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Research Paper

PRELIMINARY PHYTOCHEMICAL SCREENING OF DIFFERENT SOLVENT EXTRACTS OF LEAVES AND CAPITULA OF SOME ASTERACEOUS WEEDS FROM PUNE DISTRICT, MAHARASHTRA

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Abstract

Weeds are commonly defined as plants that grow out of place and are competitive, persistent and pernicious and contain important secondary metabolites which are valuable in terms of their uses for various reasons. The aim of this study was to assess the potential of some selected species of Asteraceous weeds, available in this reason, for their phytochemical constituents in vegetative as well reproductive parts. In the present study, almost all investigated extracts of both the parts in different solvents revealed the presence of major phytochemicals like Alkaloids, Glycosides, Flavonoids,Steroids and Tannins which could be harnessed for their various applications.

Key words: Phytochemical screening, Asteraceae, Weeds, Secondary metabolites.

INTRODUCTION

Weeds, like any other plant, are a reservoir of many types of phytochemical which are the different kinds of secondary metabolites, are often the reason for the various medicinal properties of plants and to exert profound influence on various activities of plants.

Asteraceae, also known as daisy or sun flower family, is the largest family of the flowering plants with more than 24,000-30,000 species and 1600-1700 genera [1] and inhabits almost every environment and continent except Antarctica. In India the family is represented by 900 species under 167 genera. As most of the genera of Asteraceae are weeds i.e. unwanted plants and as per the literature cited scanty information is

available, especially from this region, on asteraceous weeds for their virtue as reservoir of phytochemicals, not only in vegetative but reproductive parts also.

Keeping the importance of phytochemicals in mind, present study aimed at screening of phytochemicals from the ethanol, acetone and chloroform extracts of leaves and capitula of selected weeds species by using standard qualitative tests.

MATERIALS AND METHODS

Collection of Plant Material

Leaves and capitula of some selected asteraceous weeds species ie Cosmos sulphureus, Chromolaena odorata and Conyza bonariensis were collected from surrounding forest area of the city.The plant material was washed with tap water and dried gently in between the folds of blotting paper.

Processing of Plant Material

The plant material was kept at room temperature for 8 to 10 days for complete drying and then shade dried parts were ground using an electric blender to obtain a fine powder. The powdered samples were stored in zipped polythene bags until used for analysis.

Preparation of extracts

Ethanolic,acetone and chloroform extracts of leaves and capitula of all three species were prepared in 20g/ 200 ml ratio by using soxhlet apparatus. The solvents of extracts were dried at room temperature keeping away from direct light. The residue was weighted and solubilized in 50 ml of Dimethyl sulphoxide (DMSO). These extracts were used for the screening of preliminary phytochemical analysis.

Screening procedure

Standard tests were used for preliminary screening of secondary metabolites in extracts,as follows-

Test for Saponins

A small amount of extract was dissolved in water and shaken vigorously. Formation of honeycomb froth indicated the presence of saponins.

Test for Alkaloids

Mayer's test: 1-2 drops of Mayer's reagent were added to 1 ml extract by the side of the test tube. A creamy precipitate indicated presence of alkaloids.

Wagner's test: 2ml Wagner's reagent was added to 1- 2 ml of extract. Formation of reddishbrown precipitate indicated presence of alkaloids.

Test for polyphenols

Ferric chloride test: 0.5 ml of ferric chloride solution was added to 2 ml of extract. Development of dark green colour indicated presence of polyphenols.

Lead acetate test: 0.3 ml of lead acetate solution was added to the 2 ml of extract. A white precipitate indicated the presence of polyphenols.

Test for Tannins

Ferric chloride test: Few drops of 5% ferric chloride solution were added to 1 ml of extract. A blue-black precipitate indicated presence of tannins.

Alkaline reagent test: Few drops of 10% sodium hydroxide were added to 1 ml of extract. Development of intense yellow colour indicated presence of tannins.

Test for flavonoids

Zinc test: A pinch of zinc dust was added to extract followed by few drops of concentrated hydrochloric acid along the side wall of test tube. Development of red colour indicated the presence of flavonoids.

Sodium hydroxide test: A small quantity of extract was dissolved in water and filtered and then 2 ml of aqueous sodium hydroxide was added to produce yellow colouration.A change in colour from yellow to colourless on addition of dilute hydrochloric acid indicated presence of flavonoids.

Test for Steroids

Libermann-burchard reaction: In 2 ml of extract 2 ml of acetic acid was added and solution was cooled well in ice followsd by addition of concentrated sulphuric acid carefully.Colour development from violet to bluish green ring indicated the presence of steroids.

Test for terpenoids

Salkowaski test: 5 ml of extract was mixed in 2 ml of chloroform, and conc. sulphuric acid (3ml) was added to form a layer. A reddish brown colouration indicated presence of terpenoids.

Test for cardiac glycosides

Keller Killani test: To 2 ml of extract, 1 ml of glacial acetic acid, one drop of 5% ferric chloride and concentrated sulphuric acid were added. Appearance of reddish brown colour at the junction indicated the presence of cardiac glycosides.

RESULTS & DISCUSSION

1) % Yield of extract:

For all three plant species yield of extract was estimated in the solvents used for both parts, the leaves as well as capitula, by using the formula- Yield% = wt. of dry extract/wt. of dry plant sample × 100, and result is shown in Table I.

Table I: % Yield of different solvent extracts of leaves and capitula

Solvent	*Cosmos sulphureus*		*Chromolaena odorata*		*Conyza bonariensis*	
	Leaf	Capitulum	Leaf	Capitulum	Leaf	Capitulum
Ethanol	11.66%	18.53%	18.8%	15.33%	12.06%	6.06%
Acetone	4.8%	11.13%	19.06%	14.06%	8.66%	9.46%
Chloroform	3.3%	5.26%	10.33%	3.6%	3.2%	8.06%

2) Screening of Phytochemicals:

Preliminary screening of secondary metabolites was done in different extracts of both vegetative and reproductive parts of the plants studied and the presence or absence of phytochemical constituents namely volatile oils, alkaloids, polyphenols , flavonoids, glycosides, saponins, steroids and tannins was observed. The results obtained are presented in Table II.

Table II: Sreening of Secondary metabolites in extracts in different solvents

Tests	*Cosmos sulphureus*						*Chromolaena odorata*						*Conyza bonariensis*					
	Leaf			Capitulum			Leaf			Capitulum			Leaf			Capitulum		
	E	A	C	E	A	C	E	A	C	E	A	C	E	A	C	E	A	C
Saponins	+	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+
Mayer's Test*	+	+	-	+	+	-	+	+	-	+	+	-	+	+	-	+	+	-
Wagner's Test*	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+
Ferric chloride test**	+	+	+	+	+	-	-	+	-	-	-	-	-	-	-	+	+	+
Lead acetate test**	+	+	+	+	+	-	+	+	+	+	+	+	+	-	-	+	-	+
Ferric chloride test•	+	+	-	+	-	-	-	+	-	-	-	-	-	-	-	+	+	-
Alkaline reagent test•	+	+	-	-	-	+	+	+	+	+	+	+	+	-	-	+	+	-
Zinc test••	+	-	-	-	+	-	+	+	-	+	+	-	-	+	+	+	+	-
Sodium hydroxide test••	+	+	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	-
Steroids	+	+	+	-	-	+	+	+	+	-	+	+	+	+	+	+	+	+
Terpenoids	-	-	-	+	+	+	-	-	-	+	-	-	-	-	-	-	-	-
Cardiac glycosides	+	+	+	+	+	+	-	+	+	+	+	-	+	-	+	+	+	+

Extracts in E=Ethanol, A=Acetone, C=Chloroform. + = Presence, – =Absence
Test for * Alkaloids, ** Polyphenols, • Tannins, •• Flavonoids

Ethanolic extracts showed the highest yield percentage for both the parts in all three species except acetone extract of leaves and capitula for Chromolaena odorata and Conyza bonariensis respectively.Phytochemical screening confirmed the presence of secondary metabolites in all the solvent extract of both the parts investigated.Presence of alkaloids,polyphenols,tannins,steroids and flavonoids was confirmed in ethanol extracts of leaves and capitula of all three species whereas acetone extracts of leaves revealed presence of these constituents in Cosmos sulphureus and Chromolaena odorata. For Acetone extracts, capitula of Chromolaena odorata and Conyza bonariensis, showed positive results. Saponins were detected only in leaves extracts of Cosmos sulphureus and Chromolaena odorata. Presences of phytochemicals ,which are the different kinds of secondary metabolites, in weeds is an important attribute as these can be obtained easily and have immense applications. Alkaloids have a clearly noticeable therapeutic effect in small quantities. They show antimicrobial,antifungal activities and therefore used for medicinal purpose [2]. Flavonoids and other phenolic compounds are reported as effective antioxidant, anticancerous, antibacterial, anti-inflammatory and cardio protective agents and are useful in pharmaceutical and medical applications [3]. Tannins also have been documented for their antibacterial properties [4] whereas Saponins display diverse biological activities as well as the potential for pharmaceutical application [5].

CONCLUSION

In this study presence of phytochemicals in extracts of both the parts was confirmed. These constituents may show antioxidant, antimicrobial, antifungal activities. In order to investigate the effects of these constituents on biological system, their quantitative estimation and activity test against organisms need to be studied to prove their potential in formulating drugs. This would also lead to appropriate use of these plant species which being weeds are easily available in huge number in this region but remain unnoticed.

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