INVITRO ANTIMICROBIAL ACTIVITY OF MORINGA OLEIFERA

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INTRODUCTION

The plant is known to have many antibacterial properties and is used in all kinds of medicines. Raw preparations of many "plants" are used in medical and veterinary practice. Scientists from many places are working on a new class of plants considering their antibiotics. As the rate of extinction continues, the pressure is mounting with the search. Laboratories around the world have identified thousands of phytochemicals that have inhibitory effects on all types of bacteria. Many of these compounds have been studied in animals and humans to determine their ability to limit the growth/proliferation of pathogenic bacteria, as well as to analyse their effects on outcomes similar to legacy microbial strategies. The use and research of drugs and foods obtained from plants has gained momentum in recent years. Although 25-50% of plants are not currently used as antibiotics. Traditional healers have long used this herb to prevent or treat this disease. The plant is rich in various secondary metabolites such as tannins, terpenoids, alkaloids and flavonoids, which have been shown to have antibacterial properties in vitro. Therefore, it is important to investigate and investigate ecological diversity in plants used in traditional medicine or in desert regions where fine plants are found. The present work is done from the following perspective. The aim of evaluating the antimicrobial properties of Moringa oleifera

LITERATURE REVIEW

1. Shetty and Singh, 1991 et.al It is a medium-sized thornless tree with a grey trunk and easily branching branches; leaves usually three-needle, stem slender and articulate at base, leaves ovate or obovate and leaves rounded at apex and veins not prominent; 4-6 pairs and odd pairs. The flowers are creamy white or yellow. Capsule acute 3-lobed, slightly narrowed between seeds. The seed has 3 wings. These plants often grow in heaths, gardens, and homes. Rapid growth can be achieved by cutting.

2. Cacereers et al. (1991) Evaluate preliminary screening of antimicrobial activity of Moringa oleifera. Leaves, root, and seeds were tested against bacteria, yeast dermatophytes and helminths by using disc diffusion methods. The result showed that fresh leaf juice and aqueous extracts of seed inhibit the growth of Pseudomonas aeruginosa and Staphylococcus aureus. When extraction temperature was above 56 oC, this activity was inhibited. No activity was observed against other pathogenic bacteria and Candida albicans. A method was standardized for studying the effect of aqueous extract on Ascaris-lumbricids eggs, but no activity was exhibited by any part of tree in contrast to Chenopodium ambrosioides leaf extracts.

3. Singh et Al. (2003), Observed antimicrobial activity of leaves, root, bark, and seeds of Moringa oleifera against bacteria, yeast, dermatophytes and helminthes. The fresh leaf juice and water extracts tested against green algae, E. Coli, Pseudomonas aeruginosa, and Staphylococcus auerus, Bacillus sterothermophilus and Herpes simplex virus type I and Polio virus type I. The antibacterial effect of aqueous methonolic extract and water extract showed a fluctuation in its effects. Pseudomonas aeruginosa was more sensitive to all Moringa oleifera extracts; bacillus sterothermophilus was more sensitive than other organism to all extracts. Dried leaves ground with garlic, salt, black pepper, and turmeric are used as a treatment for dog bites or infections. Fresh leaf juice, mixed with honey, is used as an ointment for sore eyes. Decoction of dried leaves is taken orally for abortion and externally for rheumatism and wound healing.

4. Frost and O'Boyle, et. al 1981 Antibiotics which are developed in the middle of 20th century and modified thereafter have been successfully used in limiting major bacterial illnesses. But the emergence of resistance against commonly used antibiotics has possessed challenge to clinical in treating mixed infections caused by predominantly antibiotics resistant organism. Continuous race between development of newer antibiotics and emergence and selection of resistance may result into multiple antibiotics resistant super infection of bacteria which might be very difficult to kill. This has renewed the interest of researchers the world over to empirically determine the potential antimicrobial activity of many indigenous plants not explored. Plants and their products are used for the treatment of many illnesses in human and animals in all 12 parts of the world. Purified active principles of many indigenous plants are still practiced in modern medicine.

PLANTS DESCRIPTION:

Moringa (Moringa oleifera), also known as horseradish tree or drumstick tree, small deciduous tree (Moringaceae) native to Asia but also naturalized in Africa and tropical America. Flowers, pods, leaves and even twigs can be cooked and eaten. The leaves can also be eaten raw when young and are very nutritious, rich in iron, potassium and vitamin C. Use the crushed root to make horseradish flavour. The essential oil extracted from the seeds is used by watchmakers and cosmetologists; perfumers value its smell. The moringa tree can reach a height of about 9 meters (30 feet) and has a dark grey bark. The leaves are bivalve or tripartite, with oval leaflets markedly swollen (pulvini) at the junction of the segments. This plant produces clusters of fragrant white pearl-shaped flowers with five stamens (male) on one side. The angular, lanceolate fruit sometimes reaches 45 cm (18 in) long and splits.

Family: Moringaceae

Synonyms:

Latin – Moringa oleifera

Sanskrit – Subhanjana,
Hindi – Saguna, Sainjna
Gujarati – Suragavo
Tamil – Mulaga, Munaga
Malayalam – Murinna, Sigru
Punjabi – Sainjna, Soanjna
Unani – Sahajan
Ayurvedic – Haritashaaka, Raktaka, Akshiva
Arabian – Rawag,
French – Morungue
Spanish – Angela, Ben, Moringa
Chinese – La ken
English - Drumstick tree, Horseradish tree

Taxonomical Classification
Kingdom – Plantae
Sub kingdom – Tracheobionta
Super Division – Spermatophyta
Division – Magnoliophyta
Class – Magnoliopsida
Sub class – Dilleniidae
Order – Capparales
Family – Moringceae
Genus – Moringa
Species – oleifera

Morphology
Leaves
The leaves are bipinnate or commonly tripinnate up to 45 cm long the leaflets are hairy, green, and almost hairless on the upper surface. The twigs are hairy and green, these are compound leaves with leaflets of 1–2 cm long.
Flowers
The fragrant, bisexual, yellowish white flowers are hairy stalks in spreading or drooping axillary panicles 10 – 25 cm long. Individual flowers are approximately 0.7 to 1 cm long and 2 cm broad and five unequal yellowish – white, thinly veined, spathulate petals, five stamens with five smaller sterile stamens and pistil composed of a 1-celled ovary and slender style.
Fruits
Fruits are tri – lobed capsules and are referred to pods it is pendulous, brown triangular, and splits into three parts lengthwise when dry 30 – 120 cm long, 1.8 cm wide fruits production mostly occurs in March and April. Fruit contains around 26 seeds during their development stage. Immature pods are green in color they turn brown on maturity.
Seeds
Seeds are round 1cm in diameter with brownish semi – permeable seed hull with 3 papery wings hulls of seed are brown to black but can be white if kernels are of low viability. Viable seed germinate within 2 weeks, each tree can produce around 15,000 to 25,000 seeds/year. Average weight is 0.3 gm/seed. The parts of plant *Moringa oleifera* is shown in.

Pharmacological Activities
Antibacterial activity.
Anticonvulsant activity.
Antifertility effect.
Antifungal activity.
Antihistamine activity.
Anti-inflammatory activity.
Antimalarial activity.
Antimycobacterial activity.
Antitumor activity.
Antiyeast activity.
Barbiturate sleeping time decrease.
Carcinogenesis inhibition.
CNS depressant activity.
Diuretic activity.
Embryotoxic effect.
Hyperglycaemic activity.

MATERIALS AND METHODS:

A).Ingredients of bacteriological media:

- Agar -agar type I
- D - lactose
- Eosin Water Soluble Yellowish
- Mc - conkey Agar Base
- Methylene Blue M. S.
- Peptone- Bacteriological
- X Sodium Chloride
- Beef extract
- D - Mannitol
- Dextrose sugar

B). Chemicals and Reagents:

- Methyl Red Indicator.
- Neutral red.
- Phenol- red -pH indicator.
- Potassium hydroxide.
- Potassium iodide.
- Sulphuric acid.
- Xylene
- Alpha naphthol
- Barium Chloride Powder
- Buffer tablets pH 7.0
- Crystal violet
- Ethyl alcohol.
- Heparin sodium injection, 25000 I U in 5 ml
- Kovac's Reagents.

Plant materials

Fruits of Moringa oleifera were collected from the local market of Badnapur Bazar of Badnapur city, Maharashtra India and

Extraction

The fruits Moringa oleifera were cut in half inches and dried in air and finally in drier at 60-70 ºC. The dried samples were grinded to course powder with a mechanical grinder and extracted with methanol for 7 days with occasional shaking in a beaker. The extract was filtered. The filtrate was dried at 50 to 60 0 C and the yielded percentage was calculated.

Bacterial Media (Agar Media)

37 gm Nutrient Agar Media was mixed with distilled water and then sterilized in autoclave at 15 lb pressure for 15 minutes. The sterilized media were poured into petri dishes. The solidified plates were bored with 5mm diameter cork bearer. The plates with wells were used for the antibacterial studies.

Antimicrobial screening (in vitro)

According to Beur et al. 1966 and Barry et al. 1980 Method: Antibacterial activation of Moringa oleifera compounds measured by disk diffusion method. Prepared cultures were inoculated with various strains selected using the streak plate method. Make holes on the agar surface with a 6 mm cork drill. Use a sterile syringe to pour the extract into the well. For bacteria, incubate the plate at 36 ± 3ºC for 24 hours. Observe the gap area around the hole in the plate. Dissolve the methanolic extract of Moringa oleifera in sterile distilled water to create dilutions such as 30 µg, 50 µg and 100 µg. All concentrations of the moringa oil extract were tested against Staphylococcus aureus, Bacillus subtilis and Vibrio cholerae. The antibacterial properties of Moringa oleifera (methanol extract) showed that this herb exhibited antibacterial activity against the bacteria tested at concentrations of 30, 50 and 100 µg/plate. Extracts with potential susceptibility to the tested bacteria Staphylococcus aureus, Bacillus subtilis and Vibrio cholerae, an area of inhibition was noted and shown in the table below (Table 1) Moringa oleifera fruit extract (methanol extract) exhibited mild to moderate antimicrobial activity against. various experimental conditions. Bacteria at 30 µg, 50 µg and 100 µg concentrations (Table 1)

Fig 1 effect of Moringa oleifera against Staphylococcus aureus, Bacillus subtilis and Vibrio cholerae

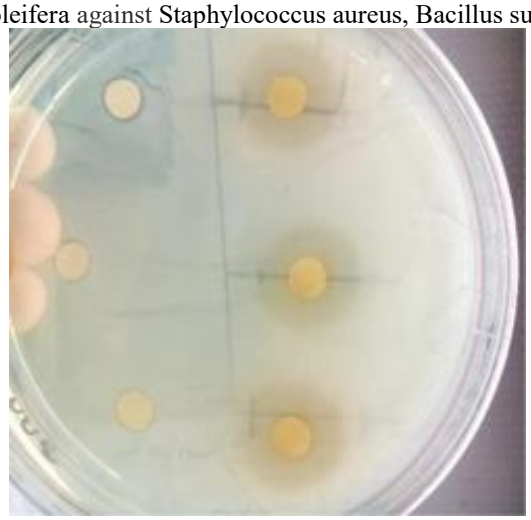

Table 1: In vitro Antimicrobial activity of the fruit extract of Moringa oleifera

Name of the Bacteria	Zone of the inhibition in mm			
	Kanamycin disc (Standard)	Methanol extract of Moringa oleifera Fruit.		
	30 µg/disc	30 µg/disc	50 µg/disc	100 µg/disc
	30 mm	13	16	17
	29 mm	10	14	15
	25 mm	12	13	18

DISCUSSION

In this study, the antibacterial and antifungal properties of Moringa oleifera fruit extract were tested against 3 potential pathogens Staphylococcus aureus, Bacillus subtilis and Vibrio cholerae to understand how to study it effectively. Moringa oleifera fruit extract has broad spectrum antibacterial activity with a zone of inhibition of 0 to 22 mm. For the methanol extract, the maximum inhibition level was found at 100 µg/disc for antibacterial activity. Bacteria were found to be sensitive above the three concentrations.

CONCLUSION

These findings suggest a new way to express Moringa's potent anti-inflammatory properties. Current research shows that herbs contain antibacterial properties that could be further developed into botanical remedies for medical treatment. Such analyses of various organic compounds and identification of active agents are urgently needed because successful prediction of lead molecules at the beginning of drug research will yield results after drug development. Finally, it was concluded that the extract inhibited the growth of Gram-positive and Gram-negative bacteria and viruses.

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