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Phytochemical screening of *Achyranthes aspera* L., *Amaranthus spinosus* L., *Parthenium hysterophorus* L., *Argemone mexicana* L., *Portulaca oleracea* L. and *Euphorbia geniculata* Ortega. from Kolhapur district of Maharashtra

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Abstract

The phytochemicals present in weeds act as potential source of useful drugs to improve the health status of humans. Phytochemical analysis is the first step towards the discovery of useful drugs. Weeds are the richest resource of drugs and useful for the various biological activity. The present investigation includes the phytochemical screening of some common weed species from the crop fields of Kolhapur district. Phytochemical tests were carried out specially for screening secondary metabolites from the selected weed plants. The phytochemicals like Tannin, Coumarin, Saponin, Proteins, Amino acids, Flavonoids, Cardiac Glycosides are present and Carbohydrates, Phlobatannins, Alkaloids are absent in these weeds. So they indicate that these leaves of weed contain a number of medicinally important compounds.

Keywords: Phytochemicals, *Achyranthes aspera* L., *Amaranthus spinosus* L., *Parthenium hysterophorus* L., *Argemone mexicana* L., *Portulaca oleracea* L. and *Euphorbia geniculata* Ortega

Introduction

Phytochemicals are, biologically active chemical compounds naturally occurring in plants. They are non-nutritive plant chemicals that have protective or disease preventive properties. They are a large group of plant-derived compounds hypothesized to be responsible for much of the disease protection conferred from diets high in fruits, vegetables, beans, cereals and plant-based beverages such as tea and wine.

They are non-essential nutrients, meaning that they are not required by the human body for sustaining life. It is well-known that plants produce these chemicals to protect themselves but recent research demonstrate that they can also protect humans against diseases. More than 4,000 of these compounds have been discovered, and it is expected that scientists will discover many more. Some of the well-known phytochemicals are lycopene in tomatoes, isoflavones in soya and flavanoids in fruits.

The presence of certain types of phytochemicals in some plants can act as a natural defense system providing protection against such things as attack from insects and grazing animals. In contrast, other plants produce phytochemicals that provide colour, aroma and flavour, thus inviting attention from potential consumers.

Vegetables could provide as many as 100 different phytochemicals. They are classified into terpenoids such as the carotenoids and other phenolic compounds flavonoids alkaloids. There are works differently like antioxidant, hormonal action, stimulation of enzymes, interference with DNA replication, anti-bacterial effect and physical action. In recent years, Secondary plant metabolites (Phytochemicals), previously with unknown pharmacological activities, has been extensively investigated as a source of medicinal agents [5]. Nature has been a source of medicinal agents since times immemorial. The importance of herbs in the management of human ailments cannot be over emphasized.

Phytochemical analysis is the primary way to the discovery of new useful drugs. Plants are the greatest reservoirs of drugs of traditional systems of medicine, phytochemical intermediates and chemical entities for synthetic drugs [2].

Weeds are the plants growing out of place and out of time. Weeds are also found to be resistant to most of the microbial and pesticidal diseases [8]. Weeds have been neglected and their use for medicinal purpose has not been considered. Phytochemical studies is the primary way to discovery of new drugs [1].

Materials and methods

Plant collection and identification

We collected *Achyranthes aspera* L., *Amaranthus spinosus* L., *Parthenium hysterophorus* L., *Argemone mexicana* L., *Portulaca oleracea* L. and *Euphorbia geniculata* Ortega. from different location of Kolhapur districts. These samples were free from disease. This plant materials were identified by stranded literature.

Extraction of plant material

Preparation of aqueous extracts

We weighed 10 gm of sample using an electronic balance and 10 gm of plant material were crushed in 100 ml of distilled water and filter through muscline cloth. These samples are used for photochemical analysis.

Preliminary Phytochemical Analysis

The individual extract was subjected to the qualitative phytochemical screening for the presence of some chemical constituents. Phytochemical test were carried out adopting standard procedure [4, 7].

Test for Alkaloids

A quantity (3 ml) of concentrated extract was taken into test cooled and filter, the filtrate was used for following test. Dragen Droff's Test: 2 drops of Dragen droff's reagent were added to 1ml of the extract. The development of a creamy ppt was indicates of the presence of alkaloids.

Test for Saponin

5 ml extract was mixed with 20 ml of distilled water then agitated in the graduated cylinder. For 15 min formation of foam indicates Saponin.

Test for Steroids

1 ml extract was dissolved in 10 ml of chloroform and equal volume of concentrated H_2SO_4 acid was added from the side of test tube. The upper layer turns red and H_2SO_4 layer showed yellow with green fluorescence. This indicates the presence of steroid.

Test for Tannin

4ml of extract was treated with 4 ml $FeCl_3$ formation of green colour indicates that presence of condensed tannin.

Test for Anthocyanin

2 ml of aqueous extract is added to 2 ml of 2N HCl and NH_3 , the appearance of pink red turns blue violet indicates presence of the Anthocyanin.

Test for Coumarin

3 ml of 10% of NaOH was the added to 2 ml of aqueous extract formation of yellow colour indicates the presence of Coumarins.

Test for Emodins

3 ml of NH_4OH and 3 ml of Benzene was added to extract appearance of the of the red colour which indicates the presence of Emodins.

Test for Protiens

Xanthoproteic Test: Extract was treated with few drops of concentrated HNO_3 formation of yellow colour indicates the presence of Protiens.

Test for Amino Acid

Ninhydrin Test: To the 2 ml of extract 2 ml on the Ninhydrin reagent was added and boil the for few minutes, formation of blue colour indicates the presence of the Amino Acid.

Test for Flavonoids

Alkaline Reagent Test: Extract was treated with 10 % of NaOH solution, formation of intense yellow colour indicates the presence of the Flavonoids.

Test for Diterpenes

Copper Acetate Test: Extract were dissolved in water and treated with copper acetate solution, formation of the emerald green colour indicates presence of Diterpenes.

Test for Phytosterol

Salkowski's Test: Extract iwas treated with chloroform and filtered. The filtered was treated with few drops of concentrated H_2SO_4 and shakes, allow the standing, appearance of golden red indicates the positive test.

Test for Phenol

Ferric chloride Test: Test extract were treated with 4 drops of Alcoholic $FeCl_3$ solution. Formation of bluish black colour indicates the presence of Phenols.

Test for Phlobatannins

Deposition of red ppt when aqueous extract of each plant sample is boiled with 10 % aqueous HCl was taken evidence of presence of the Phlobatannins.

Test for Leucoanthocyanine

5 ml of isoamyl alcohol added to the 5 ml of aqueous extract, upper layer appear red in colour indicates presence of the Leucoanthocyanine.

Test for Anthraquinone

5 ml of extract was hydrolyzed with dilute H_2SO_4 , then add the 1 ml of benzene and 1 ml of NH_4 , formation of Rose Pink coloration suggested that presence of Anthraquinone.

Test for Cardial Glycosides

Killer-Killani Test: Plant extract treaed with glacial acetic acid containing a drop of $FeCl_3$. A brown coloured ring indicates the presence of the positive test.

Test for Carbohydrates

Iodine Test: Take 2 ml of extract were treated with 5 drops of Iodine solution, gives blue colour, indicates the positive test.

Benedict's Test: Filtrate were treated with the Benedict's reagent and heated gently, orange red ppt indicates the presence of reducing sugar.

3. Results & Discussion

Table 1: Phytochemical analysis of weed like *Achyranthes aspera* L., *Parthenium hysterophorus* L. and *Amaranthus spinosus* L.

Sr. No.	Phytochemicals	<i>Achyranthes aspera</i> L.	<i>Parthenium hysterophorus</i> L.	<i>Amaranthus spinosus</i> L.
1.	Alkaloids	-	-	-
2.	Saponin	+	+	+
3.	Tannin	+	+	+
4.	Anthrocyanin	-	+	+
5.	Coumarin	+	+	+
6.	Proteins	+	+	+
7.	Amino Acids	+	+	+
8.	Flavonoids	+	+	+
9.	Phenol	+	-	-
10.	Phlobatannins	-	-	-
11.	Cardial Glycosides	+	+	+
12.	Carbohydrates	-	-	-

Table 2: Phytochemical analysis of weed like *Euphorbia geniculata* Ortega, *Argemone mexicana* L. and *Portulaca oleracea* L.

Sr. No.	Phytochemicals	<i>Euphorbia geniculata</i> Ortega.	<i>Argemone mexicana</i> L.	<i>Portulaca oleracea</i> L.
1.	Alkaloids	-	-	-
2.	Saponin	+	+	+
3.	Tannin	+	+	+
4.	Anthrocyanin	-	*	-
5.	Coumarin	+	+	+
6.	Proteins	+	+	+
7.	Amino Acids	+	+	+
8.	Flavonoids	+	+	+
9.	Phenol	+	-	-
10.	Phlobatannins	-	-	-
11.	Cardial Glycosides	+	+	+
12.	Carbohydrates	-	-	-

Note: [(+)= Positive, (-)=Negative, (*)Doutful]

The photochemical constituents of *Achyranthes aspera* L. is presented in table:1 shows presence of saponin, tannin, coumarin, protein, amino acids, flavonoid, phenol, cardial glycosides and alkaloids, anthocyanin, phlobatannins, carbohydrates are absent [3]. Saponin, tannin, anthocyanin, coumarin, protein, amino acid, flavonoid, cardial glycosides are observed and alkaloids, phenol, phlobatnnins, carbohydrates are absent in *Parthenium hysterophorus* L. [1]. In *Amaranthus spinosus* L. saponin, tannin, anthocyanin, coumarin, protein, amino acid, flavonoid, cardial glycosides are present and alkaloids, phenol, phlobatannins, carbohydrates are absent.

In *Euphorbia geniculata* Ortega. Alkaloids, Anthocyanin, Phlobatannin, Carbohydrates etc. shows negative test and Saponin, Tannin, Coumarin, Proteins, Amino acids, Flavonoids, Phenol, Cardial Glycoside etc. tests shows positive test. Alkaloids, Phenol, Phlobatannins, Carbohydrates etc. tests shows negative test as well as Saponin, Tannin, Coumarin, Proteins, Amino acids, Flavonoid, Cardial Glycosides etc. tests shows positive test in *Argemone mexicana* L. In *Portulaca oleraceae* L. Alkaloids, Anthocyanin, Phenol, Phlobatannin, Carbohydrates tests indicates negative test and Saponin, Tannin, Coumarin, Proteins, Amino acids, Flavonoids, Cardial Glycosides etc. tests indicates positive test [6].

Conclusions

The phytochemicals observed in this study shows these plants have a potency for use in producing pharmaceutical bioactive compounds for therapeutic drugs. Further studies should be carried out on this plants in order to isolate, identify the bioactive compounds and determine their mechanism in action. The presence of phytochemicals make the plant useful

for treating different diseases and have a potential for providing a drug for human use.

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