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STUDY OF PHYSIOCHEMICAL ANALYSIS OF *ACHYRANTHES ASPERA* EXTRACTS

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ABSTRACT: *Achyranthes aspera* (Amaranthaceae) is an important medicinal herb found as a weed throughout India. It has been used in almost all the traditional system of medicine, ayurveda, unani, and sidha from the ancient time. It serves as a folk medicine in traditional uses. In present study, the methanolic extract and aqueous extracts of leaf, stem, inflorescence and roots of *Achyranthes aspera* was screened. The Physio-Chemical Parameters of *Achyranthes aspera* like determination of moisture content, total ash content, acid insoluble ash content, water soluble ash content and solvent extractive values were done. Qualitative phytochemicals revealed the presence of alkaloids, saponins, flavonoids and glycosides in each extract. In *A.aspera* extract the moisture content, total ash content, insoluble ash content in stem and roots was more than leaf and inflorescence and water soluble ash content was found highest in inflorescence followed by stem then leaf and least in roots.

INTRODUCTION: Plants have been used in traditional medicine for several thousand years. The secondary metabolites of the plants are the major sources of pharmaceutical, food additives and fragrances. Although it has many medicinal properties, it is particularly contain numerous active constituents of immense therapeutic value. In the present era of drug development and discovery of newer drug molecules many plant products are evaluated on the basis of their traditional uses. One of the many plants which are being evaluated for their therapeutic efficacies is *Achyranthes aspera* which is commonly known as Latjeera [1].

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It is an erect or procumbent, annual or perennial used spermicidal [2], antipyretic [3] and as a cardiovascular agent [4]. Also used for the treatment of fever, dysentery and diabetes. Roots are used as astringents to wounds and stomach pain [5].

It is a very important plant for its large number of medicinal properties [6] as well as medicinally important chemicals like ecdysterone [7], achyranthine [8], betaine, pentatriaontane, hexatria-contane, 6-pentatriacontanone and tritriacontane.

The plant shows many pharmacological activities [9] like, anti-allergic [10], hepatoprotective [11], cardiovascular [12], antidiabetic [13], hypoglyceamic, analgesic and antipyretic [14].

Many traditional uses are also reported like antiperiodic, purgative and laxative, in various types of gastric disorders and in body pain [15].

OBJECTIVES:

1. To determine the physiological and physiochemical parameters of *Achyranthes aspera*.

2. To prepare extracts of the plant parts for detection of the presence or absence of phytochemicals.

MATERIALS AND METHODS

Physicochemical Parameters of *Achyranthes Aspera*: Physicochemical parameters of the powdered drug such as different ash content, extractive values, moisture content were performed.

1. **Determination of Moisture Content:** 2 g of each sample were placed in pre-weighed flat porcelain dish. Dry in the oven at 100°C±5°C till the constant weight was obtained. The loss of weight was calculated with reference to air dried material.

2. **Determination of Total Ash Content:** 2 gm of air dried powder was placed as a uniform layer in crucible silica and ignite gradually up to 500-600°C until it was white indicating the absence of carbon, allowed to cool and weighed to determine the percentage of ash with reference to air-dried respective samples.

3. **Determination of Acid Insoluble Ash Content:** The ash was boiled with dilute HCL for 5 minutes and insoluble matter was collected in a sintered glass crucible washed, ignited, and cooled finally it was weighed to calculate the percentage of acid-insoluble ash with reference to the bone dried material.

4. **Determination of Water Soluble Ash Content:** Total ash was boiled with water for 5 minutes and insoluble ash was collected in a sintered glass crucible washed ignited at a temperature not exceeding 450°C.

   Cool and weighed for the determination of water soluble ash with reference to the bone dried drug.

5. **Determination of Solvent Extractive Values:** 5gm of the air dried, powdered macerated with 100 ml of solvent for 24 hours, shaken frequently and allowed to stand for 24 hours. Thereafter, filtered, evaporated the filtrate to dried and weight was taken. The percentage of solvent soluble extractive with reference to bone dried sample has to be calculated.

Preparation of Extract by Sequential Extraction Method:

1. **Preparation of Methanolic Extract:** The different parts of plant were shade dried and extract was prepared in methanol by filtering the mixture at regular intervals.

2. **Preparation of Aqueous Extracts**: The filtrate of methanolic extract was shade dried and with this filtrate the aqueous extract is prepared in distilled water.

3. **Preliminary Phytochemical Screening of Extracts of *Achyranthes aspera*:** Plants contain different compounds like alkaloid, glycoside, volatile oils, tannins, saponins, flavonoids etc. To check the presence or absence of primary and secondary metabolites, all the extract were subjected to chemical tests.

Test for Saponins:

1. **Foam test:** Samples were dissolved in distill water and shaken vigorously. A layer of foam on top layer was formed which is stable, indicates the presence of saponins in the sample.

Test for Flavonoids:

1. **NaOH Test:** Taken 1ml of the sample with 10ml of 1% NaOH solution and gently shaken the sample, yellow color was observed denoting the presence of flavonoids.

Test for Glycosides:

1. **Hansch Test:** In aqueous extract conc. H_2SO_4 was added from the side walls and

formation of a brown ring suggested the presence of carbohydrates.

Test for Proteins:

1. **Xanthoprotein Test:** Mix 3 ml extract solution with 1 ml conc. H_2SO_4 and boiled it by which yellow precipitate was obtained indicating the presence of proteins in it.

OBSERVATIONS AND RESULTS:

Physicochemical Parameters of ***Achyranthes aspera*:** In physicochemical parameters moisture content, total ash content, acid soluble ash content, water soluble ash content and solvent extractive value was observed and the result are shown in **Table 1**.

In *A. aspera* extract, the moisture content in stem and roots (40%) were more than the values in leaf and inflorescence, total ash content in stem (7%) was more followed by leaf then inflorescence and least in roots, acid insoluble ash content was found highest in stem and inflorescence (1%) then in leaf and least in roots and **water** soluble ash content was found highest in inflorescence (5.5%) followed by stem then leaf and least in roots.

TABLE 1: PHYSICOCHEMICAL PARAMETERS OF ***ACHYRANTHES ASPERA***

Parameters Values (%) w/w	Moisture %	Total Ash content	Acid Insoluble Ash content	Water Soluble Ash content
Leaf	30%	5%	0.98%	4.0%
Stem	40%	7%	1.00%	5.0%
Inflorescence	35%	4%	1.00%	5.5%
Roots	40%	2%	0.79%	1.0%

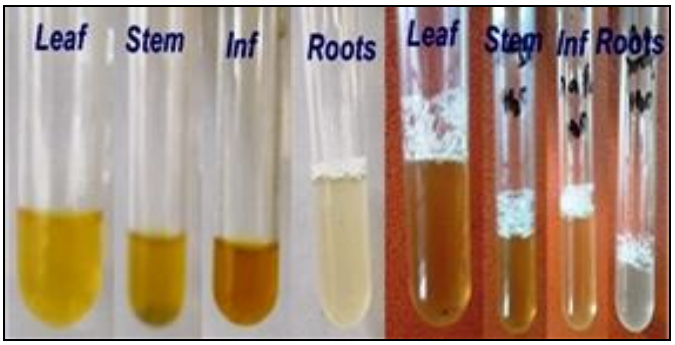
From **Table 2**, we observe the highest percentage yield for methanol extract was found in leaf and inflorescence extract (7% and 8%) while for aqueous it was for inflorescence (10%) and least for both solvents was for roots. The color observed as green for methanolic leaf, stem and inflorescence extract. Orange for methanol roots extract. While for aqueous extract it was dark brown for leaf and stem, greenish brown for inflorescence and yellowish brown for aqueous roots extract.

TABLE 2: EXTRACTIVE VALUES, PERCENTAGE YIELD AND COLOUR OF EXTRACTS OF *ACHYRANTHES ASPERA*

Solvent Used	Solute	Percentage Yield	Color of Extracts
Methanol	Leaf	7%	Greenish
	Stem	5%	Brownish
	Inflorescence	8%	Greenish
	Roots	6%	Light Brown
Water	Leaf	9.0%	Green
	Stem	7%	Brown
	Inflorescence	10%	Greenish Brown
	Roots	8%	Light Brown

TABLE 3: PRELIMINARY PHYTOCHEMICAL SCREENING OF EXTRACTS OF *ACHYRANTHES ASPERA*

Extracts	Saponins		Flavonoids		Glycosides		Proteins	
	Meth. Extract	Aqueous Extract	Meth. Extract	Aqueous Extract	Meth. Extract	Aqueous Extract	Meth. Extract	Aqueous Extract
Leaf	-	+	+	+	+	+	-	+
Stem	-	+	+	+	+	+	+	+
Inflo.	-	+	+	+	+	+	-	+
Roots	+	+	+	+	+	+	+	+

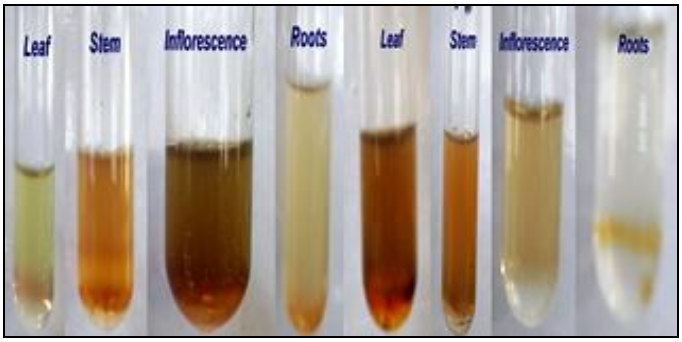


METHANOLIC EXTRACTS AQUEOUS EXTRACTS

FIG. 1: FOAM TEST FOR SAPONIN

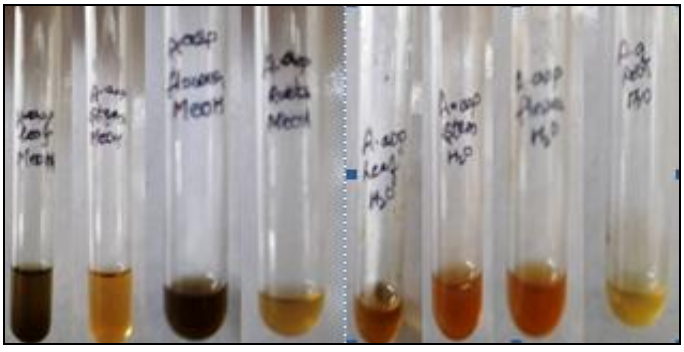
METHANOLIC EXTRACTS AQUEOUS EXTRACTS

FIG. 2: TEST FOR FLAVONOIDS



METHANOLIC EXTRACTS AQUEOUS EXTRACTS

FIG. 3: HANSCH TEST FOR GLYCOSIDES



METHANOLIC EXTRACTS AQUEOUS EXTRACTS

FIG. 4: TEST FOR PROTEIN

RESULT: The preliminary phytochemicals tests (**Table 3**) showed the presence of flavonoids in aqueous extracts while negative for methanolic extract which suggests that the flavonoids are well dissolved in aqueous than methanolic extracts and for saponins, methanolic extract of inflorescence and roots showed mild foams in foam test for saponins as less foam was obtained which was not stable for certain long time. Whereas in aqueous extracts of same showed foams which were very dense and stable for several minutes. This shows the dissolvability of saponins in water is very much higher than methanol.

Glycosides were found present in both methanolic and aqueous extracts as the brown ring was obtained in test tubes. The tests for proteins were obtained positive for methanolic stem and roots extracts and negative for leaf and inflorescence extracts. Whereas all extracts of *Achyranthes aspera* showed positive result for proteins. This shows that proteins are well dissolved in water than methanol.

CONCLUSION: The present work is for study of different parts of *Achyranthes aspera*, physiochemical parameter such as loss of drying, ash value, acid soluble ash and water and methanol soluble extractive values, qualitative and quantitative test of *Achyranthes aspera* were determined. Physiological studies were carried out to determine basic characteristic of particular species and proves to be the standard for identification of the plant species. Preliminary phytochemicals screening of methanol extract and aqueous extracts showed the presence of flavonoids, saponins, proteins and glycosides.

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