oleifera leaf extract has been shown to regulate mono amine levels of brains, which may be useful in Alzheimer's disease. Aqueous extracts of moringa oleifera can be used as anticonvulsant. Its leaves can be used for studying penicillin induced convulsion, locomotor behavior, brain serotonin (5-HT), dopamine and norepinephrine level is evaluated[5].

Managing blood pressure and cardiovascular problems: Moringa leaves are particularly hailed for their blood pressure management benefits. Consuming moringa leaves have been found to manage high blood pressure. Thus, one of the primary benefits of eating drumstick leaves is preventing cardiovascular ailments by managing high blood pressure. Additionally, due to its antioxidant and anti-inflammatory properties, leaves from the moringa tree contribute to promoting good heart health[2]. Possible mechanism of actions of Moringa oleifera nutrients and bioactive compounds in combating vascular dysfunctions and myocardial damages. Possible mechanism of actions of Moringa oleifera nutrients and bioactive compounds in combating vascular dysfunctions and myocardial damages. The bioactive compounds prevent and improve Cardiovascular conditions risk factors such as hyperlipidemia, hyperglycemia, and hypertension[6].

Treating Oedema: Oedema is a condition in which fluid builds up in the body tissues. Inflammation is one of the causes of oedema. For instance, experiencing ear oedema can help to experience swelling around the ear. Using moringa seed oil may help to reduce inflammation on the skin of the affected area[2]. Research conducted by Lia Hikmatul Maula and Maria Ulfah in 2023 showed the results that there was a decrease in the pain scale from before the action of giving warm Moringa leaf compresses to a scale of 5 (moderate pain) and after the action to a scale of 2 (mild pain) for pain in elderly with gouty arthritis. In this study, the patient's pain level decreased from moderate to mild pain after treating pain by administering warm compresses of moringa leaves. The warm compress used in this study was via a cloth or towel soaked in hot water in a particular place or a bottle filled with water. A warm water compress plays a role in widening blood vessels, relieving stiffness, stimulating blood flow, and reducing pain. Warm compresses can be combined with herbs for other benefits, including Moringa leaves. The phytochemical content in Moringa leaves, such as steroids, tannins, triterpenoids, saponins, flavonoids, alkaloids, and interquinones, acts as an antibiotic,

anti-inflammatory, antibacterial, and detoxification drug. Flavonoid compounds, in particular, can inhibit xanthine oxidase. Xanthine oxidase is an enzyme that oxidises hypoxanthine to xanthine and then forms uric acid in the body[7].

Preventing kidney stones: Among the numerous advantages of consuming drumstick leaves, maintaining kidney health and preventing kidney stones are prominent. Moringa leaves may also help to prevent minerals from building up and causing stones in the kidneys[2]. Moringa *oleifera* are a rich source of bioactive compounds; i.e., quercetin, gallic acid, caffeic acid, vanillic acid, benzoic acid chlorogenic acid, p-coumaric acid, M-coumaric acid and sinapic acid. Previous studies have also reported the presence of flavonoids and phenolic acid that creates a positive link with its potential as an antiurolithiatic agent. Flavonoids have been reported to diminish experimentally-induced urolithiasis in rats through numerous pathways such as modifying urinary stone-forming composition, reducing renal oxidative stress and inflammatory damage. Terpenes have been known for their spasmolytic, calcium channel blocking, antioxidant and diuretic properties. It has been reported that leaves of Moringa *oleifera* possess a thiocarbamate glycoside named niazimicin, reported to possess spasmolytic potential that can be linked to medical expulsive therapy (MET), used for the management of urolithiasis[8].

Preventing cancer: Moringa leaves contain certain properties that might help to prevent cancer, such as Niazimicin, which has been found to suppress the progress of cancer cells. Not only the leaves of the moringa tree are beneficial in this regard, but also the bark and potentially other parts of the tree as well[2]. Studies have shown that moringa can be used as an anti-neoproliferative agent, thereby inhibiting the growth of cancer cells. Soluble and solvent extracts of leaves have been proven effective as anticancer agents. Furthermore, research papers suggest that the anti-proliferative effect of cancer may be due to its ability to induce reactive oxygen species in the cancer cells. Researchs show that the reactive oxygen species induced in the cells leads to apoptosis. This is further proved by the up regulation of caspase 3 and caspase 9, which are part of the apoptotic pathway . Moreover, the ROS production by moringa is specific and targets only cancer cells, making it an ideal anticancer agent. Tiloke et al. also showed that the extracts increased the expression of glutathione-S-transferase, which inhibits the express of antioxidants[9].

Treating Blood-Related Diseases: Drumstick tree leaves benefits also include preventing and treating blood-related diseases such as anaemia and sickle cell disease. This benefit can be credited to the antioxidant properties of moringa leaves, which help to remove excess iron and other elements contributing to such diseases of the blood[2].

Conclusion:

From the above review from various authors it was concluded that Moringa oleifera is a plant having versatile applications. The review of Moringa oleifera concluded that deep research required on Moringa oleifera due to abundant applications. It may play important role in herbal medicine to improve the health of patients with minimum side effects. The long approach is required for the study of traditional medicines as these having least side effects compared to the allopathic medicines.

The review of various authors above concludes that Moringa oleifera is a plant with diverse applications. It highlights the need for extensive research on Moringa oleifera due to its wide range of potential uses. This plant may play a significant role in herbal medicine, offering health benefits to patients with minimal side effects. A thorough and long-term approach is necessary for studying traditional medicines, as they typically have fewer side effects compared to allopathic treatments.

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