PHYSICO-CHEMICAL ANALYSIS, BIOASSAY&TRADITIONAL USES OF *MORINGA OLEIFERA* LEAVES

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ABSTRACT

Moringa oleifera (Moringaceae) is high valued plant distributed in many countries of tropic and subtropics. It has an impressive range of medicinal uses with high nutritional value. *M. Oleifera* is very important for its medicinal value. Various part of this plant such as leaves, roots, seeds, bark, fruit, flower & immature pods acts as cardiac and circulatory stimulants, possess antipyretic, antiepileptic, anti-inflammatory, antiulcer, antidiuretic, antihypertensive, cholesterol lowering, antioxidant, anti diabetics, hepatoprotective , antibacterial, and antifungal activity and are being employed for the treatment of different aliments in the indigenous system of medicine, particularly in south Asia. Phytochemical study shows presence of glycosides, flavanoids, tannin & saponin. Whereas antibacterial activity against pathogens *staphylococcusaureus, S. Typhimurium, P. Vulgaris, P. auruginosa & B. Megaterium.* Out of five extract ethanol & acetone extract shows good antibacterial activity.

Key words:- Aqueous extract, Ethanol extract, Chloroform extract, Acetone extract, Petroleum ether,Phytochemical & Glycosides,Traditional uses.

Introduction

" Moringa Oleifera " has 14 species of family *moringaceae*, native to India, Africa, Arabia, South Asia, South America and pacific and Caribbean islands. Because *Moringa oleifera* has been naturalized in tropic & sub tropic regions worldwide, the plant is referred to number or

names such as horesdish tree, drumstick tree ben oil tree, miracle tree and "Mothers best friends". [1]

Moringa Oleifera is a small, fast growing evergreen or deciduous tree that usually grows upto 10 to 12 m. in height, open crown of dropping fragile branches, feathery toliage of tripinnate leaves and thicky corky, whitish bark.[2]

Moringa Oleifera is used as a highly nutritive vegetable in many countries. Its young leaves, flowers, seeds & tender pods are commonly consumed and they are having same medicinal properties. Traditionally its roots are applied as plaster to reduce the swelling & rheumatism. The root, flower, fruit & leaf have analgesic & anti-inflammatory activity.

Moringa leaves contain phytochemical having potent anticancer and hypotensive activity and are considered full of medicinal properties and used in siddha medicine.[3] The whole plant of *Moringa Oleifera* is used in the treatment of psychosis, eye diseases, fever & as an aphrodisiac, aqueous extract of root & bark were found to be effective in preventing implantation , aqueous extract of fruit have shown significant anti inflammatory activity, methanolic extract of leaves have antiulcer activity and ethanolic extract of seed exhibited antitumor activity.[4] *Moringa Oleifera* is used as drug in many ayurvedic practitioners for the treatment of asthama and evaluate the anthelmentic activity of methanolic extract of *Moringa Oleifera* in adult Indian earthworms pheretima posithuma at different doses. [5] The *Moringa* plant provides a rich and rare combination of zeatin, quarcetin, kaemferon and many other phytochemicals. various parts of the plant such as leaves, root, seed, flower, fruits and immature pod acts as cardiac and circulatory stimulant, posses antitumor, antipyretic, antiepileptic, anti inflammatory , antiulcer. [6] Other important medicinal properties of the plant includes antispasmodic [7], diuretic [8], antihypertensive [9], cholesterol lowering [10], antioxidant, anti diabetic , hepatoprotective [11], antibacterial and antifungal activity. [12].

Table .1: Ash analysis of *Moringaoleifera*leaves.

Sr. No.	Type of ash	Percentage(w/w)
1	Total ash	10.0 %

2	Acid insoluble ash	2.0%
3	Water soluble ash	2.1%

Table .2: Percentage extractive value of*Moringaoleifera*leaves

Sr. No.	Type of extractive value	Percentage(w/w)
1	Water	13.5 %
2	Ethanol	21.2%
3	Chloroform	9.7 %
4	Acetone	7.4 %
5	Petroleum ether	8.6 %

Table .3 : Phytochemicals present in various extracts of *Moringa Oleifera* leaves.

Sr. No.	Chemical constituents	Aqueous extract	Ethanol extract	Chloroform extract	Acetone extract	Petroleum ether extract

1	**Test for Carbohydrate** a) Molisch test b)Benedicts test c)Fehling test	 +++ +++ ---	 +++ +++ ---	 +++ +++ +++	 +++ --- ---	 +++ --- ---
2	**Test for alkaloids** a)Mayer's test b)Wagner's test c)Dragendroff's test d)Hagner's test	 +++ +++ +++ +++	 +++ +++ +++ +++	 --- --- --- ---	 +++ --- --- ---	 +++ --- --- ---
3	**Glycosides** a)Modified Borntrager's test b)Legal's test	 +++ +++	 +++ ---	 --- ---	 --- ---	 --- ---
4	**Saponins** a)Froth test b)Foam test	 +++ +++	 --- +++	 --- ---	 --- ---	 --- ---
5	**Phytosterols** a)Salkowski's test b)Libermann Burchard's test	 --- ---	 --- ---	 --- ---	 --- ---	 --- ---
6	**Phenols** a) Ferric chloride test	 +++	 +++	 +++	 +++	 +++
7	**Tanin** a)Gelatin test	 +++	 +++	 ---	 +++	 +++
8	**Flavanoids** a)Alkaline test b) Lead acetate test	 --- ---	 +++ +++	 --- ---	 --- ---	 --- ---
9	**Proteins & amino acid** a)Xanthoproteic test b)Ninhydrin test	 --- ---	 +++ +++	 --- ---	 --- ---	 --- ---

+++ - Present, --- Negative

Table .4: Antibacterial activity of *Moringaoleifera*leaves in different solvent.

Sr. No.	Name of organism	Aqueous extract mm	Ethanol extract mm	Chloroform extract mm	Acetone extract mm	Petroleum ether extract mm
1	*Staphylococcus aureus*	-	2	-	1	-
2	*Salomonella typhimurium*	-	2	-	-	-
3	*Proteus vulgaris*	-	2	-	-	-
4	*Pseudomonas aeruginosa*	-	3	3	-	-
5	*B. megaterium*	-	3	-	-	-

Table.5: Some common medicinal uses of different parts of *Moringa Oleifera.*

Plant part	Medicinal uses
Leaves	Purgative, applied as poultice to sores, rubbed on the temples for headaches, used for piles, fevers, sore throat, bronchitis, eye and ear infections, scurvy and catarrh, leaf juice is believed to control glucose level, applied to reduce glandular swelling. [13]
Root	Antilithic, rubefacient, vesicant, carminative, antifertility, anti inflammatory, stimulant in paralytic afflictions; acts as cardiac, circulatory tonic, used as a laxative, abortifacient, treating rheumatism, inflammations, articular pain, lower back of kidney pain and constipation. [14]
Flower	High medicinal value as stimulant, aphrodisiac, abortifacient, cholagogue; used to cure inflammations, muscle diseases, hysteria, tumors and enlargement of spleen, lower the serum, cholesterol, phospholipid, triglycerides, decrease lipid profile of liver, heart and aorta in hypercholesterolaemic and increased the excretion of faecal cholesterol. [15]
Stem Bark	Rubefacient, vesicant and used to cure eye diseases and for treatment of delirious patients, prevent enlargement of the spleen and formation of tuberculous gland of the neck, to destroy tumors and heal ulceres. The juice from the root bark is put into ears to relieves ear aches and also placed in a tooth cavity as a pain killer, and has anti tubercular activity. [16]
Seed	Seed extract exerts its protective effect by decreasing liver lipid peroxide, antihypertensive compounds thiocarbamate and isothiocyanate glycosides have been isolated from the acetate phase of ethanolic extract of Moringa Oleifera pods. [17]
Gums	Used for dental caries, and is astringent and rubecient, gum, mixed with sesame oil is used to relieve headache, fevers, intestinal complaints, dysentery, asthama and some times used as an abortifacient and to treat sysphilis and rheumatism. [18]

3 Results and Discussion:

The antibacterial activity of aqueous, ethanol, chloroform, acetone and petroleum ether extract was investigated using disc diffusion method against the selected bacteria such as *staphylococcus aureus, salmonella typhimurium, P. Vulgaris, psendomonas aerugionosa, B. Megaterium* out of five extract three shows varying degree of antibacterial activity against pathogens. Phytochemical analysis shows presence of active chemical constituents such as alkaloid, glycosides, tannins, flavonoids, saponins.

Table.1 shows physico-chemical analysis of Moringa Oleifera in which total ash is 10.0%, acid insoluble ash 2.0% and water soluble ash 2.1%. In present investigation leaves of *Moringa oleifera* extracted with different solvent such as water, ethanol, chloroform, acetone and petroleum ether from the weight its extractive values are calculated.The extractive value of water is found to be 13.5 %. Ethanol shows the extractive value as 21.2 %. Extractive value of chloroform is 9.7 %, acetone having value as 7.4 % and petroleum ether extract value is 8.6 % shown in Table.2.

Table.3 shows phytochemical analysis of plant extract using aqueous, ethanol, chloroform, acetone & petroleum ether extract. Phytochemical analysis shows that tannin & phenol were found in *M. oleifera* in different solvent. The ethanol extract & aqueous extract shows presence of flavonoids glycosides, carbohydrates, alkoloides, saponin & tannins. Whereas chloroform, acetone & petroleum ether extract shows presence of phenols & tannins.

Table.4 shows the antibacterial activity of ethanol extract of *M. oleifera* showed maximum zone of inhibition (3mm) against *Pseudomonas aeruginosa& B. Megaterium.* Whereas aqueous extract & petroleum ether extract does not shows antibacterial activity against any one pathogen. Whereas chloroform extract shows maximum zone of inhibition (3mm) against *Pseudomonas aeruginosa.* Acetone extract shows maximum zone of inhibition (1mm) against*staphylococcus aureus.*

Table.5 shows that traditionally *M. oleifera* is act as cardiac & circulatory stimulants, posses antitumor, antipyretic, anti-inflammatory, antiulcer, anti diuretic, antihypertensive, cholesterol

lowering, antioxidant, anti diabetics, hepato protective, antibacterial, antifungal activity therefore employed for treatment of different diseases.

Moringa oleifera leaves to treat common medical conditions but a few use it for preventing &treating malnutrition. Presence of phytochemicals indicates possible prevention & curative properties. Therefore it is need to carry more pharmacological & antimicrobial studies to support the use of *M. oleifera* as a medicinal plant.

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