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# Antifungal activity of Chirattai thailam (coconut shell oil)

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***Abstract:*** *The Siddha System of Medicine (Traditional Tamil System of medicine), which has been prevalent in the ancient Tamil land, is the foremost of all other medical systems in the world. Chirattai thailam is wound healing Siddha drug was tested for antifungal activity by using disc diffusion method. Test organisms were Candida albicans, Candida tropicalis, Aspergillus fumigatus and Aspergillus niger. Drug was taken in three different doses 20µl, 5µl, 1µl. Significant antifungal effect was noticed at the dose of 20µl and 5µl.*
***Key words:****Chirattai thailam (coconut shell oil), Antifungal activity.*

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## I. Introduction

According to World Health Organization(WHO), the prevalence rate of superficial fungal infection worldwide has been found to be 20-25%. [1] In developing countries superficial fungal skin diseases are very common if not treated properly will become more complicated and life threatening rarely.These are more prevalent in tropical and subtropical countries like India where the heat and humidity is high for most part of the year. [2]Dermatophytosis, pityriasis versicolor, and candidiasis are the three most common types of superficial fungal infections.Commonly these infection types are named according to the affected body parts tineacorporis or ring worm (general skin), tinea crurisor jock itch (groin), tinea unguum (nails), tineacapitis or ring worm of scalp (scalp), tinea barbae(beard area) and tinea manuum (hands).

These superficial fungal infections are very common and most neglected by low socioeconomic groups because of rarely life threatening, especially lack of awareness and knowledge.There are large number of drawbacks in synthetic drugs so people move towards herbal drugs especially Siddha medicines and Ayurvedic medicines which are more safe, efficacious, cost effectiveand developing less resistance.Chirattai thailam (coconut shell oil)[3] is one of the most important external medicines in the Siddha system of medicine. It has a potential to cure warts, corns, eczema and ring worm including other skin diseases. Apply only at the site of infection, after diluting with equal amount of coconut oil. The oil is corrosive and hence should not be applied near the eyes. In this study, antifungal effects of the Chirattai thailam was evaluated by using fungal cultures against the organisms found commonly in fungal infections.

## II. Material Methods

Chirattai thailam was purchased from The Indian Medical Practitioner's Co-operative Pharmacy & Stores Ltd (IMCOPS), Chennai.

***Preparation of Chirattaithailam***

Take a pot with a few holes in the bottom. Pass thin wires through these and bend them so that they converge at a point a few inches away from the base. Suitably secure the upper ends. Fill with shell pieces and seal the top. Prepare oil by destructive distillation by placing a collecting vessel in the centre of a pit and supporting the pot on it and applying heat only to the pot by heaping and igniting cow dung cakes arranged around and above the pot.

Fungal stains used for this study were Candida albicans (MTCC-4748), Candida tropicalis (MTCC-4370) collected from Siddha Central Research Institute, Arumbakkam, Chennai-600106 and *Aspergillus niger* (MTCC-10180), Aspergillus fumigatus(MTCC-6498) isolated from plant material at Regional Research Institute of Unani Medicine, Royapuram, Chennai-60013.

Standard drug Amphotericin was purchased from Himedia company in Regional Research Institute of Unani Medicine, Royapuram, Chennai-60013.

***Disc diffusion method***

Antifungal activity of Chirattai thailam was tested by using Disc diffusion method. [4]Mueller Hinton Agar for *Candida albicans* and *Candida tropicalis* and Sabouraud dextrose agar for *Aspergillus niger*, Aspergillus fumigatuswere recommended for the diffusion of antifungal agents impregnated on disc through an agar gel as described in CLSI Approved Standard. [5, 6] Different concentration of Chirattai thailam (1µl, 5µl, 20µl) were used in this study. These discs were incubated for 48 h at 25ºC. Zone of inhibition in mm were determined after 48 h.Amphotericin B (10mcg) was used as standard control drug. Amphotericin B was the most effective, broad spectrum antifungal drug. It is on the World Health Organization's List of Essential Medicines. [7] The zones of inhibition of different concentrations were measured andthe data of all the parameters were statistically analysed.

## III. Results and Discussion

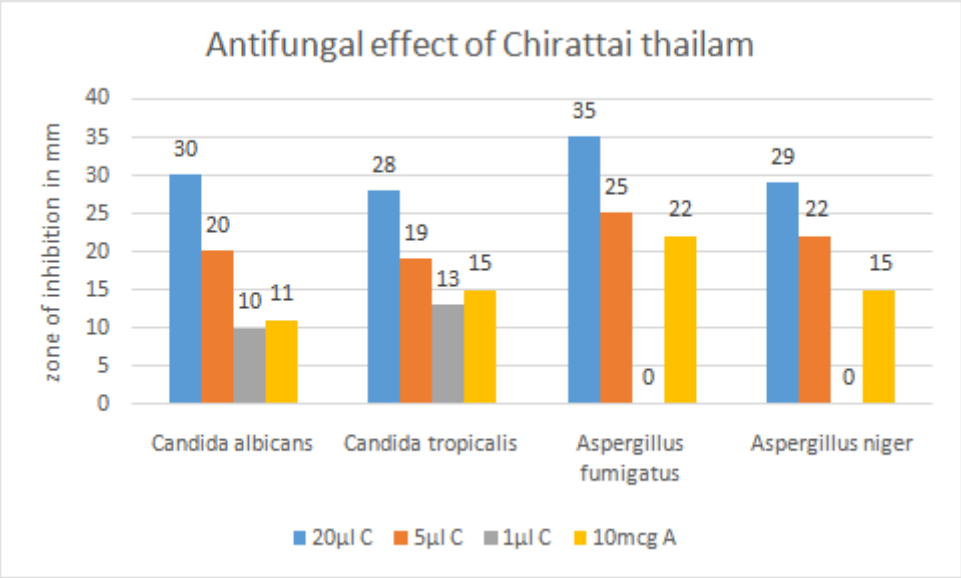
Antifungal activity of Chirattai thailam in different concentrations on four fungal strains in disc diffusion method were presented in table 1 and fig 1, 2, 3, 4, 5.

Zone of inhibition of Chirattai thailam at different concentrations 20µl, 5µl, 1µl respectively for *Candidaalbicans*30mm, 20mm, 10mm, *Candida tropicalis*28mm, 19mm, 13mm, Aspergillus fumigatus35mm, 25mm, 0mm, *Aspergillus niger*29mm, 22mm, 0mm and zone of inhibition of standard drug Ampotericin B (10mcg) for *Candidaalbicans* 11mm, *Candida tropicalis*15mm, *Aspergillus fumigatus*22mm, *Aspergillus niger*15mm.

**Table 1:**Antifungal activity of Chirattai thailam (in disc diffusion method)

| S.NO. | Organism | Zone of Inhibition in mm | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | Std Amphotericin B 10mcg |
| 1. | ***Candida albicans*** | 30 | 20 | 10 | 11 |
| 2. | ***Candida tropicalis*** | 28 | 19 | 13 | 15 |
| 3. | ***Aspergillus fumigatus*** | 35 | 25 | - | 22 |
| 4. | ***Aspergillus niger*** | 29 | 22 | - | 15 |
| **Concentration: sample as such; 1: 20µl; 2: 5µl and 3: 1µl; Disc Diameter 5mm.** | | | | | |

**Figure 1:**Comparative antifungal activity of Chirattaithailam




C- Chirattaithailam, A-Amphotericin B
Zone of inhibition of Chirattaithailam

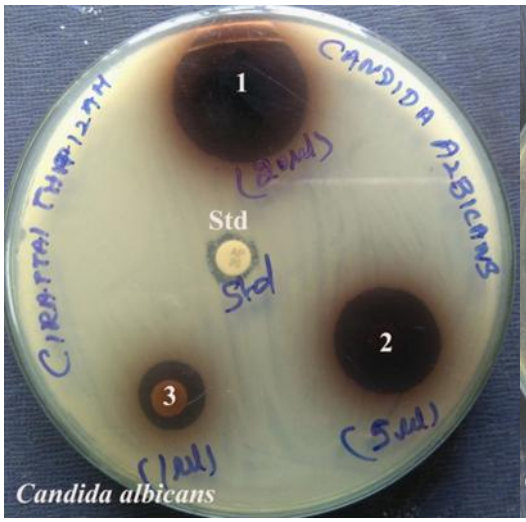
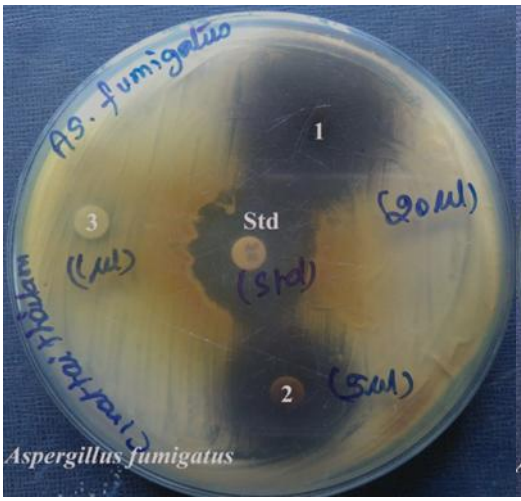




**Figure 2:**Candida albicans**Figure 3:** Candida tropicalis



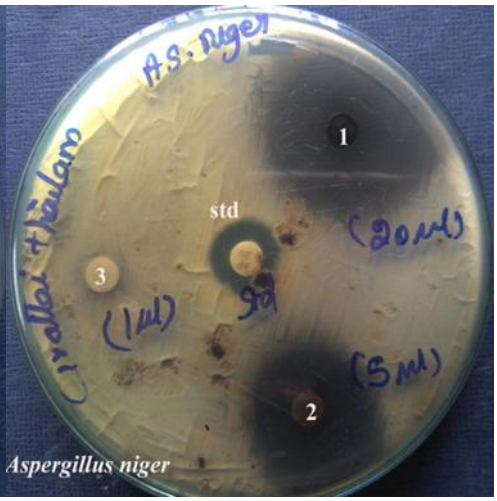




**Figure 4:**Aspergillus fumigates **Figure 5:**Aspergillus niger

In this study Chirattai thailam showed effective antifungal activity against all the tested organisms. It was more active at the dose of 20µl in all organisms with little difference in zone of inhibition. zone of inhibition at the dose of 5µl also effective in all organisms but less effective than the dose of 20µl of Chirattai thailam . At the dose of 1µl showed equal effect of standard drug of Amphotericin B at the dose of 10mcg in Candida albicans and candida tropicalis. No effect was seen in Aspergillus fumigatus and Aspergillus niger at the dose of 1µl of Chirattai thailam. A significant zone of inhibition was seen at the dose of 20µl of Chirattai thailam. Least or no effect was seen at the dose of 1µl of Chirattai thailam.

At present use of traditional medicine is increasing day by day. Siddha is one of the traditional medicines of South India and Chirattai thailam was one of the Siddha drugs. One of the major cause of using these traditional drugs are developing resistance to synthetic medicine. [8] Now a days increasing fungal infections are more resistance to synthetic medicine. It was observed that the selected wound healing Siddha drug viz. Chirattai thailam showed significant antimicrobial activity[9] against the common pathogens of wound infection such as *Staphylococcus aureus*, *Acinetobacterbaumannii*, and Escherichia coli when compared to the standard antibiotics Amoxycillin and Ciprofloxacin. So, in this study tested for antifungal effect of Chirattai thailam showed significant effective at the dose of 20µl in Candida albicans, Candida tropicalis, *Aspergillus fumigatus* and *Aspergillus niger* when compared with standard drug Ampotericin B. Chirattai thailam is very much safer than Ampotericin B which causes so many adverse effects. Depending upon site of dermatophyte infection duration of treatment also deferent from 3months to 12 months. Development of resistance and toxicity during prolonged treatmentare very common where Chirattai thailam is safe natural medicine.

## IV. Conclusions

A Siddha traditional medicine Chirattai thailam showed effective antifungal activity in Candida albicans, Candida tropicalis, Aspergillus fumigatus and Aspergillus niger by using disc diffusion method compared with standard drug Ampotericin B. Antifungal activity of Chirattai thailam is potential to be used to treat external fungal infections. Herbal drugs are major drugs for future perspective because of safe against synthetic drugs. However, further studies should be conducted to know spectrum of activity, efficacy and safety.

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