Evaluation of a Few Medicinal Plants for Antifungal Activity

Y.Srinivas*, B.S.Kittur, V.M.Chandrashaker, I.S.Muchchandi.

* Hanagal Shri Kumareshwar College of Pharmacy,
B.V.V.S. Campus, Bagalkot-587101, Karnataka, India.

Summary

Piper nigram, Curcuma amada and *Cassia alata* were traditionally used for anti-bacterial, antifungal, Skin disease, ringworm and eczema. Ethanol and Ethanol Water (50:50) extracts were subjected to determination of MIC against skin disease causing fungal organisms. All exacts are showed significant antifungal activity and MIC=0.6 mg/ml concentration against skin disease causing fungal organisms.

Introduction

Traditional medical knowledge of medicinal plants and their use by indigenous cultures are not only useful for conservation of cultural traditions and biodiversity but also for community the healthcare and drug development in the present and future. Due to poor sanitary conditions, sunburns, psoriasis and to the climatic conditions the infections of the skin are very common in the rural areas. Therapy with synthetic topical applications have most side effects and cannot be afford by the people due to import cost of the drug, to overcome this problem plants growing around us are utilized without scientific validation. The three medicinal plants *Piper nigram* (Piperaceae), *Curcuma amada* (Zingiberaceae) and *Cassia alata* (Leguminosae) were traditionally clamed for Skin disease, ring and eczema [1]. Scientifically *Piper nigram* was evaluated against mosquito larva [2], anti-amoebic activity [3], insecticidal activity against mosquito and files [4]. *Curcuma amada* evaluated for carminative [5], CNS activity [6], hypercholestermic effect in rabbits [7] and *Cassia alata* leaves are evaluated for antimicrobial [8], treat ringworm and skin diseases [9]. So it is thought worthwhile to investigate antifungal activity (MIC) of these drugs. The present paper reports the MIC for the ethanol and ethanol water (50:50) extracts of *piper nigram, Curcuma amada* and *Cassia alata* against skin disease causing pathogenic fungal organisms.

Materials and method

Piper nigram fruits, *Curcuma amada* rhizomes and *Cassia alata* leaves are widely available in India, the fresh fruits , rhizomes and leaves were collected from village Kundargi, located in North Karnataka region, in the month of May-June, they were identified and authenticated by Prof S.A.Kappali, Botanist, Department of Botany, Basaveshwar Science College, Bagalkot, Karnataka. A voucher specimen (No: BSC/Pharmacy/2008/1/15) was stored in the department for future reference. Fruits, Rhizimea and Leaves were shade dried, powdered and extracted using soxhlet [10, 11] with absolute ethanol and absolute ethanol: water (50:50). The extracts were evaporated under reduced pressure at 35^{o}C to get dry residue.

Anti-fungal activity

All the extracts were evaluated for antifungal activity against few clinical isolates, by serial dilution method in duplicate [12] .The antifungal activity was tested against, *Epidermophyton, Tinea niger, Candida albicans, Asperigilus fumigatus, Mocrosporum* and *Trichophyton,* all these fungi organisms procured from ATCC, LGC Promochem Pvt, Bangalore, India, all of these organisms often causing skin diseases, were collected from blood sample of patients. They are grown on blood agar media, subcultured and insolated. On the other hand control strains of same organisms were also developed in suitable culture media. The inoculums of both control strains and clinical isolates were standardized by adjusting to McFareld scale (0.5) using Muller-Hinton broth (10^5CFU/ml). Flucanazole were used as reference standard. The plant extracts were initially dissolved in minimum quantity of DMSO and then added to Muller-Hinton broth to reach final concentration of 1mg/ml. 300µl of these extracts were added to first and second tubes further dilutions were made from second tube to ninth tube using 2 fold dilution technique, so that the highest and lowest concentration of each extracts were 300mg/ml and 0.6 mg/ml respectively. To each of these tubes 100µl of microbial culture (10^5CFU/ml) was added and incubated for 24hrs at 37º C, and were examined from bottom using reflective viewer. The lowest growth was recorded as MIC for each organism [13].

Results and discussion

The Ethanol extract of *Piper nigram* shown good activity against *E.phyton, A.fumigatur, microspourn* and *Trichophyton* and *T.nigra* and moderate activity against *C.albicans.* The ethanol water (50:50) extract shown good activity against *A.fumigatus, Trichophyton, T.nigra* and *Microsperm,* moderate activity against *E.phyton* and *C.albicans.*

The ethanol and ethanol water (50:50) extracts of *Curcuma amada* shown good activity against all the tested fungal organisms, except the ethanol water (50:50) extract shown moderate activity against *C.albicans.*

The ethanol extract of *Cassia alata* leaves shown the activity against *A.funigatus* and for remaining all fungal organist shows moderate activity, but the ethanol water (50:50) shown the good activity against *T.nigra, A.fumagatus* and *Trichnophyton* but moderate activity for remaining all organisms. The results were given in table1.

On this basis in our studies we find that the plants extracts are active against one or more of the tested skin disease causing fungal organisms. The knowledge of medicinal plants is limited to traditional healers, herbalists and elderly persons who live in rural areas. This study also points out that certain species of medicinal plants are being exploited by the local residents who are unaware of the importance of medicinal plants in the ecosystem as best antifungal agent.

Table:1 Antifungal activity of the plant extracts

Plant materials	Extracts	MIC (mg/ml)					
		Epidermo Phyton	*Tinea nigra*	*Candida albicans*	*Aspergilus fumigatus*	*Microsporum*	*Trichophyton*
Piper nigram fruit	Ethanol (3.4%)	0.6	1.125	18.75	0.6	0.6	0.6
	Ethanol Water (50:50) (2.8%)	2.25	1.125	9.0	0.6	1.125	0.6
Curcuma amada. Rhizome	Ethanol (5.6%)	0.6	0.6	9.0	0.6	0.6	0.6
	Ethanol Water (50:50) (4.2%)	0.6	0.6	4.5	0.6	1.125	0.6
Cassia alata leaf	Ethanol (5.4%)	9.0	2.25	9.0	0.6	2.25	2.25
	Ethanol Water (50:50) (4.4%)	18.75	0.6	18.75	0.6	18.75	0.6
Flucinozole		0.008	0.007	0.079	0.008	0.078	0.079

MIC=Minimum Inhibition concentration

Good activity: (0.6 to 2.25 mg/ml). Moderate activity: (4.5 to 18.75 mg/ml)

References

1. Chatterjee A, Chandrapakrashi.S. The Treaties on Indian Medicinal Plants.National Inistitute of Science Cummumication. New Delhi.
2. S.E.Lee. *J. Am. Mosq. Control Assoc*. 16, 254 (2000).
3. S. Ghosal, B.N. Prasad, V.Lakshmi. *J.Ethnopharmacol*. 50, 169. (1996).
4. M.Miyakado and I.Nakayama. In Insecticidal of plant origin. ACS symposium series 387, p.183, *American Chemical Society*. Washington, DC (1989).
5. A.Hussain, O.D. Uirmani, S.P. Popli,W. Misra, M.M.Gupta. et al. Dictionary of Indian Medicinal Plants, Director, Central Institute of Medicinal and Aromatic Plants, Lucknow. 161-162. (1992).
6. D.S. Bhakuni, M.S.Dhar, M.M.Dhar, B.N.Dhawan, B.N. Mehrotra. Screening of Indian plants for biological activity. *Indian J. Expt. Biol*. 7, 250-260. (1969).
7. S.P. Pachuri, S.K. Mukherjee. Effect of *C.amada* on the cholesterol level in experimental hypercholesterolemia of rabbits. *J.Res. India Med*. 5, 27-31. (1970).
8. M.C. Fuzellier, F. Mortier and P.Leetard. Antifungal activity of *Cassia alata*. *Ann.Pharm.Fr*. 40, 357-363. (1982)
9. N.R. Farnsworth and N.Bunyaprapbatsara. *Thai. Medicinal Plants.* (1992). Recommended for primary Health Care system. Medicinal plant information centre, Faculty of Pharmacy Mohidol University. Thiland.
10. J.B. Harbone. Phytochemical method, 3rd ed. Champan and Hall Londan. 31. (1988).
11. D.Vinod Rangari. Pharmacognosy and Phytochemistry. Part-I, 1st ed. Carriere Publication, Nasik. 132 (2002).
12. K.W. Koneman. Testo Atlante di microbiology Diagnostica, 2nd ed. A Delfino, Roma. 550-605. (1995).
13. B.A.Adeniyi, H.H.S. Fong, J.M.Pezzuto, L.Luyengi and H.A odelola. Abtibacterial activity of Diospyrin, isodiospyrin and Bis-isodiospryin from the root of Diospyros piseatorial (Gurke). *Phytother. Res*. 14. 112-117. (2000).