



**EVALUATION OF ANTIFUNGAL ACTIVITY OF ROOTS OF *ACHYRANTHES ASPERA*
FOR RINGWORM INFECTION**

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ABSTRACT

The plant *Achyranthes aspera* is widely used in Ayurvedic system of medicine as Anti-diabetic, Anti-asthmatic, diuretic, Antiviral, Anti-carcinogenic, tooth brush, appetizer and cure gastric disorders. Roots are used in treatment of snakebites. Through literature survey it has been revealed that the paste of the roots of the plant is beneficial in treatment of ringworm infection. Thus, the study is carried out in order to determine the antifungal (ringworm) activity of the roots of the plant. The roots of the plant are subjected to extraction with water and ethanol. The antifungal activity was carried out using agar well diffusion method. All the plant extracts were compared with standard Clotrimazole (1% w/w) as positive control and distilled water, ethanol used as negative control. Accordingly ethanolic extract of the roots was found to more effective against *Trichophyton rubrum* as compared to aqueous extract.

KEYWORDS: Antifungal, Clotrimazole, *Trichophyton rubrum*, *Achyranthes aspera*.

INTRODUCTION

Various species of *Achyranthes* are used medicinally in India, China and Bangladesh. The plant *Achyranthes aspera* is also known as apamarg, chirchira, and chaff flower. It taxonomically belongs to the family Amaranthaceae. The *A. aspera* (L.) Pers. is naturalized throughout the hot and moist parts of India.^[1]

The leaves used for treatment of Gonorrhoea, Bowel complaint, piles and skin eruptions.^[2] It also used as diuretic, Anti-periodic, Antimicrobial, Anti-inflammatory, shows Hypoglycemic effects and Anti-carcinogenic effects.^[3,4,5,6,7,8] Roots are used in pneumonia, as an astringent to bowels, menstrual disorders, stomachic and reported to have anti-fertility activity.^[9,10] Chemically, *Achyranthes aspera* contains Triterpenoid saponins which possess oleanolic acid (0.54%), aglycone A, B, C and D, ecdysterone, long chain alcohol, 17-penta triacontanol, water soluble base betaine and enzyme level are isolated. Two long chain compound isolated from shoots have been characterized as 27-cyclohexylheptacosan-7-ol and 16-hydroxy-26-methylheptacosan-2-ol by chemical and spectral investigations.^[11] The fresh leaves are used very effectively for the treatment of snakebites, dog bites and diarrhea in folk medicines.^[12] Literature survey also reveals that paste of roots is beneficial in the treatment of ringworm infection.^[13] Although the antifungal activities of extracts of leaves have been reported, no systematic

study has been reported on the roots of the plant. Hence the present investigation deals with evaluation of antifungal activity of roots extract *Achyranthes aspera* against *Trichophyton rubrum*, one of the causative organisms for Ringworm infection.

MATERIAL AND METHODS

PLANT MATERIAL

The roots of *Achyranthes aspera* were collected from forest region, cleaned and dried at room temperature in shade and kept away from direct sunlight. The plant was authenticated in the herbarium, Botany department, Govt. Science College Durg, Chhattisgarh, India by comparing morphological features.

DRUGS AND CHEMICALS

The roots of *Achyranthes aspera* were collected and dried in the shade and then pulverized in a grinder. The powdered drug was utilized for extraction. Material was passed through sieve No.120 meshes to remove fine powders where as coarse powder which remained on sieve was used for extraction. This powder was further subjected to preliminary phytochemical test and thin layer chromatography. Clotrimazole (1% w/w) is used as standard drug.^[14]

EVALUATION OF ANTIFUNGAL ACTIVITY

The in vitro antifungal activity of the *Achyranthes aspera* root extract was carried out by Agar well diffusion

method.^[15] Clotrimazole (1mg/ml) was used as standard antifungal agent respectively. Antifungal activity was carried out against culture of *Trichophyton rubrum*, using Sabouraud dextrose agar medium.^[16] The microorganism inoculated plates were maintained at room temperature for 2 hours to allow diffusion of the solution into the medium. The petridishes used for antifungal activity were incubated $25^{\circ}\pm 1$ for 7days.^[17] The diameters of zone of inhibition surrounding each of the wells were recorded.

RESULTS

PHYTOCHEMICAL SCREENING

The extracts were then subjected to preliminary Phytochemical screening to detect the presence of various Phytoconstituents.^[18] The results shows that the Ethanolic extract contains steroids, saponins, glycosides, vitamins and aqueous extract contain saponins,

glycosides as chemical constituents was confirmed by thin layer chromatography.

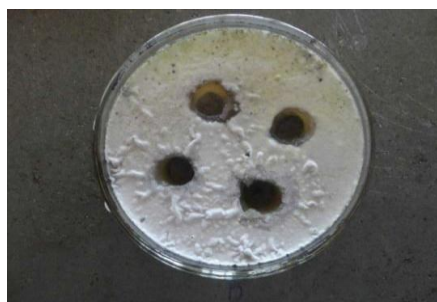
ANTIFUNGAL ACTIVITY

The antifungal results reveal that the activity of the crude extracts of *Achyranthes aspera* plant is encouraging. Antifungal activity was done by using Agar well diffusion method; Clotrimazole were used as standard for comparing results for antifungal activity. The zone of inhibition of Ethanolic extract is 23mm and aqueous extract has 19mm taking 10mg/ml of extract. The zone of inhibition of standard drug Clotrimazole has 21mm. Ethanolic extract shows good antifungal activity. Ethanolic extract shows good antifungal activity against *Trichophyton rubrum* as compare with aqueous extract respectively (Table1).

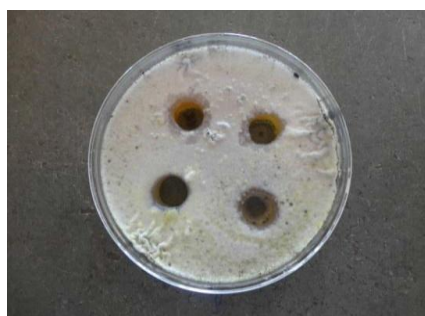
Table1: Effect of *Achyranthes aspera* aqueous and alcoholic extract against *Trichophyton rubrum* showing antifungal activity.

	Zone of inhibition (mm)							Result
	Extract against <i>Trichophyton rubrum</i>							
	1	2	3	4	5	Mean	S.D	
Aqueous (5mg/ml)	18	19	18	18	19	18.4	0.5	18.4±0.5
Alcoholic (5mg/ml)	18	19	20	19	19	19.2	0.6	19.2±0.6
Aqueous (10mg/ml)	19	20	20	19	19	19.4	0.5	19.4±0.5
Alcoholic (10mg/ml)	23	24	23	23	22	23	0	23.0±0
Standard	21	21	20	21	21	20.8	0.4	20.8±0.4
Water (negative) control	12	12	12	12	12	12	0	No activity
Ethanol (negative) control	12	12	13	13	13	12.6	0.5	12.6±0.5

Diameter of hole –12mm, S.D – Standard Deviation.



Antifungal activity against *T. rubrum* of *A. aspera* alcoholic extract.



Antifungal activity against *T. rubrum* of *A. aspera* aqueous extract.

DISCUSSION

Ethanolic extract shows good antifungal activity against *Trichophyton rubrum* as compare with aqueous extract. Phytoconstituents present in Ethanolic extract are steroids, saponins, glycosides, vitamins and aqueous extract contains saponins, glycosides. The zone of inhibition of standard drug Clotrimazole has 21mm (1mg/ml). When 5mg/ml taken Ethanolic extract gives 19mm and aqueous extract gives 18mm of zone of inhibition. On the basis of zone of inhibition results, Ethanolic extract shows better antifungal activity against *Trichophyton rubrum* as compare with aqueous extract.^[19]

CONCLUSION

From the above results, it is concluded that *Achyranthes aspera* used traditionally and in backward are as to treat ringworm infection, showed significant antifungal activity. The experimental evidence obtained in the laboratory model could provide a rationale for the traditional use of this plant as antifungal. The plant may be further explored for its phytochemical profile to recognize the active constituent accountable for antifungal activity. Thus the present experiment proved its traditional claim for the beneficial effect in the ringworm from aqueous and alcoholic extract of root of *Achyranthes aspera*.

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REFERENCES

1. The Ayurveda Pharmacopoeia of India, Part I, Govt. of India Ministry of Health and Family Welfare Dept. of ISM & H, 3: 13-14.
2. Dwivedi Sumeet and Dubey Ragvhendra, *Achyranthes aspera* Linn. (Chirchira): A Magic Herb in Folk Medicine, 2008; 1: Article 89.
3. Gupta SS, SCL Verma, AK Ram, RM Tripathi, 1972; 4(4): 208-214.
4. Vasudeva Neeru and Sharma SK, Pharmacognosy Division, Faculty of Pharmaceutical Sciences, Guru Jambheshwar University, Afr J Tradit Complement Altern Med; Published online August 28, 2007.
5. Bashir A, El Sayed H, Amiri MH et al, Antimicrobial activity of certain plants used in the folk medicine of United Arab Emirates LXIII, 1992; 4: 371-5.
6. Gokhale AB, Damre AS, Kulkarni KR, Preliminary evaluation of anti-inflammatory and anti-arthritis activity of *S. lappa*, *A. speciosa* and *Achyranthes aspera*, Jul 2002; 9(5): 433-7.
7. Akhtar MS, Iqbal J; Evaluation of the hypoglycemic effect of *Achyranthes aspera* in normal and Alloxan-diabetic rabbits J Ethnopharmacol, 1991; 31: 49-57.
8. Chakraborty A, Brantner A, Mukainaka T, Cancer chemo preventive activity of *Achyranthes aspera* leaves on Epstein-Barr virus activation and two-stage mouse skin carcinogenesis, Mar 8, 2002; 177(1): Pub Med 11809524.
9. Dwivedi Sumeet and Dubey Ragvhendra, *Achyranthes aspera* Linn. (Chirchira): A Magic Herb in Folk Medicine, 2008; 1: Article 89.
10. Vasudeva N, Sharma SK, Post coital anti-fertility activity of *Achyranthes aspera* L. roots. J Ethnopharmacol 107, 2006; 2: 179-81.
11. The Wealth of India, First supplement series (Raw Materials), Second print, A-Ci, National Institute of Science Communication & Information Resources, CSIR, 2007; 1: 17.
12. The Ayurveda Pharmacopoeia of India, Part I, Govt. of India Ministry of Health and Family Welfare Dept. of ISM & H, 3: 13-14.
13. Acharya D, Herbs for treatment of skin diseases in Patalkot valley, 2004, www.Selfgrowth.Com.
14. Khandelwal KR, Practical Pharmacognosy Techniques and Experiments, 19th edition, Nirali Prakashan, 2005; 149-156.
15. Acumedia, Neogen corporation PI 7150, Rev 04, October 2008, www.google.com.
16. Biokar diagnostics, Reu des Quarante Mines, France; www.biokardiagnosics.com.
17. Aneja KR, Experiments in Microbiology Plant Pathology and Biotech, 4th edition, New Age international Publisher, 2007.
18. Khandelwal KR, Practical Pharmacognosy, 17th edition, Pune, India, Nirali Prakashan, 2007; 157-8.
19. Lohar DR, Protocol for Testing Ayurvedic, Siddha & Unani medicines, Government of India Department of AYUSH, Ministry of Health & Family Welfare, Pharmacopoeial Laboratory for Indian medicines Ghaziabad, 2007; 48-49.