

***In-vitro* Antifungal Activity of Three Selected Pakistani Medicinal Plants**

¹Abdur Rauf, ²Ajmal Khan, ²Shagufta Rasool, ¹Zafar Ali Shah and ²Muhammad Saleem

¹Institute of Chemical Sciences, University of Peshawar, Peshawar -25120, KPK, Pakistan

²H.E.J. Research Institute of Chemistry,

International Center of Chemical and Biological Sciences, University of Karachi, Karachi-75270, Pakistan

Abstract: In the present investigation three Pakistani medicinal plants were studied for their Antifungal potentials. The antifungal activity of these medicinal plants was determined by tube dilution method. Among the entire fraction hexane fraction shows remarkable inhibition zone in the range of 40-60 mm. while chloroform and ethyl acetate also show good inhibition as compared to ethanol fraction. Thus a lead hit can be discovered by further phytochemical investigation on these medicinal plants.

Key words: *Periploca aphylla* · *Ficus sarmentosa* · *Isodon rugosus* · Antifungal activity

INTRODUCTION

Plants are natural source of producing wide number of bioactive chemical constituents in a most efficient way and with precise selectivity. Since the middle of the 19th century, different class of bioactive compounds have been isolated and characterized. Many of these are used as the active ingredients of the modern medicine, or as the *lead compounds* for new drugs discovery. Several plant derived medicines, are rich in phenolic compounds such as those used in protection against coronary heart diseases and carcinogenesis [1-2].

Periploca aphylla belongs to family Asclepiadaceae, is a large erect branched shrub, grown on different altitudes, all over South West Asia. *P. aphylla* is commonly used for the treatment of tumours and swellings, while the bark of the *P. aphylla* used as antipyretic [3]. *Ficus sarmentosa* is commonly found at N. W. Hills, Kashmir, Northern India, Bangla Desh, Burma and China. It is extremely variable and common wild species. The plant is found creeping on rocks and in crevices or climbing on other trees with the help of adventitious roots, up to c. 2300 m from sea level. It is an indigenous climber and its leaves are lopped for feeding all types of animals particularly by the marginal social segments occupying the steep terrain [4]. *Isodon rugosus* belong to family *Lamiaceae*. Is a deciduous shrub growing up to 1.5 m. It flowers from July to September and the seeds ripen from August to October. It has suitable

for light (sandy), medium (loamy) and heavy (clay) soils. The suitable pH for this plant is acid, neutral and basic (alkaline) soils. It can propagate in semi-shade (light woodland) or no shade and prefers moist soil. One report mentioned that the plant is edible, but no data are reported to show which part of the plant is used [5]. In current study three medicinal plants were evaluated for their antibacterial and phytotoxic activities.

MATERIAL AND METHODS

Plant Material: *Periploca aphylla*, *Ficus sarmentosa* and *Isodon rugosus* were collected from Razagram, Toormang, Dir, Khyber Pakhtunkhwa Pakistan in month of December 2011. The plants were identified by Ghulam Jelani Department of Botany University of Peshawar Pakistan.

Extraction: Shade dried and crushed plant material of *Periploca aphylla*, *Ficus sarmentosa* and *Isodon rugosus* were subjected to hot extractions with methanol in soxhlet extractor for 48h. The solvent extract was concentrated under reduce pressure at 40°C using rotavapor and suspended in water and successively partitioned with *n*-hexane, chloroform, ethyl acetate and methanolic fractions as discuss earlier [6-11].

Antifungal Bioassay: Antimicrobial effect of the crude extracts and various isolated fractions against various fungal strains was profiled. The antifungal activity was

determined by the tube dilution methods [12]. In the described method Miconazole was used as the standard drug. The compound was dissolved in DMSO (22 mg / 5ml). Sterile Sabouraud's dextrose agar medium (5ml) was placed in a test tube and inoculated with the sample solution (400 µg /ml) kept in slanting position at room temperature overnight. The fungal culture was then inoculated on the slant. The samples were incubated for 7 days at 29 °C and growth inhibition was observed.

RESULTS AND DISCUSSION

Effect of antifungal activity of some very important medicinal plants was carried out by standard protocol. Antifungal activity of three medicinal plants extract was assayed by the tube dilution methods. The result revealed that the extract of three medicinal plants showed

significant reduction in growth of *Aspargillius flavus*, *Aspargillius niger*, *Trichoderma. Harzianum* and *Fusarium. Oxysporum*.

Among all the three plants extract, the hexane extract of *Periploca aphylla*, *Ficus sarmentosa* and *Isodon rugosus* exhibited maximum antifungal activity (30-60 mm) against the entire organism which are studied over there except *F. oxysporum* organism in which hexane fraction is inactive against this organism as compared to other fractions. Similarly chloroform is the second most important fraction which show inhibition zone in the range of 60-80 mm as compared to methanol. The ethyl acetate fraction of *Ficus sarmentosa* have significant inhibition zone in the range of 40-100 mm. Keeping in view the antifungal effect of various fraction may lead very potent antifungal pure natural product by further isolation and purification from the most active fractions.

Table 1: Inhibition Spectrum of the Medicinal Plants against *Aspargillius flavus*

S. No	Name of Medicinal Plant	Zone of inhibition (mm)				
		Hexane	Chloroform	Ethyl acetate	Methanol	DMSO
1	<i>Periploca aphylla</i>	60	80	100	105	115
2	<i>Ficus sarmentosa</i>	30	60	80	90	115
3	<i>Isodon rugosus</i>	60	80	80	100	115

Table 2: Inhibition Spectrum of the Medicinal Plants against *Aspargillius niger*

S. No	Name of Medicinal Plant	Zone of inhibition (mm)				
		Hexane	Chloroform	Ethyl acetate	Methanol	DMSO
1	<i>Periploca aphylla</i>	60	65	55	70	115
2	<i>Ficus sarmentosa</i>	45	60	70	80	115
3	<i>Isodon rugosus</i>	45	60	70	80	115

Table 3: Inhibition Spectrum of the Medicinal Plants against *Trichoderma. harzianum*

S. No	Name of Medicinal Plant	Zone of inhibition (mm)				
		Hexane	Chloroform	Ethyl acetate	Methanol	DMSO
1	<i>Periploca aphylla</i>	60	65	55	70	115
2	<i>Ficus sarmentosa</i>	30	60	80	90	115
3	<i>Isodon rugosus</i>	60	80	80	100	115

Table 4: Inhibition Spectrum of the Medicinal Plants against *Fusarium. oxysporum*

S. No	Name of Medicinal Plant	Zone of inhibition (mm)				
		Hexane	Chloroform	Ethyl acetate	Methanol	DMSO
1	<i>Periploca aphylla</i>	-	10	30	40	115
2	<i>Ficus sarmentosa</i>	40	60	40	80	115
3	<i>Isodon rugosus</i>	10	20	20	40	115

In conclusion these studies suggest that the environmental friendly treatment of various diseases of crops which are induced due to these funguses may be treated and cured. Furthermore all the diseases of human caused by these organisms can be treated in a cost effective manner by using the various plant extract after proper toxicological studies.

REFERENCES

1. Uddin, G., A. Rauf, B.S. Siddiqui and S.Q. Shah, 2011. Preliminary Comparative phytochemical Screening of *Diospyros Lotus Stewart*, Middle-East Journal Scientific Research, 10(1): 78-81.
2. Uddin, G., A. Rauf, T.U. Rehman and M. Qaisar, 2011. Phytochemical Screening of *Pistacia chinensis* var. *integerrima*. Middle-East Journal Scientific Research, 7(5): 707-711.
3. Kazimierz, B., 1966. The genus *Periploca* L. A Monograph. *Arboretum kornichie*, 11: 5-104.
4. Rauf, A., N. Muhammad, A. Khan, N. Uddin, M. Atif and Barkatullah, 2012. Antibacterial and Phytotoxic Profile of Selected Pakistani Medicinal Plants, World Applied Sciences Journal, 20: 540-544.
5. Singh, G. and P. Kachroo, 1976. Forest flora of Srinagar, A good flora of the western Himalayas but poorly illustrated. Some information on plant uses.
6. Uddin, G. and A. Rauf, 2012. Phytochemical screening, antimicrobial and antioxidant activities of aerial parts of *Quercus robur* L., Middle-East J Med Pl Res., 1(1): 01-04.
7. Rauf, A., M. Qaisar, G. Uddin, S. Akhtar, N. Muhammad and M. Qaisar, 2012. Preliminary phytochemical screening and antioxidant profile of *Euphorbia prostrata* Middle-East Journal of Medicinal Plants Research, 1(1): 09-13.
8. Uddin, G., A. Rauf and S. Akhtar, 2012. Studies on Chemical Constituents, Phytochemical Profile and Pharmacological Action of *Datura alba*, Middle-East Journal of Medicinal Plants Research, 1(1): 14-18.
9. Shaha, N.Z., M.N. Muhammad, S. Azeem and A. Rauf, 2012. Preliminary Phytochemical and Anti-Radical Profile of *Conyza sumatrensis*. Middle-East Journal of Medicinal Plants Research, 1(1): 05-08.
10. Uddin, G., A. Rauf, M. Arfan, M. Ali, M. Qaisar, M. Saadiq and M. Atif, 2012. Preliminary phytochemical Screening and antioxidant activity of *Bergenia Caliata*. Middle-East Journal of Scientific Research, 11: 1140-1142.
11. Uddin, G. and A. Rauf, 2012. Phytochemical screening and biological activity of the aerial parts of *Elaeagnus umbellate*. Scientific Research and Essays, 7(43): 3690-3694.
12. Waliullah, G., Uddin, A. Rauf, B.S. Siddiqui, T.U. Rehman, S. Azam and M. Qaisar, 2012. Chemical Constituents and Biological Screening of *Grewia optiva drummond* ex Burret Whole Plant. American-Eurasian Journal of Agric Environ Sci., 11: 542-546.