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Letter to the Editor

Phytochemical analysis and antimicrobial activity of different extracts of *Orthosiphon pallidus*

Sir,

Orthosiphon pallidus (*Laminaceae*) is a medicinal herbaceous shrub widely distributed in South East Asia, and it is used for treatment of various diseases like fever, hepatitis, edema, jaundice and rheumatism (Singh et al., 2015). The current literature revealed nothing about the chemical investigation of *O. pallidus* except those reported by Regina (Regina et al., 2015). The objective of the present work was to perform phytochemical and antimicrobial activity of different extracts of *O. pallidus*.

The plant of *O. pallidus* was collected from local area of Pratapgarh district, Uttar Pradesh, India. The plant was authenticated and identified by Mr. B. K. Shukla, Scientist-D, Botanical Survey of India, Central Regional Centre, Allahabad, Uttar Pradesh (Voucher Specimen No. BSI/CRC/ 2013/1286).

The fresh whole plant sample was air dried and extracted with ethanol, water and water-ethanol in a ratio of 50:50 using a Soxhlet extractor for 8 hours at 55–60°C. The supernatant was filtered through Whatman filter paper No. 1 and concentrated under reduced pressure using vacuum at 44 ± 1°C in a rotavapor (IKA ® RB 10 Rota Evaporator, India) followed by lyophilization (Thermo Fisher, Germany and Thermo Heto LL 3000). The lyophilized plant powders were stored at 4°C (Prathapan et al., 2011).

The preliminary phytochemical screening of ethanolic, aqueous and hydroalcoholic (50:50) extracts were chemically tested using standard method (Kokate et al., 1994; Dethe et al., 2014). The concentrations of different extracts were prepared using dimethyl sulfoxide and the antimicrobial activity was determined by agar well diffusion method (Perez et al., 1990). The antimicrobial

Table I

Antimicrobial activity of *Orthosiphon pallidus* extracts

Microorganism	Concentration (µg/mL)	Zone of inhibition (mm)			
		Ethanol extract	Aqueous extract	Hydroalcoholic extract (50:50)	Gentamicin/ fluconazole (20 µg/mL)
Staphylococcus aureus MTCC 3160	200	10 ± 0.5	10 ± 1.3	11 ± 3.6	21 ± 1.8
	400	12 ± 0.5	11 ± 1.2	14 ± 3.6	
	800	15 ± 0.4	13 ± 1.3	16 ± 1.3	
	1600	16 ± 0.5	14 ± 1.2	18 ± 0.7	
	3200	18 ± 0.5	15 ± 1.2	19 ± 0.9	
Streptococcus mutans MTCC 890	200	9 ± 0.2	8 ± 0.3	10 ± 1.1	22 ± 0.1
	400	12 ± 1.2	11 ± 0.2	13 ± 1.2	
	800	13 ± 0.3	12 ± 1.0	14 ± 1.1	
	1600	15 ± 0.3	13 ± 0.1	17 ± 1.3	
	3200	16 ± 0.0	15 ± 0.1	18 ± 1.1	
Bacillus coagulans MTCC 492	200	11 ± 1.1	10 ± 1.0	9 ± 1.0	20 ± 1.6
	400	13 ± 1.2	12 ± 1.1	13 ± 1.1	
	800	14 ± 1.1	14 ± 1.2	15 ± 1.5	
	1600	16 ± 1.3	14 ± 2.0	16 ± 1.3	
	3200	18 ± 1.2	16 ± 1.3	17 ± 1.4	
Candia albicans MTCC 3017	200	6 ± 0.4	7 ± 1.4	9 ± 0.7	18 ± 0.8
	400	8 ± 0.2	8 ± 1.1	11 ± 0.5	
	800	9 ± 0.3	10 ± 1.1	12 ± 0.3	
	1600	10 ± 1.6	11 ± 2.4	13 ± 1.5	
	3200	11 ± 1.0	12 ± 1.0	15 ± 0.6	

Results are expressed as Mean ± SD of three replicates

activity of all extracts was compared using gentamicin and fluconazole (20 µg/mL) as a standards and dimethyl sulfoxide as control.

The results of the phytochemical investigation indicate that ethanolic extract contained carbohydrate, glycosides, tannins, flavonoid and amino acid. The aqueous extract contains carbohydrate, glycoside and tannin and hydroalcoholic extract contained carbohydrate, tannin and flavonoid.

The antimicrobial activity of ethanol, aqueous and hydroalcoholic (50:50) extract of *O. pallidus* was performed and results are presented in (Table I). The extracts *were* tested against three bacterial (*Staphylococcus aureus*, *Streptococcus mutans*, *Bacillus coagulans*) and one fungal strain (*Candia albicans*). The results of antimicrobial activity shown highest zone of inhibition for hydroalcoholic extract, when compared to ethanolic and aqueous extracts. All the extracts were found to be more antibacterial than antifungal. The antimicrobial activity of all extracts found to be comparative as that of standard drugs. Preliminary phytochemical screening of all the extracts of *O. pallidus* suggests that all the extracts possess potential sources of beneficial phytochemicals. The hydroalcoholic extract indicates highest zone of inhibition as compared to ethanol and aqueous extract.

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