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Research Paper

Preliminary Phytochemistry and Antimicrobial Activity of *Salvia Plebeia* R. Br. and *Colebrookea Oppositifolia* Smith

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Abstract: *Salvia plebeia R. Br. and Colebrookea oppositifolia Smith, are two less known lamiaceae members having promising medicinal potential. The present study deals with the screening of preliminary phytochemicals present in the leaves of these two plants and antimicrobial activity of various organic and aqueous extracts against fungal and bacterial strains. It was observed that, both plants are rich in chemical composition containing, alkaloids, phenolics, flavonoids, tannins, glycosides, saponins and steroids. They also contain volatile oil as prominent component. The leaf extracts of both the plants showed significant antimicrobial activity, however, the highest antifungal and antibacterial activity was observed in methanolic extracts.*

Keywords: Antimicrobial activity, Phytochemistry, *Salvia plebeia* R. Br., *Colebrookea oppositifolia* Smith.

1. Introduction

Lamiaceae is one of the most important angiospermic family, comprising a variety of members with distinct aroma. About 16 members of this family were reported from Vidarbha region (MS) India (Dhore and Joshi, 1988). Off these, two less known species i.e. *Salvia plebeia* R. Br. and *Colebrookea oppositifolia* Smith. were selected for screening their preliminary chemical composition and antimicrobial activity. Both these plants were reported to have promising medicinal potential[2]. *Salvia plebeia* was a small herb used by the tribals of Melghat (MS) for its anthilmintic, diuretic, astringent and dimuliscent properties. It was also used on diarrhea, menorrhegia and as memory enhancer. *Colebrookea oppositifolia* was used to cure epilepsy, urinary disorders and as antiseptic (Shirsat, 2013).

2. Material and Methods:

The plants, *Salvia plebeia* R. Br. and *Colebrookea oppositifolia* Smith, were collected from the Chikhaldara forest ranges (MS) India and were authenticated. The plants were shade dried for about 2 weeks and then powdered using electrical blender.

Preliminary Phytochemical Analysis

The powder was then subjected to sohxlet extraction using various solvents and then were analyzed for the presence of alkaloids, terpenoids, reducing sugars, saponins, tannis, Carbonyls, Flavonoids, Phlobatannis, steroids, proteins and volatile oil (Harborne, 1994; Krishnaiah et al., 2009 and Koche et al., 2010).

Antimicrobial Activity

The antimicrobial activity of the selected methanolic extracts was determined by disc diffusion method (NCCLS, 1997 and Elizabeth, 2005). The microbial strains taken for the study were *E. coli, B. subtilis, S. aureus* and *C. albicans*. Tetracycillin was used as a positive reference. Discs without samples were used as a negative control. Plates were kept at 4^{o}C for 1h. The plates were incubated at 37^{o}C for 24h for bacteria and at 30°C for 48h for fungal strains. Antimicrobial activity was assessed by measuring the diameter of the growth-inhibition zone in millimeters (including disc diameter of 6 mm) for the test organisms comparing to the controls.

3. Results and Discussion

It was found that, methanol was the best of three solvents and methanolic extracts of both plants showed presence of all the parameters analyzed. The aqueous extract of *S. plebeia* showed presence of phenols. tannins, saponins glycosides, carbohydrates, sugar and oils; while its chloroform extract showed presence of alkaloids, phenols, tannins, flavonoids, glycoside and terpenes. (table-1). Aqueous extract of *C. oppositifolia* found to contain phenolics, tannins, flavonoids, saponin, carbohydrates, sugar and volatile oils. While its chloroform extract possesses, alkaloids, phenolics, flavonoids, glycosides and terpenes (table- 1). Steroids, terpnes, proteins and amino acids were absent in both aqueous extracts and chloroform extracts of both plants give negative tests for proteins, carbohydrates, sugars and volatile oil (table-1).

The extracts of both plants showed significant antimicrobial activity against microorganism tested. The methanolic extracts were found more vigorous than aqueous extracts (table- 2). On the whole, first look of the results showed that *S. plebeia* extracts possesses more antimicrobial activity than the *C. oppositifolia* extracts.

The highest antibacterial activity (zone of inhibition 28.20±1.80 mm) was showed by methanolic extract of *S. plebeia* against *S. aureus*, while the least (zone of inhibition 09.50± 2.20 mm) was shown by aqueous extract of *C. oppositifolia* against *B. subtilis*.

Against *E. coli*, methanolic extract of *S. plebeia* showed highest antibacterial activity (zone of inhibition 21.25± 2.05 mm) while that of other extracts was in the range of 12.50± 0.85 mm to 17.60± 1.30 mm. Against *S. aureus* highest antibacterial activity was observed was that of methanolic extract of *S. plebeia* (zone of inhibition 28.20±1.80 mm) followed by methanolic extract of *C. oppositifolia* (zone of inhibition 20.50± 0.95 mm) and least was that of aqueous extract of *C. oppositifolia* (zone of inhibition 15.30± 1.10 mm). In case of *B. subtilis*, the highest antibacterial activity was recorded was that of again methanolic extract of *S. plebeia* (zone of inhibition 20. 30±0.60 mm) closely followed by methanolic extract of *C. oppositifolia* (zone of inhibition 15.10± 1.05 mm) and aqueous extract of *S. plebeia* with zone of inhibition 12.40± 0.80 mm. The least

antibacterial activity against *B. subtilis* was showed by aqueous extract of *C. oppositifolia* (zone of inhibition 09.50± 2.20 mm).

The same trend of inhibition of bacteria was found to be followed in case of fungal inhibition. The highest antifungal activity against *C. albicans* was recorded with methanolic extract of *S. plebeia* (zone of inhibition 25.40±1.20 mm followed by methanolic extract of *C. oppositifolia* (zone of inhibition 17.80± 1.60 mm) and the least was that of aqueous extract of *C. oppositifolia* (zone of inhibition 07.35± 0.90 mm) (Table 2).

The preliminary phytochemical analysis of both the plants revels that, they are rich in alkaloids, phenolics, flavonoids, glycosides, saponnins, steroids and also showed presence of reducing sugars, proteins, carbohydrate and volatile oils. Most of these phytochemicals was extractable in methanolics extracts. Off these, the phenolics, flavonoids, polyphenol groups and volatile oils are potent antimicrobial compounds. Probably, each of these individually or in combination might be responsible for antimicrobial potential of extract of these plants.

Similar reports were by several workers indicating the antimicrobial activity of medicinal plants including some lamiaceae members (Essavi and Srour, 2000; Gislene et al., 2000 and Hussain et al., 2009). The results presented here are in analogy with the work reported earlier in allied species (Koche et al., 2012); however, this is the first report of both the plants indicating their antimicrobial potential, therefore, this has good perspectives in developing antimicrobial agents and further biological research.

Tables:

Table 1: Preliminary phytochemical analysis (qualitative tests) of various extracts of *Salvia plebeian* and *Colebrookea oppositifolia* leaf powder

Parameters tested	*Salvia plebeia*			*Colebrookea oppositifolia*		
	AQ	ME	CL	AQ	ME	CL
Alkaloids	-	+	+	-	+	+
Phenolics	+	+	+	+	+	+
Tannins	+	+	-	+	+	-
Flavonoids	+	+	+	+	+	+
Saponins	+	+	-	+	+	-
Glycosides	+	+	+	-	+	+
Steroids	-	+	-	-	+	-
Terpenes	-	+	+	-	+	+
Proteins and amino acids	-	+	-	-	+	-
Carbohydrates	+	+	-	+	+	-
Sugars	+	+	-	+	+	-
Volatile oil	+	+	-	+	+	-

Table 2: Antimicrobial activity (zone of inhibition in mm) of *S. plebeia* and *C. oppositifolia* extracts (n=3)

Samples	*E. coli*	*S. aureus*	*B. subtilis*	*C. albicans*
S. plebeia (methanolic extract)	21.25± 2.05	28.20±1.80	20. 30±0.60	25.40±1.20
S. plebeia (aqueous extract)	16.50± 1.50	19.25± 1.15	12.40± 0.80	14.50± 1.35
C. oppositifolia (methanolic extract)	17.60± 1.30	20.50± 0.95	15.10± 1.05	17.80± 1.60
C. oppositifolia (aqueous extract)	12.50± 0.85	15.30± 1.10	09.50± 2.20	07.35± 0.90
Tetracycline (+ve control)	28.15± 0.85	42.50± 1.25	25.80± 1.20	30.50± 1.25

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