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Review on Phytochemical Screening and Pharmacological Activities on Leaves of Moringaoleifera

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Abstract: *The leaves of Moringaoleifera were phytochemicallyanalyzed for the presence of phytoconstituents using different solvents. The result reveals the presence of alkaloids, flavanoids, glycosides, terpenoids, tannins, saponins, steroids etc. which could be a source for the industrial manufacture of useful drugs in treatment of various diseases.The leaves of Moringaoleifera were phytochemicallyanalyzed for the presence of phytoconstituents using different solvents. The result reveals the presence of alkaloids, flavanoids, glycosides, terpenoids, tannins, saponins, steroids etc. which could be a source for the industrial manufacture of useful drugs in treatment of various diseases.*

Keywords: Moringaoleifera, phytochemical screening, Drumstick, Miracle tree

I. INTRODUCTION

This review focus on the Moringaolifera as the multi-Purpose tree and importance material.Moringaoleifera L. (Moringa), belongs to the Moringaceae family which Included many species such as the famous ones MoringaOleifera, Moringaperegrina (Forssk.) and MoringaStenopetala. This tree has been grown in a tropical and Subtropical region around the word. Fahey (2005) report that All parts of this tree has useful traits, having it a multi-Purpose tree which used as natural medicine, food, feed, Natural stimulants for fertilizers, forage and migration of Bees. In addition, it is used as a good source of many Vitamins such as C, B and A, riboflavin, pyridoxine, Folic Acid, beta-carotene, Ascorbic Acid, , nicotinic acid, alpha-Tocopherol, with high mineral content for iron and calcium in Order to a major source of essential amino acids (Kumar et Al., 2012). Dahot., (1988) indicate that the tree is anti-tumor, Anti-inflammatory, antioxidants, antimicrobial activity. Moringa contains powerful fungus and antibiotics effectively Used as a natural and inhibitory biomarker for many plant Pathogens.[2]

Moringaoleifera (MO), also known as drumstick Tree, is indigenous to South Asia, mainly in Foothills of Himalayas, India, and it has been grown And naturalized in other countries such as Afghanistan, Nepal, Bangladesh, Sri Lanka, South and Central America, West Indies, Philippines, and Cambodia. It is Short, easy to cultivate, grows quickly, and does not shed Its leaves in dry season, and its leaves are highly nutritious And rich in amino acids, vitamins, minerals, and natural Antioxidants. This was mentioned 5000 years ago In CharakaSamhita, and is well known in African folk Medicine.[8] This review focuses on the phytochemistry And pharmacological activities of this plant.[3]

1.1 Taxonomic Classification of Moringaoleifera:

Kingdam	Plantae
Subkingdam	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Capparales
Family	Moringaceae
Genus	Moringa

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Species	Oleifera

1.2 Macroscopy

Fresh leaves compound, alternate, 30 to 45 cm long, 5 to 10 mm in width, pale green, dried Leaves are shrivelled, broken, never attached with main rachis. Odour characteristics, taste bitter.[6]

1.3 Microscopic Characters

Anatomical sections of the fresh leaf, surface preparations and Powdered sample were prepared for microscopic examination using standard method. For macroscopic examination, each plant Sample was identified by visual examination of Physical properties such as texture, size, color, and Visual inspection. For microscopic examination, the Fresh sample and powered drug (ground and sifted Through a 250 micron sieve) were inspected for cell And tissue characteristics under a microscope Equipped with micrometer.

The vertical section of leaves showed dorsiventral structure. The Epidermis was single layered present on both sides and often interrupted By stomata on both side and covered with thin cuticle on both sides. The Epidermal cells were barrel shaped on upper sided whereas circular to Semicircular and smaller on lower side. The non-glandular, unicellular Hairs with blunt tips and often with curved apices were present on Both the surfaces of leaves, Metcalfe and Chalk] have also described Presence of unicellular hairs. These hairs were arising from the joints Of 5-7 epidermal cells, arranged in star shape of fashion. The size of Trichome varied from 42-115 µm. The stomata were anomocytic type Present on both the surfaces of leaves however these were more scattered On lower surfaces. The mesophyll was differentiated into i.e. palisade and Spongy parenchyma. The palisade layer was 2 – 3 celled in thickness and Spongy parenchyma was present below this region. The traces of vascular Strands also present in this region. The rosette crystals were scattered Throughout the region but rarely seen in palisade region .In the midrib region the section showed convex surface on both the Sides but more prominent on lower side. The palisade cells were also Present in this region. A few idioblasts also present throughout the leaf Which were either filled with rosette shaped crystals or cells filled with Starch grains. A few myrosin cells also present throughout the leaves But mainly present in midrib region. The arc shape Merisel present in Midrib region where phloem present below the xylem on dorsal side. The parenchymatous ground tissue was present upper and below the Vascular region of the midrib. Stomata index on lower surface was 10.83And upper surface 1.48, vein islet 47.18 per mm2, vein termination 31.45 Per mm2 palisade ratio 6-9.[5]

Powder Microscopy

Shows fragments of upper and lower epidermii in surface view embedded with Anomocytic stomata, rosette crystals and simple starch grains scattered as such or embedded in Parenchymatous cells of the ground tissue of the midrib and rachis, thick walled, warty, short and long Trichomes or their broken fragments scattered as such, or attached with the cells of epidermis, Longitudinally cut fragments of annular and spiral vessels, tears of gums, pigment and mucilage cells Scattered as such from the rachis.[5]

II. MATERIAL AND METHOD

1) MoringaOleifera Plant

2) Collection and drying of Leaves: After collection of leave they are wash with tapped water and dry for 15 days.

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3) Formation of Powder

After drying of leaves the powder are form by grinding process. The powder are ready to perform the further process.

4) Preparation of Extract by Maceration Technique

The maceration are performed by taking 7 gm of powder into the three iodine flask . Then add 50 ml of pet.ether , 50 ml of acetone , 50 ml chloroform in three respectively flask. Then maceration are performed for 72 hrs. After 72 hrs the extract are filtered . These filtered are use to perform phytochemical test.

Sample Collection and Preparation of the Extract. The leaves of horseradish were harvested from a village in Cuddalore district, Tamil Nadu, India and authenticated by a senior Botanist. The dust particles in the leaves were washed with water And then subjected to air and oven-drying method at 44°C for 4 Hours and ground into a fine powder using a domestic electric Blender. The maceration technique was employed to extract the Active contents of the powdered leaves with 70% ethanol at a ratio Of 1:40, w/v for 72 hours at room temperature with occasional Shaking. The resultant extract was drained with Whatman no 1 Filter paper and the remaining substance was re-extracted by the Above process and solvent up to the exhaustion of the marc.4Then, the rotary evaporator model was used to remove the Solvent and finally, the phytochemical analysis was performed In the crude extract.[4]

Phytochemical screening of leaves of Moringa Oleifera

1. **Alkaloids**: To the small amount of extract,Few drops of dilute HCl were added and then Filtered. The filtrate is treated with Dragendroffs reagent; the formation of orange brown precipitate Confirms the presence of alkaloids.
2. **Flavonoids**: To the aqueous filtrate of plant extract 5 ml of dilute ammonia solution was added andThen few drops of concentrated sulphuric acid wasAdded. A yellow color formation indicates thePresence of flavonoids.
3. **Glycosides**: To 5 ml. of extract add 25 ml of dilute Sulphuric acid and boil it for 15 minutes. Cool andNeutralize with10% sodium hydroxide, then 5 ml.Fehling solution was added to it. Brick redPrecipitate indicated the presence of glycosides.
4. **Terpenoids**: To 5 ml. of extract, 2 ml. of chloroformWas added followed by carefully addition ofConcentrated sulphuric acid. The formation of reddish brown color layer at the junction confirms The presence of terpenoids.
5. **Tannins**: Small amount of extract is diluted, then 4-5 drops of 10%ferric chloride was added .TheFormation of blue or green color indicates the Presence of tannins.
6. **Saponins** : To two ml. of alcohol diluted with water Is added to the 2 ml. of the plant extract, shakedWell for 15 minutes. Formation of foam indicatesThe presence of saponins.
7. **Steroids**: Extracts were treated with few drops of Concentrated sulphuric acid in chloroform,Appearance of red colour in chloroform layer Indicated the presence of steroids.[9]

Sr. No.	Plant constituent	Aq. Extract	Petroleum ether extract	Acetone extract	Chloroform extract
1	Alkaloids	+	+	-	+
2	Flavonoids	-	-	-	+
3	Glycoside	+	+	-	-
4	Terpenoids	+	-	+	+
5	Tannins	-	-	+	+
6	Saponins	+	+	+	-
7	Steroids	-	-	+	+

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Result of Phytochemical Screening

The presence of phytochemicals in the ethanolic extract of MOL Extract is summarized in the Table Stronger presence of some chemical compounds like proteins And amino acids, flavonoids, alkaloids, steroids, and saponins were Detected. The extract showed weak positivity for phytosterols, Reducing sugars, and fats and fixed oils. But carbohydrates, anthraquinones, tannin, and triterpenoids were not identified in The extract of MOL.

Pharmacological Action

Antimicrobial Study

Leaves, roots, bark and seeds of Moringaoleifera showed in Vitro antimicrobial activity against bacteria (Bacillus cereus, Candida albicans, Streptococcus faecalis, Staphylococcus Aureus, Staphylococcus epidermidis, Bacillus subtilis, Shigellashinga, Shigellasonnei, Pseudomonas aeruginosa, E.Coli and Aspergillusniger), yeast, dermatophytic and Helminthes in a disk diffusion technique. It was also reported That Moringaoleifera exhibit antifungal activity in both Dilution and agar plate methods against Trichophytonrubrum And Trichophytonmentagrophytes, EpidermophytonXoccosum, and Microsporumcanis, Fusariumsolani and Rhizopussolani. 4-(-L-rhamnopyranosyloxy) benzyl Isothiocyanate 4,4-(-L -rhamnopyranosyloxy)Benzylglucosinolate and Pterygospermin are the responsible Chemical constitutes responsible for its anti-biotic activity.[8]

Anti-Inflammatory Study

Methanolic extract of root bark, aqueous extract of roots, Methanolic extract of leaves and flowers as well as ethanolic Extract of seeds of Moringaoleifera had showed anti-Inflammatory activity in carrageenan induced paw edema Model. Aurantiamide acetate and 1, 3-dibenzyl urea, isolated From roots shown this anti-inflammatory activity so they Responsible for anti-inflammatory activity of MoringaoleiferaRoots.[8]

Analgesic Study

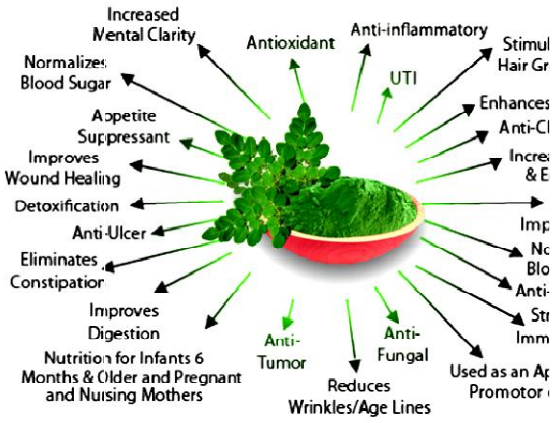
Methanolic extract of Moringaoleifera root bark showed Analgesic activity in Acetic acid induced writhing model in Mice.[11]

Anti-Cancerous Study

Various extracts of leaves and ethanolic extract of seeds of Moringaoleifera showed antitumor activity in in-vitro tests. Thiocarbamate and isothiocyanate related compounds were Isolated, which act as inhibitor of tumor promoter teleocidin B-4- induced Epstein Barr virus (EBV) activation in raji cells.[8]

Antifertility Study

Shukla et al., (1988) studied that the aqueous extract of Moringaoleifera was found be effective as anti-fertility in Presence as well as absence of estradioldipropionate and Progesterone and shown increased histoarchitecture of Uterine.[8]



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Applications of Moringaoleifera in Food Industry:-

Moringaoleifera has several uses due to its composition. The seed powder is used to purify water, eliminating a large amount of suspended material in rivers and turbid waters, making it a natural coagulant for water treatment. The oil from the seeds can be used as a fertiliser in plantations to encourage the growth of other species; it is also used for cosmetics such as soaps and perfumes ,and even for the production of biodiesel.[10]

Hepatoprotective and Nutraceutical Activity

Consumption of high-fat diet (HFD) induces nonalcoholic fatty liver disease) andMay lead to multiple complications affecting human health. In the study of Das et al. The preventive as also curative hepatoprotective activity effect of M. oleifera leaf ExtractIn alleviating HFD induced liver injury in mice has been reported. Results suggested That M. oleifera leaf extract treatment protected HFD-induced liver damage as indicatedBy histopathology and liver enzyme activity compared to only-HFD fed group ($p < 0.05$).Interestingly, early signs of HFD-induced fatty liver were also alleviated by M. oleiferaleafExtract. Moreover, significant increase in endogenous antioxidant parameters and lowerbLipid peroxidation were found in liver of all M. oleifera leaf extract treated groups].Almatrafi et al. [studied the mechanisms by which M. oleifera leaves modulate Hepatic lipids on guinea pigs. Low moringa or 15% high moringa diets with 0.25% dietaryCholesterol to induce hepatic steatosis. This study demonstrates that M. oleifera leaves mayPrevent hepatic steatosis by affecting gene expression related to hepatic lipids synthesis Resulting in lower concentrations of cholesterol and triglycerides and reduced inflammation In the liver.Richter et al. evaluated the suitability of freeze-dried moringa leaf meal as alternative protein source for Nile tilapia. Three experimental diets were formulated substituting 10%, 20%, and 30% of the total dietary protein of fish with plant leaves. Diets with higher % of moringa leaves significantly depressed growth performance of the fish comparednThe other diets.[12]

III. CONCLUSION

Our present study mainly based on the morphological, anatomical Powder microscopy and fluorescence analysis of the medicinal plant Moringaoleifera. This study shows that plants have very important and Peculiar characters for the identification of a plant. The morphological And anatomical analysis of Moringaoleifera is essential because Only few publications are available which are not sufficient for the Standardization and authentication as a raw drug. Such peculiar Anatomical features of this plant are like presence of sclerenchyma Patches in the cortical regions of root, stem and petiole; mature root Vessels contained a balloon like outgrowth of parenchyma known as Tyloses. Presence of large mucilaginous canal in the center of the pith Of mature stem and petiole, this mucilaginous canal were two in young Stage of stem. Presence of myrosin cells mainly toward the periphery in All parts of the plant. Abundantly presence of sphaeraphids in root, stem, Petiole and leaf. In current study the complete elaborative description of All plant parts including new studies on sepals, petals and petiolules were Also preformed. Some peculiar characters like chlorenchymatous cells in Petiolule; dorsal papillose epidermal cells in petals; minute unicellular, Non-glandular hairs with blunt tips and broad lumen reported covering The epidermis of sepals. Simple, effective and economical techniques Have been used for complete identification and characterization of The plant. This can therefore, be an effective article for anatomical and Morphological identification of plants by manufacturers, industrialists, Researchers, etc.

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REFERENCES

[1]. Jaya Gupta, Amit Gupta and A.K.Gupta. Preliminary phytochemical screening of leaves of Moringaoleifera Lam. J. Chemtracks, 16 (1), 285-288, 2014

[2]. Ramesh Kumar Saini, IyyakkannuSivanesan, Young-SooKeum . Phytochemicals of Moringaoleifera: a review of their nutritional, therapeutic and industrial significance , 3 Biotech (2016) .

IJARSCT
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[3]. Ayon Bhattacharya, PrashantTiwari ,Pratap K. Sahu , Sanjay Kumar. A Review of the Phytochemical and Pharmacological Characteristics of Moringaoleifera, September 26, 2022.

[4]. RamalingamSudha , Xavier Chandra Philip , KVP Suriyakumar Phytochemical Constituents of Leaves of Moringaoleifera

[5]. H. U. Dan Malam, Z. Abubakar and U. A. Katsayal. Pharmacognostic studies on the leaves of moringa Nig. J. Nat Prod. And Med. Vol. 05 2001 published on Aug 2016.

[6]. PoornimaShukla, ManojTripathi,pharmacognostical evaluation and antimicrobial activity of moringaoleiferalamk Int. J. Pure App. Biosci. 3 (5): 95-100 (2015) .

[7]. Monika Singh, Shilpi Singh, DigvijayVerma, Morphological and Pharmacognostical Evaluation of Moringaoleifera Lam. (Moringaceae): A Plant with High Medicinal Value in Tropical and Subtropical Parts of the World, Pharmacogn Rev 2020;14(28):138-145.

[8]. Shamim, Saad Ahmed and Lubna Fatima, Medicinal properties of Moringaoleifera (Sahajana): A ThePharma Innovation Journal 2018; 7(10): 311-316.

[9]. D.Jaiswal, R.P.Kumar, A.Kumar, S.Mehta and G.Watal, J. Ethnopharmacol, 123, 392, (2009).

[10]. SANJIVE KUMAR,medicinal importance of moringaoleifera: drumstick Indian J.Sci.Res. 16 (1): 129-132, 2017

[11]. Kashyap, P.; Kumar, S.; Riar,C.S.; Jindal, N.; Baniwal, P.; Guine,R.P.F.; Correia, P.M.R.; Mehra, R.;Kumar, H. Recent Advances inDrumstick (Moringaoleifera) Leaves Bioactive Compounds: Composition,Health Benefits, Bioaccessibility, andDietary Applications. Antioxidants 2022, 11, 402.

[12]. Anzano, A.; Ammar, M.;Papaianni, M.; Grauso, L.; Sabbah, M.;Capparelli, R.; Lanzotti, V. MoringaOleifera Lam.: A Phytochemical andPharmacologicalOverview.Horticultural 2021, 7, 409.