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In-vitro screening of inhibitory activity of Poppy seeds *(Papaver somniferum* Linn.*)* extract against *Malassezia furfur.*

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ABSTRACT:

The lipophilic and yeast-like fungus Malassezia furfur, occurring in human skincauses different skin conditions such as Dandruff, Pityriasis versicolor, Seborrheicdermatitis, etc.Papaver somniferum Linn. (poppy plant) is a well-known medicinal species traditionally valued for its seeds, oil, and alkaloid-rich latex. These constituents are reported to possess antioxidant, anti-inflammatory, antimicrobial activities, suggesting potential dermatological benefits but their antifungal activity against Malassezia furfur remains largely unexplored. The presentstudy was undertaken to screen potential antifungal activity of the extract of seeds of Papaver somniferum Linn. against M. furfur. Papaver somniferum LinnSeedsextract has been tested against some fungal pathogens; M. furfur remains unstudied.This extract was evaluated for their antifungal activity against Malassezia furfuron Sabouraud Dextrose Agar media (SDA) plates by using agar well diffusionmethodthe plates were incubated at 35±20C for 24 hrs. Then diameter of zone ofinhibition was measured. Antifungal activity was observed against Malasseziafurfur.

Keywords: *Malassezia furfur, Poppy seeds, Antifungal, Dandruff.*

INTRODUCTION:

Seeds of (*Papaver somniferum* Linn.) also known as poppy seeds, is a member of the *Papaveraceae* family. It is one of those common plants with a long history of medicinal use. The most significant component of the *Papaver somniferum* Linn. are the most popularly used pharmaceutical alkaloids morphine, codeine, thebaine, and porphyroxine. In addition to these alkaloids, the Poppy also yields about 80 other alkaloids that fall into distinct tetra hydro benzyl isoquinolone-derived groups.[1]

(***Papaver somniferum***) are a major industrial crop cultivated worldwide (Turkey, China, India) sinceancient times for food (oil-rich seeds) and pharmaceutical purposes.

Antibacterial activity of aqueous infusions and aqueous decoctions of poppyseeds (*Papaver somniferum L.)* were investigated against 188 bacterial isolates belonging to 11 different genera of Gram +ve and Gram -ve microorganisms.[2] Antibacterial activity of *Papaver somniferumL.* seeds has been provedagainst Staphylococcus aureus.[3] *Papaver somniferum* Linn. Seeds extract has been tested against some fungal pathogens; *M. furfur* remains unstudied. *Malassezia furfur* is a lipophilic yeast like fungus normally present on human skin. It became pathogenic under certain conditions moisture, heat, excess sebum, immunosuppression. Which causes certain conditions like Pityriasis versicolor, Folliculitis, Seborrheic dermatitis, Atopic dermatitis, Fungemia. The available treatment option relies mainly on synthetic antifungal agents like azoles and allylamines. Although effective, these drugs have several limitations, including rising antifungal resistance, recurrent infections, adverse effect with prolong use and high relapse rates due to Malassezia's lipid-dependence and biofilm formation. Poppy seeds *(Papaver somniferum* Linn.*)* contain alkaloids, phenolics, flavonoids, fixed oils, linoleic acid, tocopherols, and antimicrobial fatty acids—all of which have shown broad-spectrum antimicrobial and antioxidant properties. However, no major published studies have specifically evaluated the antifungal potential of poppy seed extract against *Malassezia furfur.*

MATERIAL AND METHODS:

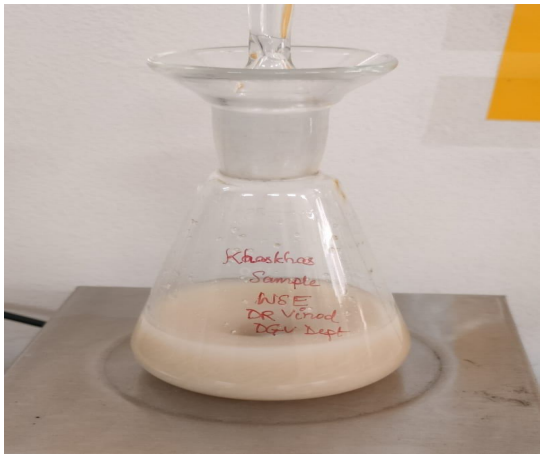
Collection of plant sample - Fresh seeds of the plant *Papaver Somniferum* Linn. were procured from Rampura in Neemach, Madhya Pradesh during February – March 2024. Seeds then air dried, homogenized to fine powder and stored in air tight bottles.

Papaver somniferum Linn. Seeds of *Papaver somniferum* Linn.

Preparation of extract – Extract was prepared by sequential cold maceration method. Using distilled water as a solvent. Five grams of Poppy seed powder was soaked in 50 ml of solvent and incubated for 48 hr at room temperature, and then it was filtered by Whatman filter paper no-1 and stored at 40^0C for further use

Figure no. 1 Preparation of Extract

Figure no. 2 Preparation of Extract



Assay for antifungal activity:

1. To check the antifungal activity, stock cultures of above genera were revived. The agar plates of Sabouraud Dextrose Broth were prepared
2. After autoclaving at 121°C for 15 minutes, 0.1 ml of each pure culture was pipetted into the media.
3. *Malassezia furfur*was incubated in respective media and incubated for 48-72 hours at 28 ^{0}C for the growth.
4. Desired turbidity of each fungal suspensions was adjusted to 1.5 x10^8 CFU/mL using 0.5 McFarland standard.
5. SabouraudDextrose Agar plates were prepared with reference to the manufacturer's instructions.
6. Media was poured aseptically (20-25) ml into sterile Petri plates and allowed it
7. A sterile swab was dipped into the suspension. The entire surface of the agar plate was then swabbed evenly to ensure a uniform growth of organisms.
8. The process was repeated once more to ensure an even distribution of the inoculum. After the plates dried, they were divided into four equal quadrants. A hole was then bored at the center of each quadrant on the agar surface using a sterile cork borer.
9. The test compounds were serially diluted and 0.1ml of each test solution is the added to the respective well. Without inverting, the petri plates were kept for incubation at the below given temperature and time.
10. After the observation period of 48-72 hours of the plates for zones of inhibition, the diameter of the clear zone using a scale was measured.

RESULTS AND DISCUSSION:

Figure no. 3 Zone of inhibition against M. furfur.

Against *Malassezia furfur* at 500mg/mL, 250mg/mL, 125mg/mL, 62.5mg/mL Test Sample

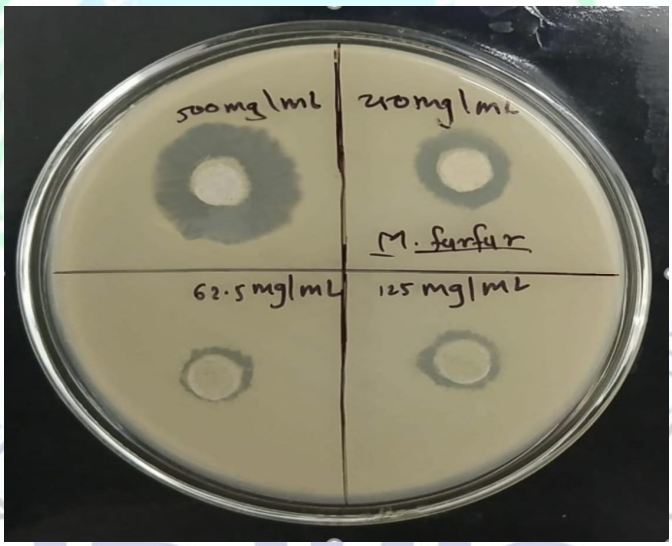


Figure no. 4 Zone of inhibition against M. furfur

Against *Malassezia furfur* at 31.25mg/mL, 15.6mg/mL Test Sample, Negative control and STD. (Ketoconazole – 50mcg)

	Concentrations (mg/mL)	Zone of Inhibition (mm)
		Malassezia furfur
1	500	20
2	250	14
3	125	12
4	62.5	11
5	31.25	-
6	15.63	-
7	Negative control	-
8	Std disc (50 mcg)	26

A clear concentration-dependent increase in the zone of inhibition was observed. The extract at 500 mg/mL exhibited the highest activity with a 20 mm inhibition zone, followed by 250 mg/mL (14 mm), 125 mg/mL (12 mm), and 62.5 mg/mL (11 mm). Lower concentrations (31.25 mg/mL and 15.63 mg/mL) did not produce measurable inhibition. The negative control showed no zone of inhibition, confirming the absence of intrinsic antifungal activity of the vehicle. The standard antifungal disc (50 mg) demonstrated a zone of 26 mm, representing the expected reference activity.

CONCLUSIONS:

It is concluded that Poppy seeds *Papaver Somniferum* Linn. extracthaving inhibitory activity against Malassezia furfur, especially at the concentrations i.e. at 500mg/mL and 250mg/mL. Therefore, Poppy seeds can be used as natural antifungal agent in skin conditions that are caused by Malassezia furfur. and be a good treatment against skin infection Tinea versicolor and Dandruff. Poppy seeds *Papaver Somniferum*Linn. exhibit promising antifungal activity against Malassezia furfur, highlighting their potential as a natural therapeutic agent. Further research is recommended to isolate active compounds, understand their mechanism of action, and evaluate clinical applicability.

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