International Journal of Applied and Natural Sciences (IJANS)
ISSN(P): 2319-4014; ISSN(E): 2319-4022
Vol. 6, Issue 6, Oct-Nov 2017; 47- 54

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

ANTIMICROBIAL ACTIVITY OF EVOVULUS ALISINOIDS (L) EXTRACT WITH DIFFERENT ORGANIC SOLVENTS IN PATHOGENIC BACTERIA AND FUNGAL SPECIES

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ABSTRACT

In recent years, allopathy medicine has more side effects, compared to Ayurveda and Siddha. In this study, we investigated on, antimicrobial activity of medicinal plant Evolvulus alisinoids (L). Whole plant of Evolvulus alisinoids has the medicinal characters of antioxidant, antipyretic, antiseptic, anticonvulsative, against respiratory disease like asthma, bronchitis etc. The leaf is extracted with different organic solvent likewise etanol, ethylacetate and chloroform, and analyzed the antibacterial and antifungal activity.

KEYWORDS: Medicinal Plants, Evolvulus Alisinoids, Antimicrobiall Activity, Shankapushpi, Shankhavalli, Vishnukranta

INTRODUCTION

Infectious diseases are the leading cause of death worldwide. The clinical efficacy of many existing antibiotics is being threatened by the emergence of multidrug-resistant pathogens (Bandow *et al*, 2003). Bacterial and fungal pathogens have evolved numerous defense mechanisms, against antimicrobial agents and resistance to old and newly produced drugs is on the rise. There is global resurgence in the use of herbal preparations and in some developing countries like India, it is being gradually integrated into the primary and secondary health care systems. Nearly, all societies have used herbal materials as sources of medicines and the development of these herbal medicines, depended on local botanical flora. Several plants are indicated in folk and other traditional systems of medicines, as anti-infective agents.

Resistance to antimicrobial agents is a major global public health problem. Infective diseases, account for approximately one-half of all deaths in the tropics. Despite the progress made in the understanding of microorganisms and their control in industrialized nations, incidents due to drug resistant microorganisms and the emergence of hitherto unknown disease-causing microbes, pose enormous public health concerns (Iwu *et al*, 1999).

Medical plants are one of the most sensitive commodity areas of research, in the world today. Many countries would like to keep their information and knowledge about medicinal plants to themselves, for fear of being marginalized in the race, to exploit the commercial values of medicinal plants.

The use of plants as a source of remedies, for the treatment of many diseases dated back to prehistory, and people of all continents have this old tradition. The search for new agents to cure infectious diseases, began long before people were aware of the existence of microbes. These early attempts used natural substances, usually native plants or their

extracts and many of these herbal remedies proved successful (Sofowora, 1982). In developing countries, where medicines are quite expensive, investigation of the antimicrobial activities of ethno-medicinal plants may still be needed. It is obvious that, these phyto-chemicals will find their way in the arsenal of antimicrobial drugs, prescribed by physicians (Cowan, 1999).

Nature has been a source of medicinal agents, for thousands of years and an impressive number of modern drugs have been isolated from natural sources, many of these isolations were based on the uses of the agents in traditional medicine (Cragg and Newman, 2001). Many plant species have been evaluated for their antimicrobial activity, in the past 20 years (Castello *et al.*, 2002).

More recently, there are several reports in the literature regarding the antimicrobial activity of crude extracts were prepared from plants (El-Seedi *et al.,2002;* Rojas *et ah,* 2003; Duraipandiyan *et ah,* 2006;Parekh and Chanda, 2007).

The present investigation deals with the following objectives the *in vitro* screening of whole plant extracts (aqueous, acetone, ethanol, chloroform, dimethyl formamide) of *Evolvulus alsinoides* were tested against some human pathogenic microorganisms such as *Bacillus subtilis, Pseudomonas aeruginosa, E.Coil., Aapergillus niger* and *A.flavus* by adopting disc diffusion assay method. This study was mainly focus on the application of biocontol agents to arrest/inhibit the growth of the tested microorganisms, without side effects.

MATERIALS AND METHODS

Evolvulus Alsinoides

- **Botanical Name**: *Evolvulus alsinoides*
- **Family Name**: Convolvulaceae
- **Common Name**: Dwarf Morning-glory, Shankhpushpi, Shankhahuli.
- **Part Used**: Whole Plant
- **Habitat**: Commonly growing throughout India and also cultivated.
- **Product Offered**: Wholeplant, Fruits, Pods

Habitat

It is widely distributed in tropical and subtropical regions throughout the world. It grows commonly as a weed in open and grassy places throughout India, ascending to 6,000 ft. Its occurrence is very rare in damp conditions. The Evolulus alisinoides plant material was obtained from the surrounding area of Puthukottai district and Trichirapalli district thiruverumbur in Tamil Nadu

Preparation of Extracts

Explant material of (Evolulus alisinoids) leaves was cut into small pieces and washed twice with sterile distilled water and after shade dried made into powder. A fine powder was taken and weighed 10gm of powder was taken and mixed with 100ml of solvent (Ethanol, Ethylacetate, chloroform) respectively.

Preparation of Disc

Disc was prepared with the help of filter paper. The filter paper was autoclaved and they were submerged with respective extract for 24hrs. (Ethanol, Ethylacetate, chloroform).

Antimicrobial Activity

Different solvent with test sample soaked disc were prepared and to tested the certain microbial strains. Microbial strains were obtained from MTCC, Chandihar, India. Antimicrobial activity using the disc diffusion method microbes were E.coli MTCC 433, Bcillus subtilis MTCC 1305, Pseudomonas aeruginosa MTCC 129 and the fungal sp like Aspergillus niger MTCC 281, Aspergillus flavus MTCC 404. A sterilized cotton swab was prepared and to inoculate the bacterial and fungal culture suspension for MHA and PDA plates respectively and then placed. (vignesh et al.,2014 and koperuncholan et al.,2015).

RESULTS AND DISCUSSIONS

The results of antimicrobial properties of ethanol, ethyl acetate and chloroform extracts from the *Evohmlus alsinoides* were screened against *Bacillus subtilis, Pseudomonas aeruginosa, E.coli*$_v$ *Aspergillus niger* and *A. flavus* by disc diffusion method were presented in the form of a table; figures & plates.

Antibacterial Activity

The antibacterial activity of ethanolic and ethyl acetate of *Evolvulus alsinoides* (**Table 1**, **Figure 1, Figure 2 and Figure 3**) expressed better activity than chloroform extracts against tested bacterial strains. The ethanol extract of this plant was showed maximum inhibitory action against *E. coli*, *Bacillus subtilis* and *Pseudomonas aeruginosa.* The ethyl acetate extract was highlighted excellent growth inhibition against *Bacillus subtilis* when compared to other two bacterial strains. These two are shown moderate activity. The *Pseudomonas aeruginosa* have been contributed maximum zone of inhibitory effect in ethanol and ethyl acetate extracts.

Antifungal Assay

The results of antifungal property of *Evolvulus alsinoides* were given in (**Figure 4** and **Figure 5**). The fungal strain *Aspergillus flavus* showed a greater inhibitory effect followed by *Aspergillus Niger.* Among the three extracts used, the ethanolic extracts exhibited better result followed by chloroform extracts. The ethyl acetate extracts of this plant showed least to moderate activity. Besides, chloroform extracts have been contributed better activity against *Aspergillus flavus.*

The medicinal plants have their own evaluative history being only unique remedy known in the primitive age. The knowledge of their effects were increased from generation to generation. The active chemical substances of the medicinal plants are found and stored during growth, but all these are directive curative properties.

India is one of the important centers, immensely rich in herbal medicinal plants, occupying in diverse ecosystems. India occupies the eighth rank in the world biodiversity. India is well known for its traditional herbal based health care, such as Ayuevedha, Siddha and Unani (Gnanasekar and Krishnaraj, 2004). According to World Health Organization (WHO) about 80% of the population of developing countries relies on herbal medicines. In the developed countries, the demand for herbal medicines has been growing faster and it is gaining good acceptance because of better action and

safety profile. It is estimated that India has 47,000 species of plants. The medicinal plants have traditionally occupied an important position in the lives or rural and tribal peoples. The aromatic plants and aroma chemicals play a vital role directly as well as indirectly in the day to day life of a man since its appearance on the earth (Chaurasia *et ah,* 2001). The main aim and objective of this investigation explores on gaining efforts to develop these natural products (from medicinal plants) will contribute to solving several health and environmental problems throughout the world.

CONCLUSIONS

The result of this research was focused the ethanol and ethyl acetate extracts of *Evolvulus alsinoides* showed better antimicrobial activity than chloroform extract. According to another report the ethanolic extract of *Euphorbia Australis* showed activity against several bacterial species, including *Klebsiellla pneumoniae* and *Pseudomonas aeruginosa* (Palambo and Semple, 2001). Similarly, Mohanasundari *et al.* (2005&2007) investigated the antibacterial activity of ethanoilc extracts of *Passiflora foetida* and *Phyllanthus wightianus* were tested against different strains including *Pseudomonas* species. Recently, Vidotti *et al.* (2006) reported the ethanolic extracts from the *Pedilanthus tithymaloides* were screened against four bacterial strains including *Pseudomonas aeruginosa.* Likewise, Sudhakar *et al.* (2006) investigated the ethanolic extracts from the leaves and flowers of *Cleome viscosa* and the roots of *Gmelina asiatica* showed significant antibacterial activity in P. *aeruginosa.*

Xavier *et al.* (2005) reported the antifungal activity of different concentration of ethanol extracts of *Alangium salviifolium* was showed better activity against *Aspergillus niger* and *Fusarium oxysporum.* Perumal *et al.* (2004) the ethanol extract of some traditional herbal extracts were inhibiting the mycelial growth of *Aspergillus flavus.* The present observation suggests that the ethanol extraction method is suitable to verify antimicrobial properties of medicinal plants and they are supported by various researchers (Krishna *et al.,* 1997; Singh and Singh, 2000; Natarajan *et al,* 2003; Xavier *et al,* 2005; Mohanasundari *et al,* 2005).

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APPENDICES

Table 1: Antimicrobial Activity of Whole Plant Extracts of *Evolvulus Alsinoides* against Selected Microbes

S. No	Organism Tested	Diameter of Inhibition zone (in cm)		
		Solvents Used		
		Ethanol	Ethyl acetate	Choloform
1.	Bacillus subtilis	0.9± 0.05	1.0±0.00	0.8± 0.00
2.	E.coli.	1.0 ± 0.1	0.7 ± 0.05	0.7+ 0.00
3.	Pseudomonas aeruginosa	0.7 ± 0.00	0.6 ± 0.00	0.6 ± 0.00
4.	Aspergillus niger	0.6 ± 0.05	0.6 + 0.00	0.6 ± 0.05
5.	Aspergillus flavus	1.1 ± 0.00	0.75 ± 0.05	1.2 ± 0.05

Table 2

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
East	0	27.4	90	20.4
West	0.2	38.6	34.6	31.6
North	45.9	46.9	45	43.9

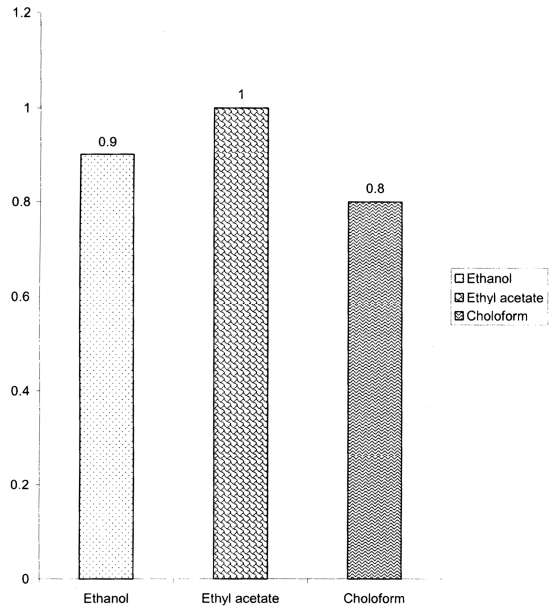

Figure 1: Antimicrobial Activity of *Evolvulus alisinoids* against *Bacillus subtilis*

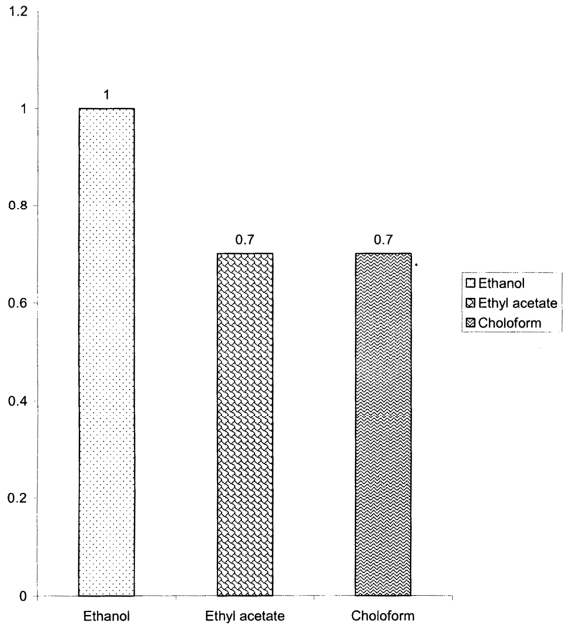

Figure 2: Antimicrobial Activity of *Evolulus Alisinoids* against *Pseudomonas Aeruginosa*

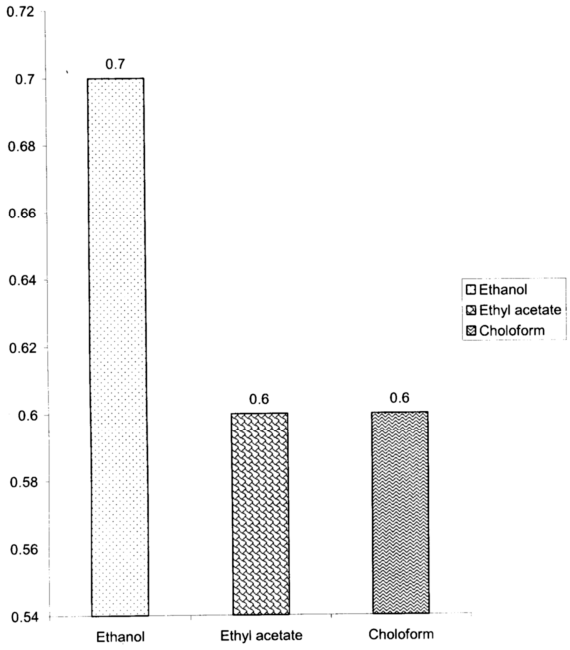

Figure 3: Antimicrobial Activity of *Evolvulus Alisinoids* against *E.coli*

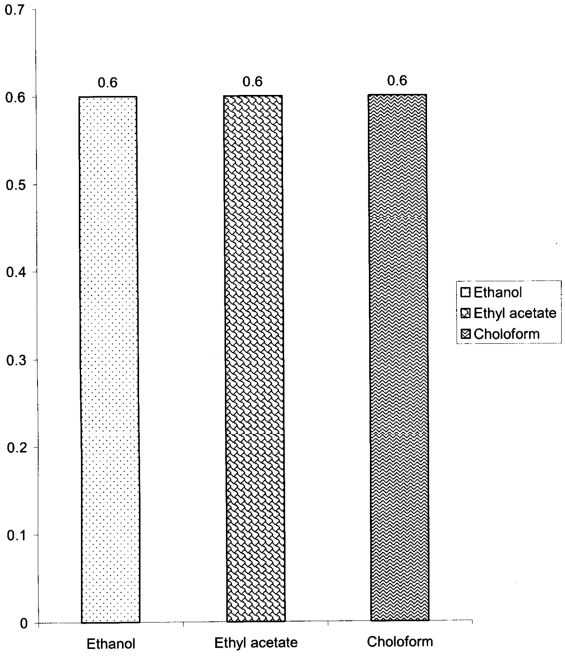

Figure 4: Antimicrobial Activity of *Evolulus Alisinoids* against *Aspergillus Niger*

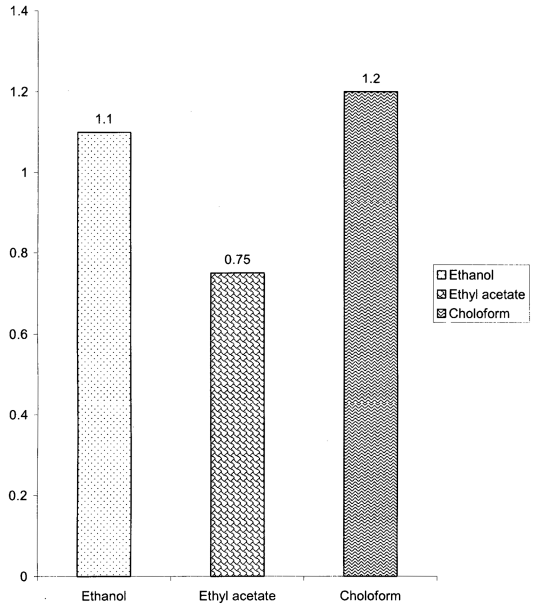

Figure 5: Antimicrobial Activity of *Evolvulus Alisinoids* against *Aspergillus Flavus*