https://doi.org/10.33472/AFJBS.6.3.2024.6203-6222

African Journal of Biological Sciences

Research Paper Open Access

A Detailed Study Of Moringa Oleifera And Their Pharmacological Properties, Including Their Animal Studies

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Article History
Volume 6, Issue 05, May 2024
Received: 02-05-2024
Accepted: 20-05-2024
Published: 01-06-2024
Doi:10.33472/AFJBS.6.3.2024.6203-6222

Abstract:

Background: M. oleifera & Moringa Pteridosperma tree has a wide range of therapeutic applications, including both prevention and therapy. Its bark, seeds, oil, sap, leaves, roots, and flowers, gums are used in conventional medicine. It provides an immediate remedy for stomach ulcer, gastric ulcer and other type of ulcer. it provides the therapeutic treatment of the ulcer disease.

Objective: The study's goal was to assess the function of M. oleifera & Moringa Pteridosperma in the treatment of anti ulcer activity. The article summarised numerous pre-clinical report, clinical trials reports, in addition to the mechanism of action to provide an overview of Moringa Oleifera & Moringa Pteridosperma usefulness in the treatment of anti- ulcer activity.

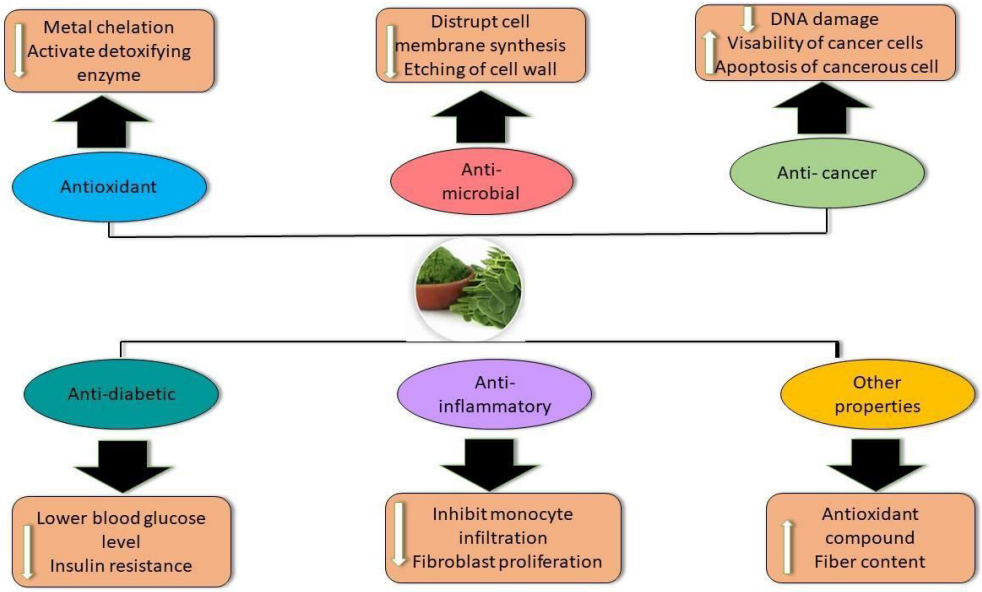
Methods: The information for their review articles was acquired by using Google Scholar and PubMed as search engines, as well as a number of publishers, including Springer Nature, Bentham Science Taylor & Francis, and Elsevier. Clinical trails.gov.in was referred to study the clinical trials data and pre-clinical trail data as a search engine.

Results: M. oleifera & Moringa Pteridosperm plants is useful for anti-ulcer activity prevention and treatment due to its anti-inflammatory, antibacterial, and antioxidant features for plant. M. oleifera & Moringa Pteridosperma plants can be used as an alternative to treat ulcer and its related physiological effects such as antibacterial effect, inhibiting the growth of helicobacter pylori healing effect and various pre-clinical and clinical studies have been summarized that have demonstrated that using M. oleifera & Moringa Pteridosperma significantly improved the mentioned parameter.

Conclusion: M. oleifera & Moringa Pteridosperma is an herb that may be used to treat antiulcer activity and its associated negative effects. More preclinical and clinical research, however, might contribute to raising awareness and management of Moringa.

Keywords: "M. oleifera & Moringa Pteridosperma", Botanical Description, Clinical and Preclinical trail.

Graphical Abstract:



Introduction

Moringa oleifera (M. oleifera), the "miracle tree", thrives globally in almost all tropical and subtropical regions, but it is believed to be native to Afghanistan, Bangladesh, India, and Pakistan [1]. The Moringa family comprises 13 species (M. oleifera, M. arborea, M. rivae, M. ruspoliana, M. drouhardii, M. hildebrandtii, M. concanensis, M. borziana, M. longituba, M. pygmaea, M. ovalifolia, M. peregrina, M. stenopetala), of which M. oleifera has become well known for its use in nutrition, biogas production, fertilizer, etc., [2-3]. Moringa has the unique property of tolerating drought. Nearly all parts of the tree are used for their essential nutrients [4]. M. oleifera leaves have a high content of beta-carotene, minerals, calcium, and potassium [5]. Dried leaves have an oleic acid content of about 70%, which make them suitable for making moisturizers [6]. The powdered leaves are used to make many beverages, of which "Zija" is the most popular in India [7]. The bark of the tree & flower is considered very useful in the treatment of different disorders such as ulcers [8]. Moringa antioxidative Effects Increased oxidative stress has long been identified as the common etiology in cardiovascular diseases. Excessive reactive oxygen species (ROS) activate signaling pathways resulting in epigenetic dysregulation, chronic inflammation, endothelial dysfunction, and ultimately in apoptotic cell death. Moringa oleifera is health restorative plant and it is very well-known in tropical and subtropical nations. Generally, Moringa oleifera is being utilized for its anti-inflammatory property because of its constituents found in leaves. In India, poltices of seed units have been utilized to treat glandular aggravation.[9]. Different investigations on extracts of Moringa oleifera seed pods, leaves, seeds done on human and animals as well as toxicity studies examined so far recommends that they are protected to use in normally used portions. Moringa oleifera shows pharmacological properties like anti-asthmatic, hepato-defensive, anti-fertility, anticancer, antimicrobial, cardiovascular, against ulcer, antipyretic action. The role of Moringa olifera, Moringa

Pteridosperma in ulcer can be used to treat it. In this review article, we have summarized the mechanism of action of Moringa olifera also we have supported also the study by summarizing the data from several clinical preclinical of Moringa Olifera, Moringa Pteridosperma.

Botanical Description:

Moringa oleifera grows mainly in the southern states of Tamil Nadu, Kerala, Andhra Pradesh, and Karnataka. India is the largest provider of Moringa oleifera, producing 1.2 million tones of organic goods per year from a land area of 388 km2. Moringa oleifera is grown in private nurseries and as a living barrier in South and Southeast Asia, where it is commonly sold in neighborhood markets. It is commonly grown in Indonesia for its edible leaves. The World Vegetable Centre in Taiwan has also successfully cultivated Moringa oleifera for vegetable research. Moringa oleifera is an evergreen or deciduous tree that can reach 10 to 12 meters high. These leaves are bipinnate or tripinnate fluffy green leaves with leaflets up to 1-2 cm long. The top layer of these leaflets is bristly and nearly hairless, while the twigs are fuzzy and green. Blossoms are normally white with fuzzy stalks; each bloom can be up to 1 cm long and 2 cm wide. They are indiscriminate, fragrant, and have 10 to 25 cm long dangling auxillary. The sepals are straight lanceolate, while the petals are thin spatulate. They include the 5 flowers and 5 staminodes and are reflexed except for the least. Natural items are frequently referred to as pods. They have three lobes and are green in color. The develop pods are dark coloured triangular, pendulous, and divide into three portions the long way when dry 30 to 120 cm long, and 1.8 cm broad natural goods generation occurs primarily in March and April. Fruits contain approximately 26 seeds during their development process. The seeds are spherical and caramel in color, measuring 1cm across. It features three papery wing bodies and a semi-permeable fruit structure. Seeds are dark but might be white when portions are unsuitable. Reasonable seed development takes within 14 days; each tree may produce between 15,000 and 25,000 seeds per year.

Pharmacological Activities:

Moringa has been mentioned as the tree of god for its multiple uses to treat Anti ulcer diseases. Moringa oleifera possess vast pharmacological activities. **Table 1**

Parts of Plant	Chemical Constituents	Reference
Leaves	Quercetin, kaempferol, carotenoids, -tocopherol, alinolenic acid, linoleic acid, Palmitic acid, Ca, Fe, Niaziminin A, and Niaziminin B, three mustard oil glycosides, niaziminin, a thiocarbamate, 4(alpha-1- rhamnopyranosyloxy)benzylglucosinolate, quercetin-3O-glucoside, and quercetin-3-O-(6"- Malonylglucoside), Niazimicin.	[10]
Flower	MUFAs, ascorbic acid, protein, D-mannose, kaemopherol, kaempferitin	[11]
Fruits	Carotenoids, monounsaturated fatty acids (MUFAs), potassium, phosphorus, copper, O-ethyl4-(alpha-L-rhamnosyloxy) benzyl carbamate, methyl-	[12]

	phydroxybenzoate, and beta-sitosterol	
Roots	Moringine, moringinine, spirachin, 1,3-dibenzyl urea, alpha-phellandrene, cymene, Deoxy-p-niazimicine, olate Benzyl glucosin (glucotropaeolin), .	[13]
Seeds	Dodecanoic acid, tetradecanoic acid, hexadecanoic acid, octadecanoic acid, palmitoleic acid, stearic acid, arachidic acid	[14]
Stem	Glucomoringin, -sitosterone, and -sitosterol are all components of glucomoringin.	[15-16]

Ethnomedicinal/Traditional Properties:

Plants part	Pharmacological activity	Finding/Outcome	Possible Phytoconstituents	Reference
Moringa oleifera leaves	Anti-diabetic activity	1. An ethanol extract of Moringa oleifera leaves lowers blood glucose, HbA1c, and glycogen levels. 2. The ethyl acetate fraction of Moringa corrected STZinduced symptoms such as weight loss and increased average water and food consumption.	Terpenoids, quercetin, chlorogenic acid, kaempferol, flavanoids, proteins, fixed oils and fats and carbohydrates	[17-22]

		Aqueous extract of Moringa oleifera leaves possess dose-dependent hypoglycemic activity in normoglvcemic and hyperglycemic animals. Aqueous leaf extract reduced albumin serum levels and total protein, indicating a decreased within the diabetes treatment group. Aqueous extract of plants lowers blood glucose levels in normal rats and regulates levels in diabetic rats (mild, sub, and severe). Ethanol extract of leaves lowered blood glucose levels in the pretreated group. It also reduced blood glucose levels dosedependently during a 14day period. Blood glucose levels in normal rats gradually decrease.		

		7. An aqueous extract of Moringa oleifera leaves was tested for wound healing in STZ-induced diabetic rats. The extract influenced dermal wound healing after systemic and topical treatment, based on the study.		
	Anti convulsant activity	The study found that hexane and ethanol extracts of Moringa leaves decreased seizure latency. 1. The study found that hexane and ethanol extracts of Moringa leaves decreased seizure latency.	Linoleic acid	[23]
	Anti depressant activity	Moringa leaf alcohol extract has been studied for antidepressant effects using three animal models: forced swim test, tail suspension test, and locomotor activity	Quercetin, kaempferol, glucosinolates, fatty acids, isothiocyanates,	[24-25]

	test. It was determined that it had antidepressant action. Moringa leaf ethanolic extract was synthesized to assess neurobehavioral properties using open field, hole board, Y-maze, elevated plus maze, and pentobarbitoneinduced hypnosis. The results of this study showed the extract of MO leaves has CNS depressive and anticonvulsant properties, which could be caused by an augmentation in a main inhibitory mechanism involving GABA release. 2.	hexadecanoic acid, flavonoids and phenols	
Antiinflammatory activity	1. Moringa oleifera leaves were dried and pulverised before being extracted with ethanol/water (4:1) followed by a series of liquid-liquid extractions. According to the findings of the study, extracts produced with polar solvents exhibited much stronger antioxidant capabilities.	Glucosinolates, isothiocyanates, β-carotene, αtocopherol, vanillin, benzoic acid, salicylic acid, chlorogenic acid, 3,4,5- methoxy - cinnamic acid.	[26-29]

	Moringa oleifera leaf extracts were investigated for antioxidant activity using developed in vitro studies during two phases of maturity. Moringa oleifera leaves were shown to have high antioxidant activity. According to the findings, there were minimal changes in antioxidant activity between mature and tender leaves. 3. Moringa leaf ethanol extracts protect male rats' livers from diclofenac sodium-induced toxicity. HPLC was used to identify phenolic chemicals.

	According to the findings, intake of the extract improved liver and kidney functioning. It protects the liver from oxidative liver damage caused by DNA. The antioxidant activity of Moringa oleifera leaves extracted with methanol and dichloromethane was tested.

		The antioxidant activity was determined using radical scavenging assays using 1, 1-diphenyl-2picrylhydrazyl (DPPH) and 2,2'-azino-bis 3ethylbenzothiazoline-6sulfonic acid (ABTS). The study shows that M. oleifera leaves have antioxidant effects.		
	Antioxidant activity	1. Moringa leaves were purified with aqueous and ethanol-based extracts. During the test, edema was suppressed, which could be owing to the inhibitory effects on the release of histamine, 5-hydroxytryptamine, and kinin-like compounds, which have been reported to release from mast cell breakdown during the first hour of carrageen-induced simulated paw edema.	Flavonoids, tannins, saponins, terpenoids, cardiac glycosides, amino acids, α and β -carotene, sterols, carbohydrates, alkaloids, iron, calcium, phosphorus, vitamin A and B, α-tocopherol,	[30-32]

	2. Hexane and ethanol were utilized to extract developed dried 3.leaves. The study provides evidence of a broad spectrum of anti-inflammatory properties in using Moringa oleifera leaves polar extracts. 3. A carrageen-induced paw oedema test and a histamine-induced pedal oedema test were used to assess the anti-inflammatory effects of Moringa leaf methanol extract. According to the findings, the methanol extract of Moringa oleifera leaf has a strong antioedematogenic action on carrageen and histamineinduced paw oedema.	riboflavin, nicotinic acid, folic acid, pyroxidine.	
Anti-cancer activity	1.Methanol and dichloromethane were used to extract the leaves of Moringa oleifera. The extract's chemoprotective and antiproliferative	Polyphenol, gallic acid, quercetin and kaempferol, glycosides, flavonoids	[29]

		properties were studied. According to the findings, it has antioxidant activity and cytotoxic and chemoprotective characteristics.		
	Anti-hyper-lipedmic activity	1. Moringa leaves were hydroalcoholic extracted. According to the study's findings, sitosterol inhibits dietary cholesterol absorption.	β-sitosterol, flavonoids, polyphenols.	[33]
Stem	Anti-ulcer activity	1. AgNPs are generated from shade dried Moringa oleifera stem bark. These nanoparticles increased the intracellular ROS generation in a dosedependent manner. These also affected the cell cycle, preventing cell multiplication. AgNPs have	Phenols, β-sitosterol, caffeoylquinic acid, quercetin, kaempferol	[34]

		anti-cancer action against HeLa cells.		
	Anti-bacterial activity	The biological activity of Moringa oleifera extracts such as methanol, chloroform, ethyl acetate, and aqueous was	Alkaloids, and flavonoids, tannins terpenoids.	[35]
		determined using the paper disc diffusion method. In various extents, all extracts, regardless of kind, inhibited the growth of test pathogens. In comparison to these extracts, ethyl acetate extract had the highest activity, followed in decreasing order by chloroform, methanol, and aqueous extracts.		
	Anti-activity	Ethanol extract of root-bark of Moringa oleifera possess anti-ulcer, antisecretory and cytoprotective activity. Moringa oleifera may be used to treat stomach ulcers and mucosal sores. It also reduces acidity and raises the pH of gastric juice.	Alkaloids, carbohydrates, proteins, tannins, phenols, steroids, saponins, triterpinoid	[36]
	Anti-oxidant activity	The anti-inflammatory activity of crude petroleum ether, chloroform, and methanol-based extracts of Moringa oleifera root was determined using the DPPH radical scavenging assay technique.	Tannins, flavonoids, steroids, alkaloids, triterpenoids, sterols, procyanidins, glycosides.	[37-38]
Flower	Anti-oxidant flower	A cold maceration method generated an alcohol extract	Tannins, steroids,	[39-40]
		of Moringa oleifera dried flowers. The extract's antioxidant activity was assessed using DPPH radical scavenging, which revealed potential radical scavenging action. Ethanol and saline extract of Moringa flowers were evaluated for antioxidant activity. The antioxidant activity was stronger in ethanol extract than saline extract.	flavonoids, alkaloids, carbohydrates, glycosides, cardiac glycosides, terpenoids, polyphenols, flavonoids, alkaloids, terpenoids	
Moringa olifera root	Antiinflammatory activity	Methanol extract of Moringa oleifera root was tested for anti-inflammatory activities utilising carrageen-induced paw oedema and 6-day air pouch inflammation acute and chronic inflammation.	Alkaloids, carbohydrates, proteins, tannins, phenols, steroids Saponins, triterpinoids.	[41]
	Anti-microbial activity	Using the disc diffusion method, several Moringa oleifera root extracts were tested	saponins, terpenoids, steroids, tannins,	[42-43]

		for antibacterial activity against Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Proteus	cardioglycosides, aminoacids and protein	
		mirabilis, Penicillium sp., Mucor sp., Aspergillus niger, and Candida albicans. Ethyl acetate extract exceeds other extracts in terms of antimicrobial activity. Aqueous extract has the most effectiveness against Penicillium species.		

Anti-microbial & Anti-fungal property

A substance N-benzylethyl thioformate (an aglycone of deoxyniazimincin) found in M. oleifera ethanolic root extract is responsible for the antibacterial and antifungal activity against a wide range of microorganisms and fungi [44]. M. oleifera methanolic leaf extract may suppress urinary tract infections caused by Gram-negative and Gram-positive bacteria such as Klebsiella pneumoniae, Staphylococcus aureus, Escherichia coli, and Staphylococcus saprophyticus [45].

The inhibitory impact of extracts via seeds, leaves, and stems of M. oleifera was provided in various microbial strains such as Aspergillus flavus, Aspergillus terreus, Aspergillus nidulans, Rhizoctonia solani, Aspergillus niger, Aspergillus oryzae, Fusarium solani, Penicillium sclerotigenum, Cladosporium cladosporioides, Trichophyton mentagrophytes, Penicillium species, Pullarium species [44]. M. oleifera seeds contain 4-(alpha-L-rhamanosyloxy) benzyl isothiocyanates, which are thought to be responsible for their antibacterial activity.

Anti-inflammatory activity

TNF- generation was suppressed by M. oleifera roots, identified as aurnatiamide acetate and 1,3dibenzylurea [46]. Anti-inflammatory substances include tannins, phenols, alkaloids, flavonoids, and carotenoids β-sitosterol, vanillin, and moringa.

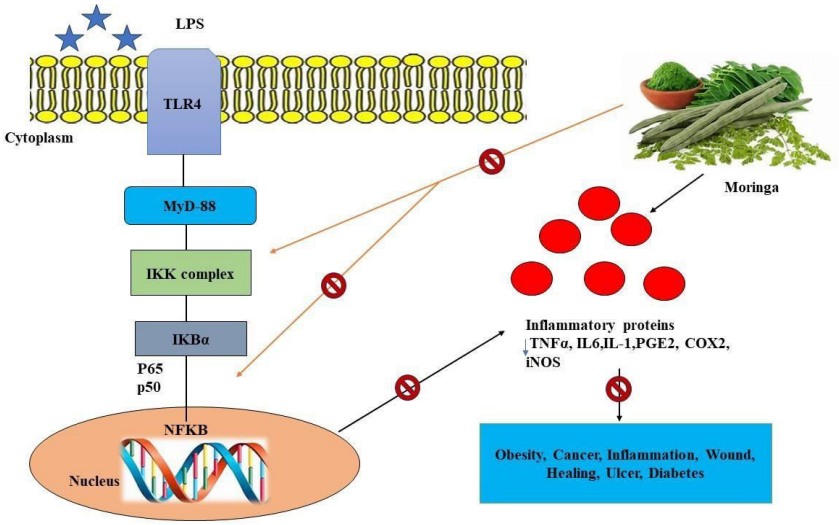


Figure No: 1 Moringa oleifera as an oxidative and inflammatory marker.

Anti-oxidant activity:

Bioactive substances from Moringa pods such as glycosylates [47], isothiocyanates [48], thiocarbamates [49], flavonoids [50], and other chemicals have been studied for reactive oxygen species. The aqueous extract is an effective free radical scavenger. Myricetin, obtained from Moringa seed extract, is a better antioxidant than BHT and alpha tocopherol. In HEK-293 cells, M. oleifera leaf extract and components such as isoquercetin, astragalin, and crypto-chlorogenic acid can reduce ROS [51-53]. Moringa also aids in the reduction of plasma monoaldehyde (MDA) and ulcer levels in fasting plasma glucose (FPG) anti-cancer activity.

Several moringa parts (fruits, leaves, flowers, and stems) are beneficial against cancer, a deadly disease. The isolated compounds thiocarbamate and isothiocyanate from moringa act as tumor cell inhibitors [54-55], and the dichloromethane fraction was found to be cytotoxic for MCF7 breast cancer cells [56] anti-ulcer activity

Bisphenols and flavonoids found in moringa leaves lowered ulcer index, duodenal ulcer, and stress ulcer in an ibuprofen-induced gastric ulcer model [57]. Moringa extract has been proven to reduce free radicals considerably, neutralize the acidic behavior of gastric juice, and protect against the development of stomach ulcers [58]. The presence of flavonoids in the plant has been proven to protect against ulcer formation by enhancing capillary resistance and boosting microcirculation, reducing cell harm cytotoxic activity

M. oleifera on human mesenchymal myeloma cell lines is observed in methanolic extract. The results of the extracts showed a higher ID50 value than other extracts [59]. It was found that the ethanolic leaves extract of M. oleifera contains active constituents that can alleviate cyclophosphamide-induced testicular toxicity by promoting genes associated with the functional integrity of spermatozoa and enlargement of DNA in spermatogonia [60-61].

Pre-Clinical Trail:

The effectiveness of the herbs in managing and preventing the various stages involved in the pathogenesis of Moringa Oleifera in rat and mouse models has been examined (**Table 1).** summarise~~s~~ a few of such studies

Table No: 1 Enlist various animal studies involving the above-mentioned plants in the management of Moringa oleifera Moringa Pteridosperma.

Plants part	Author name	Species	Effect	Dose derivative	Study design	Inference	Reference
Root bark	Manoj Kumar Cho udhary 2013	Moringa Oleifera	Gastri c ulcer	500 mg/kg body weight	Wistar rat	The MO significantly reduced the free acidity, total acidity, and ulcer index ($p < 0.01$) and increased the pH of gastric content compared with the control group.	[62]
Seeds	Attia H. Atta et.al 2019			100-200 mg/kg body weight	Spargue Dawley rat	The macro-and microscopic picture, decreased the ulcerative index, lesion score,	[63]
						oxidative markers and inflammatory mediators, and	

						inhibited the COX-1 and COX-2 enzymes. Propolis appeared to be powerful free radicals scavenger. good synergistic effect against the disease.	
Bark extract	Michael O. Ugwah	Moringa Olifera	Stomach ulcer	500 mg/kg body weight	Wistar rat	A significant dose dependent reduction in mean ulcer indices were also observed after three and seven days of treatment showed no alteration in the different doses of the extract when compared to the control.	[64]
Leaf extract	Hamid A. K. et.al 2015		Peptic ulcer	200mg/kg body weight	Swice Albino mice	Biochemical parameters showed significant anti ulcer activity of Moringa Oleifera. The anti ulcer activity was almost comparable	[65]
						to the positive control. Moringa has considerable anti ulcer activity.	
Leaves & Fruit extract	V.C. Devaraj et.al 2013	Moringa Oleifera	Gastric ulcer	200-250mg/kg body weight	Wistar rat	The leaf extracts also produced a significant reduction of stress-induced gastric ulcers and cysteamine-induced duodenal ulcers. increase healing of gastric ulcers and also prevent the development of experimentally induced gastric ulcers and duodenal ulcers in rats.	[66]
Leaves extract	Siddhartha Debnath 2012	Moringa Pteridosperma	Gastric ulcer	150-200 mg/kg body weight	Albino rat	The results of our study suggest that MO protects ulcer formation by modulating 5-HT secretion through EC cell via $5HT_3$ receptors in	[67]

						gastrointestinal tract.	

Root extract	Verma et.al 2012		Gastric ulcer	14 days	Mice	The alcoholic leaves extract of M. oleifera Lam. has shown ulcer protective effect as dose dependently against pylorusligation, ethanol, cold restraint stress, and aspirin induced gastric ulcer in rats. The said extract of M. oleifera Lam. was found to decrease ulcer and acid pepsin secretion	[68]
Flower buds	Abdul Hameed Ak htar et.al 2012	Moringa Pteridosperma	Gastric ulcer	100-125 mg/kg body weight	Wistar rat	Their effects on the volume of gastric juice secreted, acid output, peptic activity, mucin activity and curative ratio were recorded. Bauhinia racemosa (flower buds) decreased the ulcer index significantly, and Moringa pterygosperma (flo	[69]
						wer buds) showed some decrease in the ulcer index.	
Root bark extract	Manoj Kumar Cho udhary et.al 2013		Gstric ulcer	150-350 mg/kg body weight	Albino wistar rat	he MO significantly reduced the free acidity, total acidity, and ulcer index ($p < 0.01$) and increased the pH of gastric content compared with the control group. This study show that MO possesses valuable antiulcer, antisecretory, and cytoprotective activity	[70]

Seeds	Mahajan et al. 2014	Moringa Pteridosperma	Liver cancer	50-100 mg/kg body weight	Wistar rat	M. oleifera seeds also altered oxidative stress in relation to its antiinflammatory activity. results and observations, it can be concluded that the seeds possess promising anti ulcer property	[71]

Clinical Studies:

Biomedical researcher use a variety of technique to develop treatment for human illness and condition, involving computational stimulation, tissue and cultured cells, and clinical studies. Prior to a drug being approved for sale, clinical trail are gold standard for assessing the effectiveness and security of the phytochemical herbs. However, there a few different problem that have been well noticed in conventional clinical trail, including protected time and rising price among other. A variety of accelerated clinical trail methodologies to increase the effectiveness of clinical investigation **Table No: 2** summarise the clinical studies on the use of Moringa oleifera & Moringa Pteridosperma in treating the afermentioned disorder.

Table No: 2 Enlist various pateint studies involving the above-mentioned plants in the management of Moringa oleifera & Moringa Pteridosperma.

Plants part	Author name	Species	Study design	Dose derivative	Inference	Reference
Leaf powder	William F et.al 2012era	Moringa **Olief**	Diabetic pateint	5 gm	the reduced blood glucose response to M. oleifera was not due to alterations in insulin secretion.	[72]
Seed	**Arga Setyo Adji et.al 2022**		Gastric ulcer pateint	20-50 mg/kg body weight	leaf extract M. oleifera played a role in preventing some of the effects of the pathogenesis of diarrhea due to bacterial infection show anti bacterial	[73]
					antibacterial effects.	
Root	Nambiar et et.al 2012		Diabetic pateint	4.6 g/kg body weight	M. oleifera Compared with the control group, the treated subjects experienced a 1.6% decrease in total plasma cholesterol and a 6.3% increase in HDL. Comparing this study with the previous studies suggests that higher doses may be more effective.	[74]
Fruits	Subrata I Biswas et.al 2015	Moringa oleifera	Gastric ulcer	4-5 g/kg	M. oleifera extract significantly reduced the free acidity and total acidity of gastric juice.	[75]
Leaf extract	Reda Abo Elfath Ahmed Elsoud et.al		Gstric, stoamach ulcer Pateint	200-250 mg/kg body weight	It also increased the anti-inflammatory markers IL10 and GSH and decreased the	[76]

	2022					

					inflammatory marker IL6. Also, revealed that persons taking MOLE as a routine intake will be protected more than persons taking it as a medication.	
Ethanolic extract of leaves	G. Vinothapooshan et.al 2015	Moringa Pteridosperma	Stomach ulcer	2530mg/kg body weight	Ethanolic extract of the leaves of Mimosa pudica have been reported to possess antiulcer activity in a dosedependent manner and these leaf extracts may be useful as a natural antioxidant in treatment of ulcer	[77]
Leaf	Banik Bapan et.al 2022	Moreinga Pteridosperma	Gastric ulcer	100 gm powder	Results suggest that consumption of the leaves of Moringa oleifera may be beneficial in the healing of	[78]
					ulcers in patients suffering from peptic ulcer disease	
Flower extract	Tragulpakseerojn, J		Colorectal camcer	20-30 mg/kg body weight	M. oleifera has regeneration potential in addition to its anti-cancerous potential, since flower extract promoted cell proliferation in normal cells but not in cancer cells. The effect of M. oleifera extract on various cancer cell lines	[79]

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