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Phytochemical analysis of different parts of *Achyranthes Aspera*

Prachi Tiwari, Pooja Gond and Satyendra Koshale

Abstract
The qualitative study of *Achyranthes Aspera* reveals that the presence of number of secondary metabolites. Active component of different parts of *Achyranthes aspera* was extracted by two methods i.e. shaking and boiling. As plant extract contain several secondary metabolites so the extract was used for different test. Test was performed using both extract prepared by shaking and boiling method and documented. Steroid was found to be absent in all extracts prepared by using solvents (methanol, ethanol, acetone, water and diethyl ether) by both methods. Tannin is present in shoot and root of several extracts isolated by different solvent using shaking as well as boiling method. Terpenoid is absent in all part of the plant. Alkaloid is present in methanolic, ethanolic and water extracts of both methods. Phenol was absent in all extract made by shaking method and present in extract using methanol, ethanol and water as solvent and using boiling method. Leaf and inflorescence contain flavanoid. Saponin was present in root and stem parts by shaking method where as it was found in leaf and inflorescence extract by boiling method. Coumarin was found in all extract except diethyl ether. The phytochemical studies with solvent i.e. methanol, ethanol, acetone, diethyl ether and water extracts of various parts of the plant by shaking and boiling method showed to possess secondary metabolites. Medicinal plants have received great attention as potential antiperoxidative agent. Plant products are also known to their protective effects by scavenging free radicals and modulating carcinogen detoxification and antioxidant defence system. The qualitative study of *Achyranthes Aspera* reveals that the presence of number of secondary metabolites.

Keywords: *Achyranthes Aspera*, Secondary metabolites, solvents.

Introduction
Nature is a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Plant-derived substances have recently become a great interest owing to their versatile applications. *Achyranthes aspera* is a perennial herb belonging to the family of Amaranthaceae (Hossain *et al.* 2013) [1]. It is known as "Prickly chaff flower" in English and "Chirchita", "Onga", "Latjeera" or "Apamarga" in local language (Hasan 2014) [2]. It is an erect, annual herb, distributed in the hilly districts of India (Londonkar *et al.* 2011) [3]. The medicinally active plant compounds are usually their secondary metabolites like terpenoids, quinones, flavonoids, tannins etc that are responsible for protecting the plants from microorganisms, insects and other natural pests. *Achyranthes aspera* was reported to contain many phytochemicals like alkaloids, flavonoids, tannins, terpenoids, saponins, glycosides, steroids (yalavarthi *et al.* 2013) [4].

Materials and Methods
Collection of plant material
The fresh, healthy, mature plants were collected from roadside area of Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). The plant materials were identified, on the basis of flower and inflorescence part of *Achyranthes Aspera*. The leaves, stem and roots were washed and used for the present study.

Preparation of plant extract
The fresh plant parts (leaf, inflorescence, stem and root) were collected and washed with tap water. The sample were dried under sunlight for two days after that partially dried root, shoot, and inflorescence were dried in hot air oven at 50 °C for 24, 24 and 6 hour respectively. The dried plant material was powdered with mixer grinder and stored in air tight poly bags for further use.

1. Shaking method-The powdered sample was soaked or immerged with solvent (methanol, ethanol, acetone and water) in (1:10) shaking incubator for 48 hour and filtered through whatmann No.1 filter paper (Ekpo *et al*., 2009) [5]
2. Boiling method-The powdered sample were mixed with solvent. The mixture was ground using morter and pestle, boiling in water bath for 10 mins at 60 °C and filtered through whatmann No.1 filter paper (Usha *et al.* 2014) [6]

Phytochemical analysis of different parts of plant extract-
Extracts were tested for the presence of active principles such as terpenoids, Steroids, Saponins, Alkaloids, Flavonoids, Tannins, Coumarin.

1. Steroids
For determination of steroid Liebermann Burchard test was performed in which extract was mixed with few drops of acetic anhydride, boiled and cooled concentrated sulphuric acid was added from the sides of the test tube and observed for the formation of a brown ring at the junction of two layers. Green coloration of the upper layer and the formation of deep red color in the lower layer would indicate a positive test for steroids (Bhandary *et al*. 2012) [7]

2. Tannin
For the determination of tannin one ml of water and 1-2 drops of ferric chloride solution were added in 0.5 ml of extracted solution. Blue colour was observed for gallic tannins and green black for catecholic tannins (Abbas *et al.* 2013) [8].

3. Terpenoid
For the determination of terpenoid Salkowski test was performined in which five ml of each extract was mixed in 2 ml of chloroform, and concentrated H_2SO_4 (3 ml) was carefully added to form a layer. A reddish brown colouration of the interface was formed to show the presence of terpenoids (Abbas *et al.* 2013) [8].

4. Alkaloid
For determination of alkaloid Hager's Test was performed in which test solution was treated with few drops of Hager's reagent (saturated picric acid solution).Formation of yellow precipitate would show a positive result for the presence of alkaloids (Borkataky *et al*. 2013) [9]

5. Phenol
For the determination of Phenol Ferric Chloride test was performed in which test extract were treated with 4 drops of Alcoholic $FeCl_3$ solution. Formation of bluish black colour indicates the presence of Phenol (Sawant *et al.* 2013) [10].

6. Flavanoid
For determination of Flavanoid Lead acetate solution Test was performed in which test solution when treated with few drops of lead acetate (10%) solution would result in the formation of yellow precipitate (Borkataky *et al.* 2013) [9].

7. Saponin
For determination of saponin Foam Test was performed in which test solution was mixed with water and shaken and observed for the formation of froth, which is stable for 15 minutes for a positive result (Abbas *et al.* 2013) [8].

8. Coumarin
For determination of coumarin 3 ml of 10% NaOH was added to 2 ml of aqueous extract formation of yellow colour indicates coumarins (Sawant *et al.* 2013) [10].

Results and Discussion
Active component of different parts of *Achyranthes aspera* was extracted by two methods i.e. shaking and boiling and preserved at 4 °C for further use. As plant extract contain several active components, secondary metabolites so the extract was used for different test. However different components shows different solubility with solvents, so extraction was performed by using different solvent of different polarity. Different phytochemical test was performed by each fraction of extract. In which several components are found to be present and some are absent. Test was performed using both extract prepared by shaking and boiling method and documented in Table No.1 and Table No.2 respectively. Here positive sign indicates the presence of phytochemical where as negative sign indicates absent of corresponding phytochemical. During this steroid was found to be absent in all extracts prepared by using solvents (methanol, ethanol, acetone, water and diethyl ether) by both methods. Tannin is present in shoot and root of several extracts isolated by different solvent using shaking as well as boiling method. Terpenoid is absent in all part of the plant *Achyranthes aspera.* Alkaloid is present in methanolic, ethanolic and water extracts of both methods. Phenol is absent in all extract made by shaking method. This may be due to phenol was unable to dissolve in short period of incubation. But phenol is present in extract using methanol, ethanol and water as solvent and using boiling method. Leaf and inflorescence contain flavanoid. Saponin was present in root and stem part of *A. aspera* by shaking method where as it was found in leaf and inflorescence extract by boiling method. Coumarin was found in all extract except diethyl ether. In this study it was found that diethyl ether showed a negative result and this was compare to the study was (Rafiq khan 2013) in which petroleum ether, same as diethyl ether based on polarity, showed the negative response in his result. The phytochemical studies with solvent i.e. methanol, ethanol, acetone, diethyl ether and water extracts of various parts of the plant *Achyranthes Aspera* by shaking and boiling method showed to possess secondary metabolites which is clearly given in table no.1. Medicinal plants have received great attention as potential antiperoxidative agent. Plant products are also known to their protective effects by scavenging free radicals and modulating carcinogen detoxification and antioxidant defense system. The qualitative study of *Achyranthes Aspera* reveals that the presence of number of secondary metabolites which has therapeutic values.

Table 1: Qualitative phytochemical test of extracts of different parts of *Achyranthes Aspera* by shaking method.

Different phytochemicals	C	Methanol				Ethanol				Acetone				Water				Diethyl ether			
		L	I	S	R	L	I	S	R	L	I	S	R	L	I	S	R	L	I	S	R
Steroid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tannin	-	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	-	-
Terpeniod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkaloid	-	+	+	+	+	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
Phenol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flavanoid	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	-	-	-	-
Saponin	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	-	-	-
Coumarin	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-

L-leaf, I-inflorescence, S-stem, R-root, C-control

Table 1(b): Qualitative phytochemical test of extracts of different parts of *Achyranthes Aspera* by boiling method

Different phytoche-micals	C	Methanol				Ethanol				Acetone				Water				Diethyl ether			
		L	I	S	R	L	I	S	R	L	I	S	R	L	I	S	R	L	I	S	R
Steroid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tannin	-	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	-
Terpeniod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkaloid	-	+	+	+	+	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
Phenol	-	+	+	-	-	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
Flavanoid	-	+	+	-	-	+	+	-	-	+	-	-	-	+	-	-	-	-	-	-	-
Saponin	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	-	-	-
Coumarin	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-

L-leaf, I-inflorescence, S-stem, R-root, C-control

Conclusion

Medicinal plants form a large group of economically important plants that provide the basic raw materials for pharmaceuticals purpose. *Achyranthes Aspera* is present a large source of novel active biological compounds shows different activities, including anti-inflammatory, anti-cancer, antiviral, and antibacterial and cardio protective activities and anticoagulant activity. Now a day, plant materials continue to play a major role in primary health care as therapeutic remedies in developing countries. It also shows the better alternative source of pharmacologic agent.

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