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# Antifungal Activity of Petrolium and Ethanolic Extracts of *Moringa Oleifera* Leaves against *Penicillium Chrysogenum* and *Cryptococcus Neoformans*

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***Abstract—*** *Moringa oleifera is well known medicinal plant. Its different parts are widely used for the treatment of different types of diseases since is have antibacterial and antifungal activity. The leaves are rich in iron, rhamnose and a unique group of compounds called glucosinolates and isothiocyanates. Other medical proprieties include antipyretic, antiepileptic, antiinflamatory, antiulcerative, antihypertensive, cholesterol lowering, antioxidant, anti diabetic. The current investigation was undertaken to evaluate the antifungal activities by petroleum ether and ethanolic extracts of Moringa oleifera leaves against Penicillium crysogenum and Cryptococcus neoformans. From our study, it is found that as concentration of Moringa leaves extract increases the diameter of zone of inhibition found increased. The results were higher and effective for ethanolic extract than petroleum extract. The result were also found more effective against Cryptococcus neoformans than Penicillium crysogenum.*

***Keywords— Moringa oleifera, Cryptococcus neoformans, Antifungal , Antibacterial, Penicillium crysogenum.***

## I. INTRODUCTION

Moringa oleifera (Fig :1) is well known, widely distributed natural species belongs to monogeneric family Moringaceae and order Violes.(Table:1)[1,2]

*Table.1: Classiification of Moringa oleifera*

| **Botanical Classification** | |
|---|---|
| **Kingdom** | Plantae |
| **Sub-kingdom** | Tracheobionta |
| **Super-division** | Spermatophyta |
| **Division** | Angiospermae/Magnoliophyta |
| **Class** | Magnoliopsida |
| **Subclass** | Dilleniidae |
| **Order** | Capparales |
| **Family** | Moringaceae |
| **Genus** | Moringa |
| **Species** | Oleifera |

*Fig.1: Moringa oleifera tree*

Moringa tree can grow well in the humid tropic or hot dry land with average height that ranges from 5 to 10 m. It can survive in harsh climatic condition including destitute soil without being much affected by drought.[3] These are true vascular plants contains xylem and phloem for conduction of water and nutrients respectively (Sub-kingdom : Trachiobionta). Its trunk is soft, white corky and branches bearing a gummy bark. Each tripinnately compound leaves bear several small leaf legs.[4,5] Moringa is flowering plant(Division: Angiospermae/Magnoliophyta).The flowers

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are fragrant, bisexual and pentapetalous. It contains five unequal, separate, thinly veined, yellowish-white petals.(Fig:2) Flower is syncarpous and posses united carpels(Subclass : Dilleniidae). They grow on slender, hairy stalks in spreading or drooping later flower clusters. Leaves of these plants are feathery, pale green, compound and tripinnate. They are about 30–60 cm long and contains many small leaflets.[6,7] Each leaflet is about 1 to 2 cm long and 0.5 to 1.0 cm wide. Upper surface of leaflets is smooth dark while lower is pale green. They are variable in size and shape.(Fig:3)

*Fig.2: Moringa oleifera flowers*

*Fig.3: Moringa oleifera leaves*

This plant is also known as drum stick tree or horse radish tree. It have many vernacular names such as kelor, marango, mlonge, moonga, mulangay, nebeday, saijhan, sajna or Ben oil tree[8,9] Moringa oleifera is well known medicinal plant. Its different parts are widely used for the treatment of different types of diseases since is have antibacterial and antifungal activity. The leaves are rich in iron, rhamnose and a unique group of compounds called glucosinolates and isothiocyanates. Other medical proprieties include antipyretic, antiepileptic, antiinflamatory, antiulcerative, antihypertensive, cholesterol lowering, antioxidant, anti diabetic.[10,11] The current investigation was undertaken to evaluate the antifungal activities by petroleum ether and ethanolic extracts of *Moringa oleifera* leaves against *Penicillium crysogenum and Cryptococcus neoformans.*

## II. MATERIALS AND METHODS

**A) Collection of leaves :** Naturally dried leaves were directly plucked from Moringa plant. The collection is carried out from different plants growing in area of Solapur city and surrounding villages. Plant leaves were further dried in an oven at $40^0$C for a total of three days and then finally ground to a fine powder by grinder. Extraction is carried out by using petroleum ether and ethyl alcohol. [12-16]

B) **Preparation of leaf extract :** 20 gram of finely grinded powder of Moringa leaves were soaked in two different conical flasks containing petroleum ether and ethyl alcohol respectively. The sample were shaked on rotary shaker at 200 rpm for 24 hrs. The extract were filtered using Whattman filter paper. Then solvent were evaporated to obtain dry extract using a rotary evaporator and were stored in refrigerator for antifungal analysis. Before testing five different concentration of extract were prepared for both solvents separately. This was carried by dissolving 100 mg, 200 mg, 300 mg, 400mg and 500mg of extract in 1 ml solvent respectively. [12-16]

C) **Antifungal acivity :** The antifungal activity of the Moringa oleifera leaf extracts was determined using agar well diffusion method by following the known procedure. Fungal strains were spread on the surface of agar plate aseptically by sterile cotton swab. When surface was little dried wells of 4 mm diameter were punched with the help of sterile stainless steel boarer. 20 µl of petroleum and ethanol extracts of Moringa leaves were loaded separately in wells in separate agar plates. Separate wells were used for different concentrations. Each plate further contained on well loaded with solvent act as negative control. While another well was loaded with 20 µl antibiotic Nystatin (100 mg/ml). The plates were incubated at 28°C for 72 hours and the antifungal activity was assessed by measuring the diameter of the zone of inhibition at the interval of 24 hrs. [12-16]

## III. RESULT AND DISCUSSION

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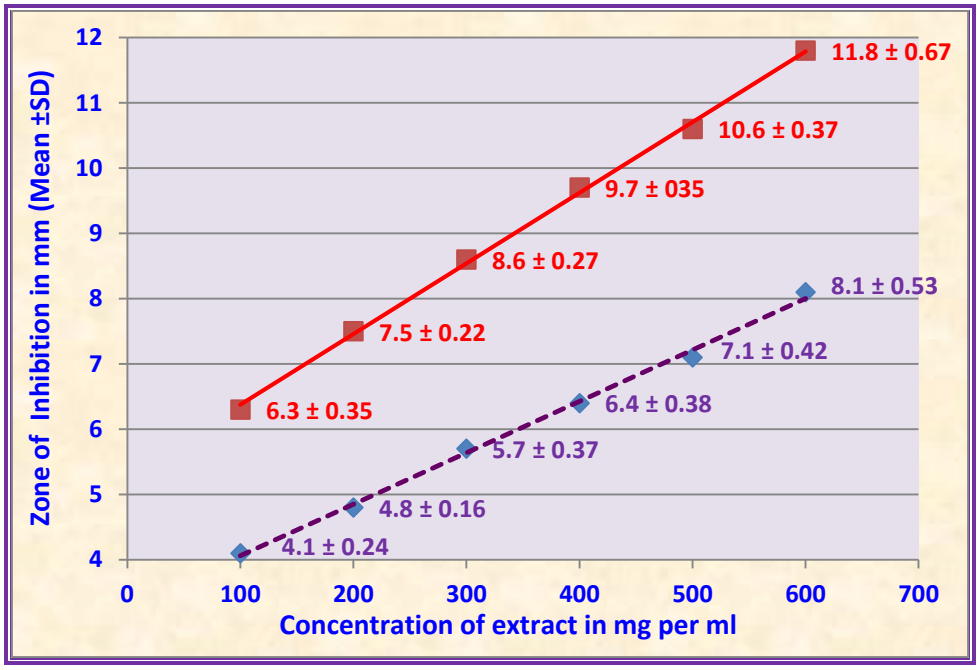
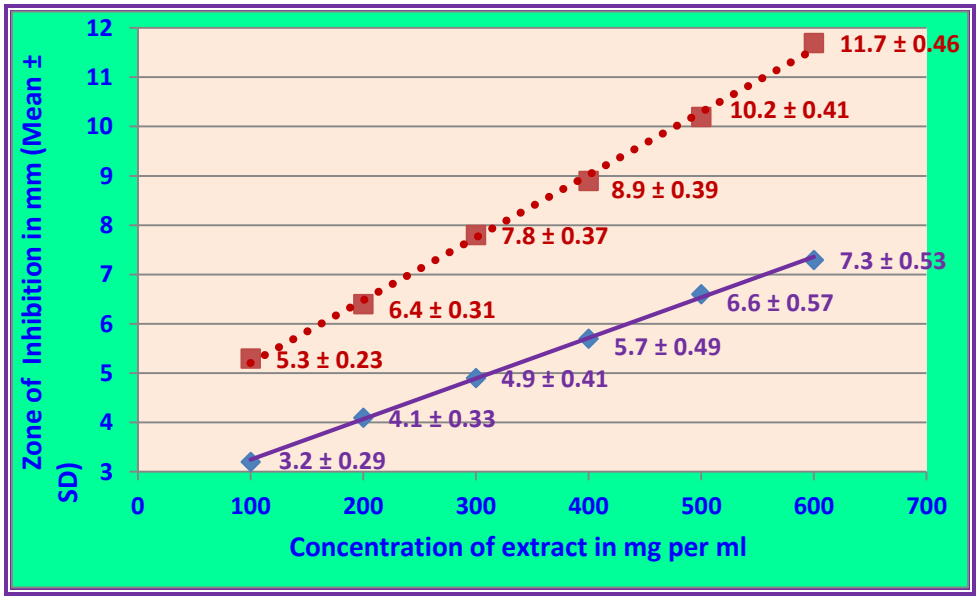
From our study, it is found that as concentration of Moringa leaves extract increases the diameter of zone of inhibition found increased. Against Cryptococcus neoformans zone of inhibition due to ethanolic extract of Moringa leaves was found increased from 6.3 mm to 11.8 mm as concentration increases from 100 to 600 mg per ml. While zone of inhibition due to petrolium extract of Moringa leaves was found increased from 4.1 mm to 8.1 mm as concentration increases from 100 to 600 mg per ml.(Graph-I) On other hand against Penicillium crysogenum zone of inhibition due to ethanolic extract of Moringa leaves was found increased from 5.3 mm to 11.7 mm as concentration increases from 100 to 600 mg per ml. While zone of inhibition due to petrolium extract of Moringa leaves was found increased from 3.2 mm to 7.3 mm as concentration increases from 100 to 600 mg per ml.(Graph-II)




*Graph.1: Effect of Ethanolic extract (Red line) and Petrolium ether extract (Violet line) of Moringa oleifera leaves against Cryptococcus neoformans.*




*Graph:2: Effect of Ethanolic extract (Red line) and Petrolium ether extract (Violet line) of Moringa oleifera leaves against Penicillium crysogenum.*

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Nystatin is a polyene antibiotic. Polyene antibiotic is a class of antimicrobial polyene compounds that target fungi. It is most commonly used for the treatment of fungal infections. It was used as a positive control against both Cryptococcus neoformans and Penicillium crysogenum.

The results were higher and effective for ethanolic extract than petroleum extract. The result were also found more effective against Cryptococcus neoformans (Graph-I) than Penicillium crysogenum.(Graph-II)

## IV. CONCLUSION

From our study it comes to known that there are some alkaloids present in extract of leaves of Moringa oleifera which can be effectively used to treat infection caused by Cryptococcus neoformans and Penicillium crysogenum.

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