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Short Communication

PHYTOCHEMICAL AND ANTIBACTERIAL SCREENING OF *EVOLVULUS ALSINOIDES* L. EXTRACTS AGAINST CLINICAL PATHOGENS

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ABSTRACT

Medicinal plants have been used to cure a number of diseases. Currently 80% of the world population depends on plant derived medicine as the first line of primary health care for human beings since it has no side effects. This present study was carried out on phytochemical screening and antibacterial activity of *Evolvulus alsinoides* L. against some clinical pathogens. Phytochemical compounds such as tannin, terpenoids, saponins, flavonoids, carbohydrates are presence in all the plant extracts. The methanol extract were observed utmost number of phytochemical compounds compared than other extracts of water and ethanol. The phytochemical composition of flavonoids and steroids may be the reason for the higher antibacterial activity against different bacterial strains. The maximum zone of inhibition was noted in *Evolvulus alsinoides* L. methanol extract against *Escherichia coli* (25 ± 1.2 mm in diameter) and *Klebsiella pneumoniae* (22 ± 1.2 mm in diameter) compared to other gram positive bacteria. The crude extract as well as the isolated compounds found to be active in this study could be useful for the development of new antimicrobial drugs.

Keywords: Phytochemical, Antibacterial, Evolvulus alsinoides L.

1. INTRODUCTION

World is endowed with a rich wealth of medicinal plants. Man cannot survive on this earth for long life without the plant kingdom because the plant products and their active constituents play an important role. Though the recovery is slow, the therapeutic use of medicinal plant is becoming popular because of its inability to cause side effects and antibiotic resistant microorganisms. In India around 20,000 medicinal plant species have been identified but more than 500 traditional communities use about 800 plant species for curing different aliments of human beings [1]. According to World Health Organization (WHO) more than 80% of the world's population relies on traditional medicine for their primary healthcare needs [2]. Evolvulus alsinoides L. commonly found in India, Africa, and the Philippines, is an important medicinal plant employed for different ailments in India traditionally. It grows in open and grassy places throughout almost all of India and subtropical countries of the world. According to an ethno botanical survey conducted among Kani/Kanikaran ethnic groups in Southern Western Ghats of India, whole plant of *E. alsinoides L.* is used for the treatment of venereal diseases [3]. In Uttara

Kannada district of Karnataka, E. alsinoides L. is used as spermopiotic. The Valaiyan community of Piranmalai hills, Tamil nadu consumes leaf juice of E. alsinoides L. internally for three days for fever. Dhanalekshmi et al. [4] have been studied to explore the wound healing and antimicrobial effects of crude ethanolic extract of the whole plant of Evolvulus alsinoides L, (Convolvulaceae). Saranya et al. [5] have been investigated the antimicrobial activity of various parts of plant of Evolvulus alsinoides. The antimicrobial activity of E. alsinoides was evaluated against four clinical pathogenic bacterial strains viz., Staphylococcus aureus, Bacillus cereus, Escherichia coli and Pseudomonas aeruginosa using agar well diffusion assay. Hence, the present study has been carried out to evaluate the antibacterial activity of the extract of plant parts leaves of Evolvulus alsinoides L. against the four human pathogens and out the particular microorganisms for which the herbal extract are active.

2. MATERIAL AND METHODS

Plant leaves of *Evolvulus alsinoides L.* were collected from Karisakkadu, Pudukkottai, TamilNadu, India in December, 2019. The collected plant leaves were air dried, sample was grounded in a grinding machine in

procedures to identity the constituents [6-8]. Disc diffusion method [9] was adopted for evaluation of antibacterial activity *Evolvulus alsinoides* L. plant leaf. The various solvent extracts prepared discs individually were placed on the each petriplate and also placed control and standard (Gentamicin) discs. The plates were incubated at 37°C for24hrs, after incubation period, the diameter of the zone formed around the paper disc, were measured and expressed in mm. The results obtained in the present investigation were subject to statistical analysis like Mean (\bar{x}) and Standard Deviation (SD) by Zar [10].

3. RESULTS AND DISCUSSION

In this investigation tannin, terpenoids, saponins, flavonoids, carbohydrates were presentin Evolvulus alsinoides L. plant leaf. All the extracts showed negative results for glycosides, cournarins, proteins, emodins, anthraquinones, phlobatannins, anthocyanins and leucoantho cyaninsturns (Table 1). Recently, much attention has been directed toward plant extracts and biologically active compounds isolated from popular plant species. The use of medicinal plants plays a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, antifungal and antiviral agents with significant activity against infective microorganisms [11]. The Evolvulus alsinoides L. plant leaf methanol extract number contians maximum of phytochemical compounds compared to other extracts.

Table 1: Qualitative analysis of Phytochemical Compounds

Observation				
Control	Aqueous	Ethanol	Methanol	
-	+	+	+	
-	-	+	+	
-	+	+	+	
-	+	+	+	
-	+	-	-	
-	-	+	+	
-	+	+	+	
-	-	-	-	
-	-	-	-	
-	-	-	-	
-	-	-		
-	-	-	-	
-	-	-	-	
-	-	-	-	
	Control - - - - - - - - - - - - - - - - - - -	Control Aqueous - + - - - + - + - + - + - + - + - + - + - + - - <tr t=""></tr>	Observation Control Aqueous Ethanol - + + - - + - + + - + + - + + - + + - + + - + + - + + - + + - - + - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	

+ indicate presence; - indicate absence; control - distilled water

Among the study, flavonaids and steroids $(1.389\pm0.50$ and $1.346\pm0.09 \ \mu g/ml$) maximum amount were noted in *Evolvulus alsinoides* L compared to other compounds such as tannins $(0.858\pm0.08\ \mu g/ml)$, terpenoids $(0.013\pm0.001 \ \mu g/ml)$ and carbohydrates $(0.750\pm0.04 \ \mu g/ml)$. Plant phenolics constitute one of the major groups of compounds responsible for antioxidant behavior, as well as for antimicrobial effects. Flavonoids, this diverse and widespread group of natural compounds are the most important natural phenolics. They possess a broad spectrum of biological activities, including radical scavenging properties and antibacterial effect. The study plant *E. alsinoides* contains alkaloids: betaine, shankhapushpine and evolvine. Fresh plant contains volatile oil. Tannins, Terpenoids, Saponins, Phlobatannins, Steroids and Carbohydrates were reported from the ethanol extract of *E. alsinoides* [12]. The phytochemical composition of the plant may be the reason for higher the antibacterial activity against different bacterial strains tested.

The results of present research highlights, the fact that the organic solvent extracts exhibited greater antimicrobial activity because the antimicrobial principles were either polar or non-polar and they were extracted only through the organic solvent medium [13]. The results clearly showed that plant extracts were specific in action against the growth of bacteria. Methanol extract was most effective followed by other ethanol and aqueous extract. *Escherichia coli* were more sensitive for ethanol extract of leaves $(25\pm1.2 \text{ mm in diameter})$. Water extract showed low inhibition against

the tested organism compared to other test plant extracts. This may be due to the lack of the solvent properties which plays an important role in antibacterial efficacy [14].

Table 2: Antibacterial bacterial activity of Evolvulus alsinoide	s L
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Bacteria	Zone of Inhibition (mm in diameter)					
	С	Standard*	Aqueous	Ethanol	Methanol	
Escherichia coli	-	26±0.5	19±1.1	21 ± 1.0	25±1.2	
Staphylococcus aureus	-	24±1.1	12 ± 2.0	13±1.6	16±1.4	
Klebsiella pneumoniae	-	25 ± 1.0	10 ± 1.2	21±1.4	22 ± 1.2	
Pseudomonas aeruginosa	-	19±1.4	09±1.0	10±0.6	20±1.1	

Values are expressed in Mean \pm Standard deviation; n=3, *Standard - Gentamicin (10 mg/disc)

The antibacterial activity of the natural naphthoquinone products alkannin and shikonin and their derivatives has been investigated [15]. In general they are active against gram positive bacteria such as Staphylococcus aureus, Enterococcus faecium and Bacillus subtilis, but are inactive against gram negative bacteria [16]. In nosocomial infection, Staphylococcus aureus is one of the most prevalent microorganisms worldwide [17]. This may explain the arduous search for new antimicrobial agents as an important line of research. In this study supported by Ramasubramania raja and Parimala Devi, [18] have been analyzed on hydro alcoholic dry extracts of Gymnema sylvestre, Mentha arvensis, Solanum surratense, Lawsonia inermis Evolvulus alsinoides for treatment of a dental caries were screened for antimicrobial activity by agar well diffusion method against Streptococcus mutans, Staphylococcus aureus, Streptococcus mitis and Candida albicans. The results of this work suggest that the plant have a broad spectrum of antibacterial activity and which can be used as an alternative for antibiotics. Moreover, this plant extract should be investigated in vivo to better understand their safety, efficacy and properties.

4. CONCLUSION

The results revealed that the extracts are potent antibacterial against for all the pathogenic bacteria studied. For all the tested bacteria, methanol extract showed maximum antibacterial activity. Hence, the methanol extract can be used to treat bacterial diseases. The results of the present study provide that, the extract from the leaves of *Evolvulus alsinoides* L. using methanol indicate the antibacterial activity and hence it can be used for the treatment of bacterial diseases. The crude extract as well as the isolated compounds found to be active in this study could be useful for the development of new antimicrobial drugs.

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