International Journal of Engineering Science Invention(IJESI)
ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726
www.ijesi.org ||Volume 6 Issue 12|| December 2017 || PP. 14-18

Impact of Plant Extracts on the Growth of Some Dermatophytes

Namita Kumari*
Department of Botany Magadh Mahila College Patna University, Patna.India
*Corresponding Author: Namita umara**

Abstract: *During our investigation, some fungal species were isolated which are dermatophytes. This group of fungi are potentially pathogenic, causing so many skin diseases in human beings and animals, such as ringworms, mycoses, moniliasis, histoplasmosis, dermatophytosis, maduromycosis, aspergillosis, candidiasis etc. Among twenty eight different fungal isolates, altogether three different dermatophytes as Monosporium apiospermum , Microsporum canis and Trichophyton verrucosum had been selected to see the influence of different plant part extracts of seven local plants, under reference that had been described to cure skin diseases. These were leaf of Argemone mexicana and Eclipta alba, bark of Bauhinia variegata and Melia azadirachta, rhizome of Curcuma longa and seeds of Butea monosperma & Psoralea corylifolia . Water, acetone and alcohol were used as solvent to extract the active principle of the plants. Further the influence of these plant extract solvents had been investigated on the growth of fungal mycelium. It had been found that most of the plant extracts were very effective against these dermatophytes, sometimes more effective than homaeopathic and allopathic medicines and even antibiotics also.*

Keywords: *Dermatophytes , Plant extracts, Growth behaviour and Control.*

Date of Submission: 07-12-2017 Date of acceptance: 18-12-2017

I. Introduction

While investigating the keratinophilic fungi, some fungi were found potentially pathogenic to cause skin diseases in man and animals. Dermophytic behaviour of this group of fungi is very significant due to the fact that they are responsible for the infection of most of skin diseases, such as ringworms,mycoses, moniliasis, histoplasmosis, dermatophytosis , maduromycosis, aspergillosis,candidiasis etc.Three dermophytic fungi Monosporium apiospermum , Microsporum canis and Trichophyton verrucosum had been selected for further study. Seven different local plants had also been selected to observe the influence of their extracts to control the growth of above three species of dermatophytic fungi.

*Associate Professor

II. Methods and methodology

Based on the reports of Kirtikar and Basu (1918) following parts of noted local plants were taken to observe the influence of their acetone, alcoholic and aqueous extracts on the mean dry weight of the mycelium.

PLANTS

Common name	**Botanical name**	**Parts**
1. Babchi	Psoralea corylifolia L.Sp Pl.	Seed
2. Firangi Dhatura	Argemone mexicana L.Sp Pl.	Leaf
3. Kachanar	Bauhinia variegata L.Sp Pl.	Bark
4. Mochrand Babri	Eclipta alba Hassk.Pl.Jav.Rar.	Leaf
5. Neem	Melia azadirachta L.Sp Pl.	Bark
6. Palash	Butea monosperma Kunze	Seed
7. Turmeric	Curcuma longa L.Sp Pl.	Rhizome

Ten grams of the above plant part was taken on dry weight basis and separately grind in a grinder and extracted with 25 ml rectified spirit and acetone. The extract was filtered and alcohol and acetone were removed by evaporation at 60^{o}c . The residue was suspended in 10 ml of sterilized distilled water. The aqueous extract was prepared by boiling the above amount of material in 50 ml of water for 30 min over water bath. The extract was filtered and adjusted to the volume of 10 ml and autoclaved at 15 psi for 15 minutes. For observing the influence of these extracts, 1 ml|49 ml sterilized sabouraud"s Dextrose liquid medium, except for the control for which simply 50 ml sterilized medium, was taken. Now it was incubated for 15 days in BOD incubator at

25ºC temperature. After the incubation period, the mycelia mats were collected by filtering them through pre-weighed Whitman's 1 to 1 filter paper individually and it was transferred to labelled butter paper envelope. It was dried inside an incubator at temperature of $60 \pm 1^{\circ} C$. After 24 hours of this drying procedure the envelops with mycellial mats were kept in a sealed desiccator over fused calcium chloride for 24 hours. Finally grown fungal mycelia were weighed in milligram. The actual weight of fungal mycelium was then calculated using the formula–

W = W2 – W1

(W1 = Wt of the fitter paper)

(W2 = wt of the fitter paper with mycelium)

(w = wt of the mycelium)

Calculation of the data:

The available data of mean dry weight of mycelium was calculated along with standard error (S.E.). The data were further analyzed statistically for A nova and C.D recorded.

III. Results

The growth of Monosporium apiospermum is significantly different due to the plant extract in three different solvents except the alcoholic extract of Argemone mexicana and Eclipta alba being insignificant. The similar thing was observed for aqueous and alcoholic extract of Butea monosperma, aqueous and acetone extract of Curcuma longa and aqueous and acetone extract of Psoralea corylifolia. The minimum growth was observed due to aqueous extract of Argemone mexicana and Eclipta alba followed by the acetone extract of the same, alcoholic extract of these two plants and aqueous and alcoholic extract of Bauhinia variegate, aqueous and acetone extract of Psoralea corylifolia, alcoholic extract of Melia azadirachta , extract of Curcuma longa in these solvents and lastly the Butea monosperma . The growth of Microsporum canis was significantly observed different for different plant extracts and the solvents except aqueous and alcoholic extract of Eclipta alba, Butea monosperma and aqueous and acetone extract of Curcuma longa .The alcoholic extract of Curcuma longa was observed to suppress the growth of mycelium to the maximum, followed by the aqueous and acetone extract of the same.

The growth of the mycelium under different plant extract may be arranged in ascending order as follows: Butea monosperma > Curcuma longa > Melia azadirachta > Psoralea corylifolia >Bauhinia variegata > Eclipta alba & Argemone Mexicana The influence of plant extract on Trichophyton verrucosum is significantly different. The picture indicates that Argemone mexicana permits minimum growth in alcoholic extract followed by aqueous and acetone extract of the same and next to come in this chain are aqueous and alcoholic extract of Psoralea corylifolia and acetone extract of the same. The aqueous and alcoholic extract of Melia azadirachta followed by the acetone extract. The remaining plants may be arranged in ascending order of the growth as Eclipta alba > Butea monosperma >Bauhinia variegata.

Table: 1 Influence of plant extract in solvents (water, ethanol and acetone) on the growth of M.apiospermum,M.canis and T.verrucosum(pH 7,temp $25+0.5^{0c}$)

(Expressed as mean dry weight in mg)

Plants (Botanical name)	Solvents	M.apiospermum	M.canis	T.verrucosum
Argemone mexicana	Water	80.000 ± 2.887	160.000 ± 1.155	40.000 ± 2.887
	Acetone	85.000 ± 2.887	152.666 ± 1.453	40.000 ± 2.887
	Ethanol	89.000 ± 2.082	155.000 ± 2.887	23.333 ± 1.666
Bauhinia variegata	Water	90.000 ± 1.155	327.666 ± 1.453	534.666 ± 1.453
	Acetone	92.000 ± 1.155	322.000 ± 1.155	530.000 ± 1.155
	Ethanol	90.000 ± 1.155	315.000 ± 0.577	535.000 ± 2.887
Butea monosperma	Water	220.000 ± 1.155	300.000 ± 1.155	334.000 ± 0.577
	Acetone	215.333 ± 0.882	290.000 ± 2.886	335.000 ± 2.887
	Ethanol	215.000 ± 1.155	300.000 ± 1.158	334.666 ± 1.453
Curcuma longa	Water	150.000 ± 1.155	70.000 ± 1.155	46.000 ± 1.155
	Acetone	150.000 ± 1.155	70.000 ± 1.155	50.000 ± 1.155
	Ethanol	152.000 ± 1.155	40.000 ± 2.887	50.000 ± 1.155
Eclipta alba	Water	80.000 ± 2.886	355.000 ± 2.887	302.666 ± 1.453
	Acetone	85.000 ± 2.887	350.000 ± 2.887	310.000 ± 2.887
	Ethanol	89.000 ± 2.082	355.000 ± 2.887	302.666 ± 1.453

Melia azadirachta	Water Acetone Ethanol	137.333 ± 1.453 133.000 ± 1.155 130.333 ± 0.333	206.000 ± 2.082 202.666 ± 1.483 200.000 ± 1.155	140.000 ± 1.155 143.333 ± 1.666 141.666 ± 0.882
Psoralea corylifolia	Water Acetone Ethanol	95.000 ± 1.155 93.000 ± 1.155 98.000 ± 1.155	354.666 ± 1.452 350.000 ± 1.155 352.666 ± 1.453	90.000 ± 2.887 92.000 ± 1.155 90.000 ± 1.155

Control 577.333 ± 1.453 621.333 ± 0.882 601.000 ± 0.577

C.D. at 1 % for plant extracts against –

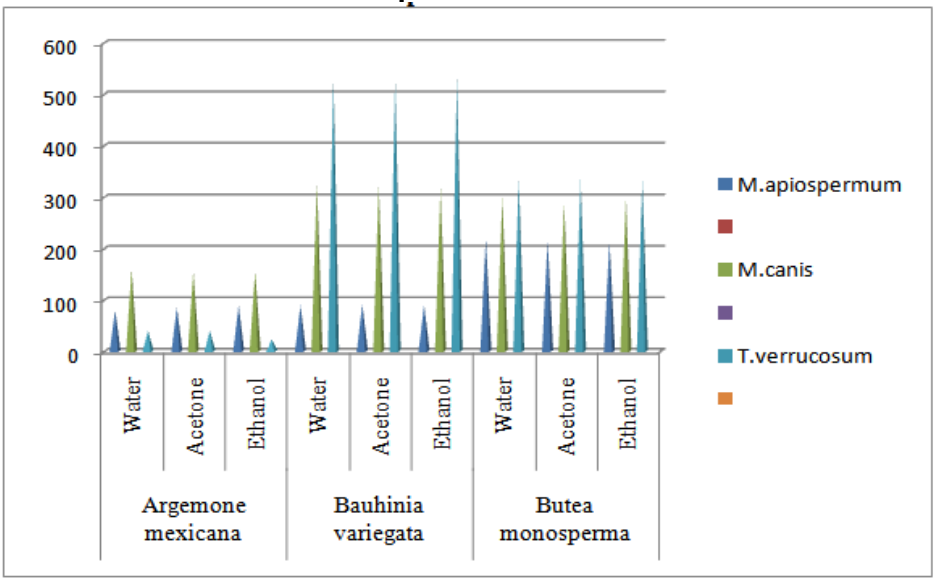
M.apiospermum – 2.680
M.canis -- 2.889
T.verrucosum -- 2.837

C.D. at 1 % for solvents against –

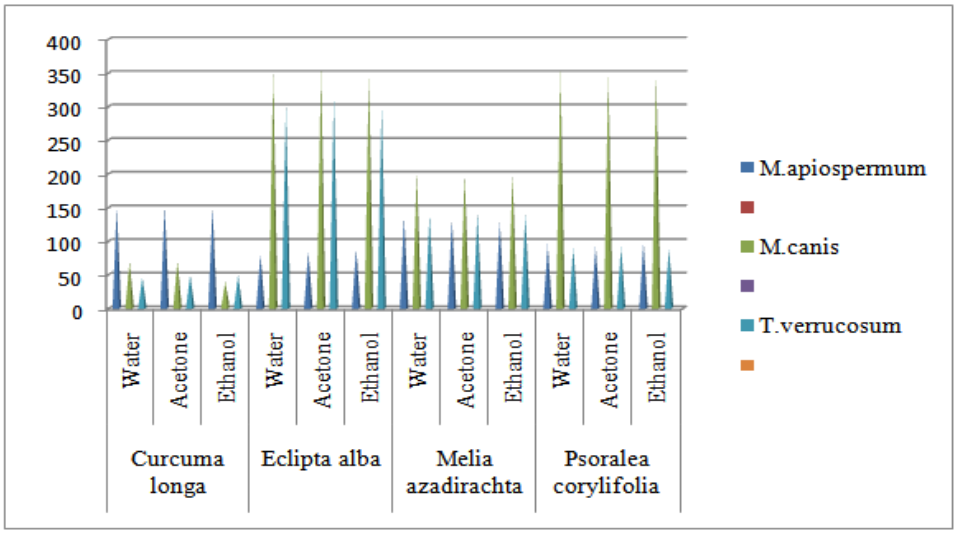
M.apiospermum – 1.641
M.canis -- 1.769
T.verrucosum -- 1.737

Graphs showing Influence of plant extracts in solvents (water, ethanol and acetone) on the growth of M.apiospermum,M.canis and T.verrucosum(pH 7,temp 25+0.5^{0c})(Expressed as mean dry weight in mg).

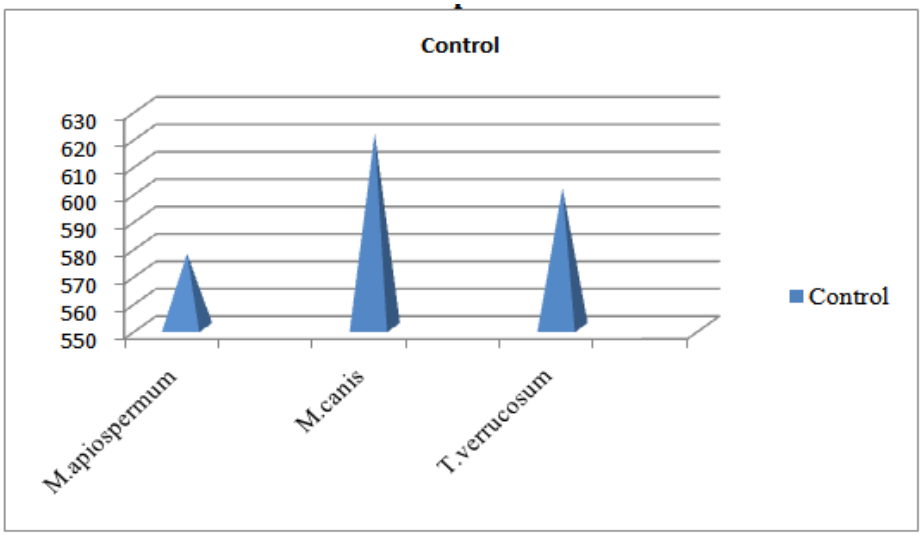
Graph -1



Graph -2



Graph -3



IV. Discussion

Water, acetone and alcohol were used as solvent to extract the active principle of the plants under reference that have been described to cure the skin diseases. Overall survey points out that aqueous extract of Argemone mexicana is highly effective against M. apiospermum while its alcoholic extract against T.verrucosum. Similarly aqueous extract of Eclipta alba and extract of Bauhinia variegata in all the three solvents were recorded effective against M. apiospermum. Alcoholic extract of Curcuma longa was found highly effective against M.canis and aqueous extract against T.verrucosum. Aqueous and alcoholic extract of Psoralea corylifolia were found highly effective against T.verrucosum. Melia azadirachta which has been popularly known plant for the therapeutic and external application of a number of skin diseases, recorded inferior to the above noted plant extracts and Psoralea corylifolia that has got its reputation against skin diseases in Aurvedic disciplineof treatment, was not observed very effective against M. canis.

Ali-Shtayeh MS, Abu Ghdeib SI. (1999) investigated that extracts of Capparis spinosa and Juglans regia completely prevented growth of M. canis and T. Violaceum, while Bhatnagar, D. and McCormick, S.P. (1988), Natarajan, V.; Venugopal, P & Menon, T.(2003), Verma, D.K.; Tripathi, V.J.; Rana, B.K. (1998)observed distorting the growth pattern of the dermatophytes (Trichophyton rubrum, Trichophyton mentagrophytes and Microsporum nanum) by the extracts of the leaves and seeds of the plant Azadirachta indica (neem).Sharma Bindu & Kumar Padma**(**2009) showed development of ecofriendly antifungal compounds for controlling plant diseases caused by *Fusarium oxysporum* by different extracts of three weed plants,namely, *Capparis decidua, Lantana camara* and *Tridax procumbens* while Pirzada J.et al .(2009)studied of *antifungal activity and some basic elements of medicinal plant Cressa cretica* Linn against fungi causing skin diseases. Silva M. R. R. et al (2005) investigated Extracts of *Ocimum gratissimum* leaves for *in vitro* antifungal activity against *Microsporum canis, M. gypseum*, *Trichophyton rubrum* and *T. mentagrophytes*.*Trichophyton rubrum. Agrawal A. et al.2004 observed* inhibitory effect of the plant Boerhavia diffusa against the dermatophytic fungus Microsporum fulvum and Phyllanthus amarus against dermatophytic fungi Microsporum gypseum. Balakumar S. et al. **(**2011) investigated antifungal activity of Aegle marmelos leaf extract on dermatophytes, while Falahati M.,Tabrizib N.O. and Jahaniani F.(2005) worked on Anti Dermatophyte Activities of Eucalyptus camaldulensis in Comparison with Griseofulvin. R.K. Korir, C. Mutai, C. Kiiyukia and C. Bii, (2012) investigated antimicrobial activity and safety of two Medicinal Plants. Bohra, N.K.; Purohit, D.K.(2002) studied Effect of some aqueous plant extracts on toxigenic strain of *Aspergillus flavus while* Caceres A, Lopez BR, Giron MA, Logemann H. (1991) Plants used in Guatemala for the treatment of dermatophytic infections.

References

Journal:

[1]. Agrawal A. et al.2004. Inhibitory effect of the plant Boerhavia diffusa l. against the dermatophytic fungus Microsporum fulvum. J Environ Biol. Jul; 25(3):307-11.

[2]. Agrawal A. et al.2004 Evaluation of inhibitory effect of the plant Phyllanthus amarus against dermatophytic fungi Microsporum gypseum. Biomed Environ Sci. 2004 Sep; 17(3):359-65.

[1]. Ali-Shtayeh MS, Abu Ghdeib SI. 1999 Antifungal activity of plant extracts against dermatophytes. Mycoses. ; 42(11-12):665-72.

[2]. Balakumar S. et al. 2011 Antifungal activity of Aegle marmelos (L.) Correa (Rutaceae) leaf extract on dermatophytes Asian Pacific Journal of Tropical Biomedicine 309-312.

[3]. Bhatnagar, D. and McCormick, S.P. 1988 The inhibitory effect of neem (Azadirachta indica) leaf extracts on aflatoxin synthesis in Aspergillus parasiticus. Journal of the American Oil Chemists'Society, 65(7):1166-1168.
[4]. Bohra, N.K.; Purohit, D.K. 2002. Effect of some aqueous plant extracts on toxigenic strain of Aspergillus flavus. Advances in Plant Sciences, 15(1), 103-106.
[5]. Caceres A, Lopez BR, Giron MA, Logemann H. 1991 Plants used in Guatemala for the treatment of dermatophytic infections. 1. Screening for antimycotic activity of 44plant extracts. J Ethnopharmacol. 31(3):263-76.
[6]. Falahati M.,Tabrizib N.O. and Jahaniani F. 2005 Anti Dermatophyte Activities of Eucalyptus camaldulensis in Comparison with Griseofulvin. Iranian Journal of
[7]. Pharmacology &Therapeutics, 4:80-83.
[8]. Natarajan, V.; Venugopal, P & Menon, T. 2003. Effect of Azadirachta indica (neem) on the growth pattern of dermatophytes. Indian Journal of Medical Microbiology, 21(2), 98-101.
[9]. Pirzada J.et al .2009 Study of antifungal activity and some basic elements of medicinal plant Cressa cretica Linn against fungi causing skin diseases. Sindh Univ. Res. Jour. (Sci. Ser.) Vol. 41 (2)15-20.
[10]. R.K. Korir, C. Mutai, C. Kiiyukia and C. Bii, 2012. Antimicrobial Activity and Safety of two Medicinal Plants traditionally used in Bomet District of Kenya. Research Journal of Medicinal Plant, 6: 370-382.
[11]. Sharma Bindu & Kumar Padma 2009 In vitro antifungal potency of some plant extracts against Fusarium oxysporum International journal of green pharmacy: 3 : (1) : 63-65
[12]. Silva M. R. R. et al 2005 Antifungal activity of Ocimum gratissimum towards dermatophytes. Mycoses, 48, (3,) 172–175
[13]. Verma, D.K.; Tripathi, V.J.; Rana, B.K. 1998. Antifungal activity of the seed coat extract of Azadirachta indica. Indian journal of Pharmaceutical Science, 60(5), 305-306.

International Journal of Engineering Science Invention (IJESI) is UGC approved Journal with Sl. No. 3822, Journal no. 43302.

Namita umara "Impact of Plant Extracts on the Growth of Some Dermatophytes." International Journal of Engineering Science Invention(IJESI), vol. 6, no. 12, 2017, pp. 14-18.