

**Original Research Article*****In-vitro* antidermatophytic activity of essential oil of *Psidium guajava* (Linn.)**Gaurav Bhushan¹, Santosh Kr Sharma², Saurabh Kumar¹, Rajat Tandon¹, AP Singh¹¹Department of Environmental science, Bareilly College, Bareilly (U.P.) India²Department of Botany, University of Rajasthan, Jaipur (Rajasthan) India**ARTICLE INFO:****Article history:**

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ABSTRACT

Dermatophyte with the ability to digest keratine invade and there on keratinized of human and animals. In the present study, the activity of essential oil of *Psidium guajava* (Linn.) was evaluated against four selected dermatophytes, namely *Microsporiumcanis*, *Trichophytomruburum*, *T. verrucossum*, *T. tonsurans*. Dermatophytes were isolated with the infected skin, scalp, nail and genital organs of patients from districts hospital, Bareilly. Griseofulvin was used as a standard antifungal drug against the test dermatophytes. Oil was extracted through clevenger's apparatus. Maximum inhibition zone was reported 69 mm against *T. verrucossum* followed by 60 mm *Trichophytomruburum*, 48 mm *Trichophytomruburum* and 45mm *Microsporiumcanis*. All five concentrations of oil showed excellent inhibitory effect against all test dermatophytes as compared to standard antifungal used.

Introduction

Dermatophytes are highly specialized group of fungi which during the long process of evolution have developed keratine digesting enzyme system and have become adopted to invade and thrive on keratinized tissues of humans and animals (Dahl, 1993 and Jones 1994). Their growth and appendages elicit certain responses in their host which ultimately manifest themselves in a variety of diseases generally described under the generic name Tinea or Ring worm. The disease is predominant in tropical and subtropical countries due to their prevailing moisture and temperature regimes and poses a therapeutic problem despite several antimycotic drugs available in the market. In recent years, there has been a gradual revival of interest in the use of medicinal plants in developed as well as in developing countries because herbal medicines have been reported to be safe and without any adverse side effects. Recently some products of plant origin have been found to be effective source of chemotherapeutic agents, without undesirable side effect and with strong fungicidal activity [1-5]. These findings promoted us to explore other plant products which could be exploited as effective antifungals. We report here the detailed antifungal study

of essential oil *Psidium guajava* (Linn.) against selected dermatophytes.

Material and methods**Extraction of Essential Oil**

For the extraction of essential oil, leaves of *Psidium guajava* (Linn.) were procured. Leaves were macerated with a small quantity of distilled water and the slurry was hydodistilled with clevenger's apparatus for 4-5 hours. The oil sample was filtered and traces of water removed over activated sodium sulphate and stored in cool place.

Microorganism Used

Oil was evaluated for their antifungal properties against the four selected dermatophytes namely *Microsporiumcanis*, *Trichophytomruburum*, *T. verrucossum* and *T. tonsurans* were isolated from the infected skin, scalp, nail and genital organs of patients from districts hospital, Bareilly.

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Screening of Oil

The filter paper disc diffusion method of Gould and Bowie⁶ was used for screening the essential oils against dermatophytes. Standard size Whatman No. 1 filter paper discs 6.0 mm in diameter, sterilized by dry heat at 140°C in an oven for one hour were used to determine antifungal activity. SDA medium for agar disc diffusion test was prepared. After sterilization, it was poured into sterilized petriplates and allowed to solidify. After this suspension of each fungus was prepared from 8 to 10 day-old cultures separately. The suspension was vortexed and 0.1 ml aliquots were spread over the respective agar medium plates. Sterilized filter paper discs were soaked in neat undiluted (100%) as well as in diluted oil (20%, 40%, 60%, 80% Concentration) *Psidium guajava* (Linn.) dilution has been done in acetone. An oil-saturated disc was placed on an agar plate containing fungal spore suspension. Similarly, solutions of standard antibiotics (Griseofulvin; 1000 µg/ml) for antifungal activity were prepared and impregnated in the filter paper discs. These discs were then placed over the plates preceded with respective microorganisms. These plates were incubated at 37°C for 48-72 hours in an incubator. Five replicates were kept in each case and the average values were determined and inhibition zone were observed. The antifungal activity was determined by measuring the inhibition zones around the discs. The activity of oils was measured by the following formula.

Activity Index AI = Inhibition zone IZ of the sample / Inhibition zone IZ of the standard

Result and discussion

Oil of *Psidium guajava* (Linn.) exhibited excellent antifungal activity at different levels of concentration against all the test fungi.

Results show in the table that maximum zone of inhibition 69 mm was reported against *T. verrucossum* in the presence of 100% pure *Psidium guajava* (Linn.). All the five concentrations of *Psidium guajava* oil inhibited more potent antifungal effect against *T. rubrum*, *T. tonsurans* and *M. canis* compared to standard antifungal drug (Griseofulvin). The minimum zone of inhibition was recorded in low concentration of oil.

Psidium guajava oil was found to be highly efficacious against human pathogenic bacteria and plant pathogenic fungi by various workers.

Efficacy of *Psidium guajava* waste leaves extract against *Microsporium gypseum*, *M. canis* and *Epidermophyton floccosum* which were closely placed in cladogram while 93% and 94% inhibition in *Trichophyton violaceum*, *T. tonsurans* and 100% static inhibition was found in *T. mentagrophytes*, *T. rubrum* [6-9].

The present study reveals that *Psidium guajava* has excellent antifungal properties against the entire test dermatophytes as compared to standard antifungal drug used. Results obtained from the present study prove this to be the source of effective medicine for skin disease (ringworm) that can be used by common people at low cost and without any side effect.

Table-1 inhibition zone shows dermatophytes against essential oil of *Psidium guajava* (Linn.)

Concentration of oil	<i>Microsporium canis</i>		<i>Trichophyton rubrum</i>		<i>Trichophyton verrucossum</i>		<i>Trichophyton tonsurans</i>	
	IZ	AI	IZ	AI	IZ	AI	IZ	AI
20%	22	1.222	30	1.21	38	1.055	30	0.967
40%	32	1.777	34	1.392	42	1.166	34	1.096
60%	38	2.111	45	1.821	57	1.5833	38	1.225
80%	40	2.222	51	2.0714	63	1.750	43	1.387
100%	45	2.500	60	2.214	69	1.9166	48	1.548

IZ = Inhibition zone including 6.0 mm diameter of filter paper disc;

AI = Activity Index

Inhibition zone of standard Griseofulvin against *Microsporium canis* = 18 mm, *Trichophyton rubrum* = 32 mm,

Trichophyton verrucossum = 36 mm and *Trichophyton tonsurans* = 31 mm

Conflict of interest statement

We declare that we have no conflict of interest

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