

# AN IN-VITRO STUDY ON ANTIFUNGAL ACTIVITY OF ECHINACEA 30C, 200C IN CANDIDA ALBICANS AND TRICHOPHYTUM RUBRUM

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#### ABSTRACT

The inhibitory action of Echinacea 30 and 200C in the development of a Candida and Trichophyton culture was studied. The objective of the study is to evaluate the effectiveness of the medicine Echinacea in varied potencies against the fungus. The fungi Trichophyton and Candida albicans were selected, which was suspended in an SDA broth and cultured for two days. A sterile swab was used to smear the inoculum onto the Sabour and Dextrose Agar medium. A known quantity of 30C and 200C of Echinacea was poured on a small circular sterile paper disc after it had been put on the SDA plate. The plates were incubated for 24 to 48 hours at room temperature. The Kirby-Bauer technique was used to assess the antifungal effects of Echinacea 30C and 200C against Candida albicans and Trichophyton. Analyses are done on the zone of inhibition and relative growth inhibition percentage. Here Echinacea 30C has a greater zone of inhibition in Candida, Echinacea 200C exhibits a moderate zone of inhibition. Considering both the fungus Echinacea is more effective in Candida.

**KEYWORDS**: Antifungal, Candida albicans, Echinacea, Kirby-bauer, Trichophyton. \*Corresponding Author Email: <u>aswathyab.94@gmail.com</u>

## INTRODUCTION

Candida albicans, one of the important fungi in the ordinary human microbiota, can occasionally result in candidiasis, an opportunistic yeast infection. Invasive candidiasis, vulvovaginal candidiasis (VVC), and oropharyngeal candidiasis are the three different kinds of candidiasis. VVC is thought to occur in more than 75% of women at some point in their lives. Furthermore, C. albicans is a prominent nosocomial organism with the ability to induce a systemic infection that is exceedingly fatal and a 30% death rate. Long-term antifungal treatment failures have increased in recent years as a result of the development of drug resistance in the Candida species. Candida is able to resist the antifungal drugs by changing the composition of the cell wall or membrane, the drug target molecule, or drug efflux mediated by ATP binding cassette. Most superficial fungal infections are brought on by the dermatophyte Trichophyton rubrum globally<sup>1</sup>. The dermatophyte most frequently connected to athlete's foot is Trichophyton. The infection can be also brought on by other dermatophytes, but these are less usually isolated from people. Since Trichophyton rubrum fugus spores may survive for a year in human scales, they are quite contagious. A class of fungus called dermatophytes can infiltrate keratinized tissues like skin, hair, and nails. Although this particular type of fungus can infect the skin everywhere, they most frequently affect the foot, inguinal region, axillae, scalp, and nails<sup>2</sup>. With a range of infection severity, the infection causes mild to serious dermatological signs. The host's immune response to the bacterium is thought to be the cause of these variances. The keratinocytes, which are the body's first line of defense against pathogens like T. rubrum, trigger this reaction. The early host defense involves the expression of a number of Toll-like receptors, including TLR2, TLR4, TLR6, Human Beta Defensin (HBD)-1, HBD-2, IL-1B(Interleukin 1 beta), and IL-8<sup>1</sup>. Tinea pedis, tinea cruris, and tinea corporis are some of the most typical skin conditions that affect people

worldwide as a result of T. rubrum infestations. Studies have revealed that several fungi can be treated successfully with homoeopathic medicines. The current investigation was conducted to assess the anticandida efficacy of different homoeopathic remedies against Candida albicans<sup>3</sup>. The modern scientific community has raised concerns regarding the efficacy of homoeopathy in treating disease and the nature of its component. Homoeopathic medical system successfully treats the fungal infection and skin disorders for both acute and chronic cases. Through this study we can discover the efficacy of drug Echinacea in different potencies in against candida albicans and Trichophyton rubrum.

# **MATERIALS AND METHODS**

#### **Collection of samples**

The drugs for the study were obtained from Amritha homoeopathic pharmacies, and the fungus Trichophyton and Candida albicans was received from Microbial Type Culture Collection and Gene Bank (MTCC). The Sabour and Dextrose Agar medium was purchased Hi media

Sensitivity discs: Whatman Filter Paper No. 1 disc, 6 mm in diameter.

## Methods of collection of data:

For collecting data and conducting the study disc diffusion method or the Kirby-Bauer testing method is used. Echinacea 30 and 200CH are the drugs used. For both candida and Trichophyton these are classified into four classes. AL 01- Itracanazol, an antifungal, was used as a positive control (5mg in 5ml of distilled water). AL 02 stands for ethanol. AL 03 echinacea 30CH. AL 04- echinacea 200C.

# Methodology

Antifungal assay by Kirby Bauer method:

From Gene Bank and the Microbial Type Culture (MTCC), Chandigarh, the fungus, Candida albicans culture, and trichophyton rubrum were purchased. Inoculation preparation: Candida albicans and Trichophyton rubrum were acquired as slants. The acquired culture was suspended in 100 ml of Sabouraud Dextrose Agar broth and incubated at 25<sup>o</sup>C for 72 hours in a shaking incubator<sup>6</sup>. Preparation of fungus-lawn: The inoculum is equally applied on sabouraud Dextrose Agar (SDA) (Hi-media, Mumbai) plates in an aseptic background. After carefully swabbing, the 6mm sterile disc was put into the suitably indicated parts with sterile forceps. Without disrupting the fungus grass, 15µl of Echinacea 30 and 200 Ch, Fucanazole (anti), and placebo are carefully inserted in the Sabouraud Dextrose Agar plates. Additionally, duplicate plates were kept <sup>6</sup>. The plates were incubated for 72 hours in an upright posture at 25<sup>o</sup> C for determining the zone of inhibition. The zone of inhibition was measured using a scale in millimeters. The zone of inhibition in the medicine-filled plates is compared among various potencies of Echinacea to that of positive and negative controls. Fungus growth in that plate will be reduced if the drug contains antifungal properties.<sup>8</sup> Triplicates were done in trichophyton rubrum.

## RESULTS

The inhibitory activity of drug Echinacea in 30 and 200 potencies are noted against Candida Albicans and Trichophyton rubrum after an interval of 24hrs and 48hrs of incubation period. In candida, among both the potencies of Echinacea 30 and 200 Echinacea 30C and showed higher zone of inhibition (20.2mm). The effect of 200C of Echinacea showed a zone of 13mm. The results indicated that among the two potencies 30C of Echinacea displayed a little more efficacy in inhibiting the growth of C.albicans. From this it is evidenced that the action of our medicine Echinacea has the power to act against candida albicans as nearly same as the antifungal drug. While conducting experiments with Echinacea drug with Trichophyton positive control Itraconazole shows 13mm zone of inhibition. The effects of Echinacea 30 and 200 shows only mild action.

#### 101



Fig 1: The inhibitory activity of Echinacea30 and Fig 2: The inhibitory activity of Echinacea 200 against Candidia albicans after 24 hours of Activity



30 and 200 against Trichophyton after 24 hours of activity

Zone of inhibition of Echinacea and control by Kirby bauer method Table 1: Zone of inhibition of Echinacea and control by Kirby bauer method on fungus Candida

Sl.No	Group	Plate (mm)
1	Itraconazole	10
2	Ethanol	20
3	Echinacea 30	22
4	Echinacea 200	13

Table 2: Zone of inhibition of Echinacea and control by Kirby bauer method on fungus Trichophyton

Sl.No	Group	Plate (mm)
1	Itraconazole	13
2	Ethanol	5
3	Echinacea 30	6

4 Echinacea 200	Nil
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## DISCUSSION

The antifungal activities of the homoeopathic medicines echinacea 30C and 200C against one of the most prevalent fungal organisms, Candida albicans, and Trichophyton were investigated in this study. Echinacea 30C demonstrated the highest antifungal activity against Candida albicans, with a zone of 22 mm. zone of inhibition, whereas Echinacea 200C had a zone of inhibition of 13mm. The zone of inhibition in the control can be assigned 20mm of zone. Previous research indicates that homoeopathic medications have particular inhibitory action against fungal microorganisms<sup>4</sup>. This demonstrates that the homoeopathic drug Echinacea in potencies 30C and 200C has strong antifungal action against Candida albicans, with 30C having the most activity, while in Trichophyton Echinacea30 shows only mild action that is about 6mm. To investigate the extent of Echinacea's antifungal capabilities, the lowest inhibitory concentration and minimum antifungal concentration must be determined.

## CONCLUSION

Though this study Echinacea shows a higher zone of inhibitory activity in candida fungus than trichophyton. The inhibitory zone of candida by Echinacea 30 is about 22mm. The effect of 200c of Echinacea showed a zone of 13mm. The results indicated that among the two potencies 30C of Echinacea displayed a little more efficacy in inhibiting the growth of C.albicans. From this it is evidenced that the action of our medicine Echinacea has the power to act against candida albicans as nearly same as the antifungal drug. While conducting experiments with Echinacea drug with Trichophyton positive control Itraconazole shows 13mm zone of inhibition. The effects of Echinacea 30 and 200 shows only mild action. So while comparing these two fungus Echinacea has evident action on candida albicans than Trichophyton rubrum<sup>4</sup>. Previous studies were there based on the antifungal activity of Echinacea drug on patients which showed inhibitory activity on fungus candida albicans. In this study also homoeopathic medicine echinacea showed greater result on candida rather than in trichophyton.

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