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Antibacterial Efficacy and Phytochemical Screening of some Selected Weeds

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ABSTRACT

Medicinal plants play a novel and useful role not only in traditional system but also in modern medicine. The traditional methods especially the use of herbs still play a vital role to cover the basic health needs in developing countries. In this present study a preliminary screening of phytochemicals and antibacterial potential of some selected weeds were carried out against some human pathogens.

Key words: Some weeds, bacterial strains, ethanolic extract.

INTRODUCTION

India is rich in biodiversity and is endowed with many useful plants. Out of 2,50,000 plant species, weeds constitute about 250 species which are prominent in agricultural and non-agricultural system. Out of which weeds constitute about 20% could be profitably exploited for both domestic and export purposes. They can be used for feed, fodder, green manure, medicinal, biomass based energy, soil conservation and other purposes [1].

This present paper deals with the primary screening of secondary metabolites of some weeds which possess economical medicinal, pharmacological, chemotaxonomical, nutritional, biological and ecological value [4]. Due to the lack of research and development and failure to evolve a right mechanism to tap the resources many species are on the verge of extinction or have become endangered species.

In the present scenario of emergence of multiple drug resistance to human pathogenic organism, this has necessitated a search for new antimicrobial substances from weeds in our surroundings.

MATERIALS AND METHODS

Plant material

For the preliminary screening work, *Euphorbia hirta* Linn, *Evolvulus alsinoides* Linn, *Commelina benghalensis* Linn, *Croton bonplandianum* Bail. and *Achyranthes aspera* Linn were collected from roadsides and fields.

Bacterial strains

The pure culture of *Staphylococcus aureus*, *Streptococcus mutans* and *Pseudomonas aeroginosa* were obtained from sea horse hospital Trichy.

Preparation of culture media

The medium used for the antibacterial activity was muller Hinton Agar. Beef extract 2g Casein acid hydrolysate 17.5g; Starch 1.7g; Agar 17g; D.water 1000ml; pH 7.4 ± 0.2.

Antibacterial sensitivity test

Kirby Bauer methods

The leaves of selected plants were thoroughly washed under tap water followed by washing with distilled water. They are surface sterilized using 0.1Hgcl2 Solution and subsequently washed with distilled water, 2-3 times prior to use. After surface sterilization, leaves were crushed with pestle and mortar using distilled water.

Sterile discs of 0.5 cm diameter were soaked separately in 1 ml aqueous extracts of 50% concentration for 1 hour. They were allowed to dry for 30 minutes under aseptic conditions. They were placed equidistantly on inoculated plates. Paper discs soaked with the extract were placed in plates were incubated at 80^0C for 24 hours and the zone of inhibition was recorded.

Preliminary screening of phytochemicals

Tests 1-8 indicated in table 1 were carried out with fresh materials consisting of stem, leaves and flowers while tests 1-8 indicated in table 2 were carried out using 80% ethanolic extracts [2],[3].

RESULT AND DISCUSSION

The leaf extracts of all the five plants proved inhibitory to human pathogenic organism *Staphylococcus aureus*, *Streptococcus mutans* and *Pseudomonas aeroginosa* (Table 1).

Table-1 : Effect of weed extracts on some human pathogens

S.No	Name of the weeds	Zone of inhibition at 50% concentration		
		Staphylococcus aureus	***Streptococcus mutans***	***Pseudomonas aeroginosa***
1	*Euphorbia hirta*	24±1.2	15±1.1	20±1.5
2	*Evolvulus alsinoides*	15±1.7	24±1.1	19±1.4
3	*Commelina benghalensis*	21±1.2	18±1.4	12±1.6
4	*Croton bonplandianum*	18±1.3	19±1.2	15±1.7
5	*Achyranthes aspera*	27±1.1	28±1.4	25±1.1

Table -2 : Screening of phytochemicals by using fresh materials

S.No	Name of the weeds	Test with fresh material							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	*Euphorbia hirta*	+	-	-	-	-	+	-	-
2	*Evolvulus alsinoides*	-	-	+	-	-	+	+	-
3	*Commelina benghalensis*	-	-	-	-	+	+	-	-
4	*Croton bonplandianum*	+	-	-	-	+	+	-	-
5	*Achryanthes aspera*	-	-	-	-	-	+	-	-

1.HCL / methanol test 2. HCN test 3. Hot water test 4. Juglone test
5. Leucoanthocyanin test 6. Maule test 7.Saponin test 8.Syringin test.

Table -3 : Screening of phytochemicals by using Ethanolic extract

SI.No	Name of the weeds	Test with Ethanolic extract							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	*Euphorbia hirta*	-	+	-	+	+	+	+	-
2	*Evolvulus alsinoides*	-	+	-	+	+	+	+	-
3	*Commelina benghalensis*	-	+	-	+	+	+	-	-
4	*Croton bonplandianum*	-	+	-	+	+	+	+	-
5	*Achyranthes aspera*	-	+	-	+	+	+	+	-

1. Alkaloid test, 2. Flavanoid test, 3. Indole test, 4. Terpenoid test, 5.Carbohydrate test, 6. Phenols test 7.Steroids test, 8.Tannins test
+ Positive -Negative

Results revealed that all the selected weeds possess inhibitory effects against the selected human pathogens.

The leaf extracts of *Achyranthes aspera* showed maximum inhibition zone against *Staphylococcus aureus* (27±1.1) followed by *Euphorbia hirta* (24± 1.2) *Commelina benghalensis* (21± 1.2). The minimum (18±1.3) effects was shown by *Croten bonplandianum* and *Evolvulus alsinoides* (15±1.7).

The inhibitory zone inherited by *A. aspera* (28±1.4) against *Streptococcus mutans* was at the peak followed by *Evolvulus alsinoides* (24±1.1), *Commelina benghalensis* , *Croton bonplandianum* (19±1.2) the inhibitory effect was least for *Euphorbia hirta* (15±1.1) against the same.
Among the selected weeds, an efficient inhibition was observed in *A. aspera* (25±1.1), the zone of inhibition descended from *C. benghalensis* (23±1.6), *E.hirta* (20±1.5) and *E. alsinoides* (19±1.4). The minimum effect was observed in *C. bonplandianum* (15±1.1).

The preliminary screening of phytochemicals are presented in the table 2 and 3. From the tables, it is clear that though these weeds spread over different families, they resemble each other in the presence of carbohydrates, flavonoids, lignin, terpenoids, steroids, phenols and in the absence of cyanogenic glycosides, saponins, syringinaldehyde and Tannins.

From the results, it is evident that these were posses various secondary plant products which could be utilized for the benefit of mankind. So the present work recommends the exploration, utilization and conservation of weeds for their various medicinal, economical, biological and ecological values.

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