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Antifungal activity of *Calotropis procera* latex against ringworm (Dermatophytes)

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Abstract: Human skin is the outer covering of the body, which constitute the first line of defence. Dematophyte cause infections of the skin, hair, nails etc. Some of the skin infections are known as "Ringworm" or "Tinea". The infection is mostly cutaneous i.e. restricted to the non-living cornified layer of skin by Cheesbrough [1]. Plant *Calotropis procera* exhibit a lot of medicinal properties including antifungal propertie,by Iqbal et al 2005[2]. This study was carried out to elucidate the antifungal activity of latex of *Calotropis procera* against selected species of deramatophytes i.e. *Trichophyton rubrum* and *Microsporum gypseum.* The Latex of *C. procera* also obtained in different concentration 20%, 25%, 50%, 75%, 100% with the media (SDA) sabouraud dextrose agar. This is treated against the dermatophytes and efficacy is recorded. The result shows that the latex of *C. procera* shows high inhibitory impacts in higher concentration. The findings of the study confirmed the usefulness of latex of *C. procera* in the treatment of ringworm and will benefit the society.

Keywords :- Antifungal activity, Latex, Dermatophytes,*Trichophyton & Microsporum*

INTRODUCTION

The genus *Calotropis* (*C. gigentea and C. procera*) belongs to family Asclepiadaceae. Plant is in the form of shrub and exhibit a lot of medicinal properties which include antimicrobial and anti inflammatory effect. This Plant is also known as King's Crown.The extract of *C. procera* is used tropically for the treatment of ringworm by Mossa et al[3]. The aquous extract of the aerial part of *C. procera* is a prominent decoction and used in treatment of variousdiseases in Saudi Arabia by Olatunde[4]. It is a spreading shrub with large grey green leaves and large green inflated fruit. A whitish sap (latex) oozes out when plant stem is broken. Plant is native to tropical Africa, Asia and frequently found in Ranchi district. Plant contains different Asteroids. Alkaloids etc. It is evident from the survey i.e. with the help of knowledgeable peoples, local healers, Vaidyas etc.

The fresh latex of *C. procera* has been used for treatment of fungal infection in the area. According to the report of WHO 80% of the world's population depend mainly on traditional therapies which involve the use of plant extract and their various active substances by Daljit et al [5].

Ringworm is a common contagious diseases caused by fungi known as dermatophytes which belong to a group of organisms that are able to break down the keratin in tissue such as epidermis, hair, nails etc by Mukhtar and Nasreen et al [6,7].

The aim of this work was to evaluate the potential antifungal activity of *Calotropis procera* latex in vitro and to identify the effect of different concentration of latex to prevent growth of fungal species(dermatophytes).

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MATERIALS AND METHODS

INDENTIFICATION, COLLECTION AND PREPARATION OF PLANT MATERIALS

Collection of Fresh Latex of *Calotropis procera*

The plant of *C. procera* is identified and collected with the help of local healers.

Fresh latex of *C. procera* was collected from the nearby area in Ranchi district. After breaking the stem of plant milky sap ooze out. Which is collected in a sterile wide corked container. This process was repeated until the required volume of latex was collected. The fresh latex was serially diluted with distilled water to get 75%,50%, 25% of the original latex concentration respectively.

The aforementioned concentrations of latex were now mixed with sterile SDA (Sabouraud dextrose agar) aseptically and poured in petridishes of 150mm×30mm.These are allowed to solidify as described by Diwedi and Dubey [8].

USE OF FUNGAL SPEICES

Two species of fungus was procured from MTCC Chandigarh which are responsible for causing ringworm, i.e dermatophytes.

These are :-

Trichophyton rubrum (3272) ;

Microsporum gypseum (2830)

SDA with *C. procera* latex is poured in the petriplates and allowed to solidify. With the help of sterile iron loop, the inocula of fungus was transferred and incubated in the middle of petriplates known as inoculum transfer.The suitable temperature for inoculum is about 27oC to 29oC. For all the concentrations test was performed in triplicates. The growth of the dermatophytes was measured (growth diameter) by the use of transparent millimeter rule daily for 7 days on each culture plate after 48 hours of inoculum transfer.

RESULTS :-

It was found that the growth of dermatophytic fungi in vitro condition,is inhibited by latex of *Calotropis procera* which is studied to varying extents. Table and Graph shows the measure of the diameter of mycelial growth for fungi *Trichophyton rubrum* and *Microsporum gypseum*.

On the basis of statistical analysis the result shows that *Trichophyton* species was more susceptible than *Microsporum* species and so highly inhibited by the latex of plant *Calotropis procera*. It is observed that 100% latex (undiluted) of *C.procera* shows highest inhibitory impact on the dermatophytes, and 25% latex has lowest.

The result of the Phytochemical analysis of the fresh latex of *C.procera* shows the presence of alkaloids, rapain, tannins, steroids, flavenoids, glycosides by Behi and Luthra[9].

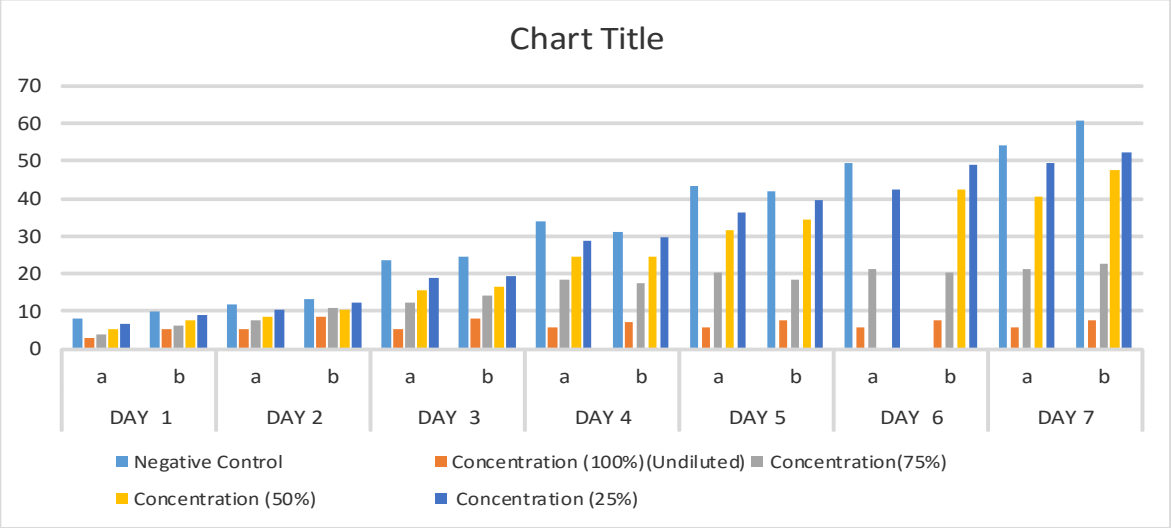
TABLE :- Measure of mycelial growth of *Trichophyton rubrum* and *Microsporum gypseum* on SDA incorporated with different concentration of *Calotropis procera* latex in mm.

Latex Concentration	DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6		DAY 7	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Negative Control	8.2	10.2	12.1	13.1	23.8	24.8	34.1	31.1	43.2	42.2	49.5	53..4	54.0	61.0
Concentration (100%)(Undiluted)	3.1	5.1	5.3	8.4	5.5	8.0	5.6	7.2	5.6	7.4	5.8	7.5	5.9	7.5
Concentration(75%)	4.1	6.1	7.4	10.8	12.2	14.2	18.4	17.4	20.4	18.4	21.1	20.5	21.4	22.5
Concentration (50%)	5.5	7.5	8.6	10.6	15.5	16.5	24.6	24.6	31.4	34.5	36..2	42.3	40.5	47.5
Concentration (25%)	6.5	9.0	10.6	12.4	19.1	19.2	28.7	29.9	36.5	39.4	42.6	49.2	49.5	52.5

a - *Trichophyton rubrum*

b - *Microsporum gypseum*

Graph :- Measure of mycelial growth of *Trichophyton rubrum* and *Microsporum gypseum* on SDA incorporated with different concentration of *Calotropis procera* latex.



DISCUSSION

Various parts of *C. procera* has been reported to be used in many countries for the treatment of various diseases.[3] The result of present studies indicated that *C. procrea* has antifungal potentials against dermatophytes.These findings agrees with Kuta 2008 [10]. He reported that in Nigeria the aquous extract of plant is used in treatment of ringworms.They show the significant inhibitory effect on the growth of different types of dermatophytes.

Similarly *C. procera* leaf extract was reported to be have antifungal activity towards some dermatophytes genera- *Microsporum spp*., *Trichophyton spp.,*and *Epidermatophyton spp* by Goyal et al [11].

The result of phytochemical analysis of the fresh latex of C. procera shows the presence of like flavonoids, steroids, saponin, tannin,anthraquinone etc. The same result was reported with the leaves, root and stem of *C. procera* in other studies by Hassan, Mainsara et al and Kuta [12,13,10].

In the present report the dermatophytes , *Microsporum gypseum* and *Trichophyton rubrum* were used to test the antifungal potential of the latex of *Calotropis procera*.It is effective on both the dermatophytes but *Trichophyton rubrum* is more susceptible than *Microsporum gypseum.*

CONCLUSION

The result of present study show that the latex of *Calotropis procera* is an effective antimycotic agent against dermatophytes in vitro. The chemical components are responsible for antifungal activity. The mechanism of action of drug is not known but these chemicals generally inhibits fungal growth by either disrupting fungal membrane permeability, inhibiting sterol synthesis,inhibiting the nucleic acid synthesis or protein synthesis by Betram[14]. This work gives indispensable approach to find out the antifungal potential in latex of *Calotropis procera.*

These findings shows that there is a “truth” in the claim of the traditional healers on the medicinal value of this plants. Therefore the use of *C.procera* latex should be encouraged in the treatment of dermatophytes infections.This could be of significant interest to the expansion of new effective drugs.The Government shall pay more attention to our local medicinal plants and help in processing them. That may create more job apportunities and will bring about a reduction in the cost of the conventional antifungal drugs.

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