

PHYTOCHEMICAL SCREENING OF SELECTED MEDICINAL PLANTS USED IN DIARRHOEA

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ABSTRACT:

Present paper deals with chemical analysis of selected medicinal plants used against diarrhoea, these plants are characterized by nearly similar chemical even though they differ in family and habits. The search for natural products, to cure diseases like diarrhoea. Diarrhoea in children is dangerous, because they may react poorly to medications that are sold for treatment of the symptom. India is a veritable emporium of medicinal plants and is bestowed with rich natural wealth due to its diverse ecological conditions. The search for natural products, to cure diseases represents an area of great interest, in which plants have been the most important source. Plants produce a large diverse array of organic compounds that appear to have no direct function in growth and development. These substances are known as secondary metabolites, secondary products or natural products. Mostly these plants are used by tribal's, villagers and medicine men. This paper contains five plants analysis for the phytochemicals contained in the plants.

Keywords: Natural products, Diarrhoea, treatment of the symptom, phytochemicals, medications, etc.

INTRODUCTION:

Phytochemical technique mainly applied to the quality control of herbal medicines of various chemical components, such as, alkaloids, flavonoids, saponins, phenolics, terpenoids, tannins, etc. Phytochemicals from medicinal plants are receiving even greater attention in the scientific literature in medicine. In the developing countries, over the counter remedies and "Ethical Phytomedicines", which are standardized toxicologically and clinically define crude drugs are seen as a promising low cost alternatives in primary health care. The field also has benefited greatly in recent years from the interaction of the study of traditional ethnobotanical knowledge and the application of modern phytochemical analysis and biological activity studies to medicinal plants (Hopkins, 1995).

The search for natural products, to cure diseases represents an area of great interest, in which plants have been the most important source. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body.

Plants produce a large diverse array of organic compounds that appear to have no direct function in growth and development. These substances are known as secondary metabolites, secondary products or natural products. Secondary metabolites have no generally recognized, direct roles in the process of photosynthesis, respiration, solute transport, translocation, protein synthesis, nutrient assimilation, differentiation or the formation of carbohydrates, proteins and lipids. Secondary metabolites also differ from primary metabolites (amino acids, nucleotides, sugars, acyl lipids) in having restricted distribution in the plant kingdom i.e. particular secondary metabolites often found in only one plant species or related group of species, whereas primary metabolites are found throughout the plant kingdom. Secondary metabolites were thought to be simply functionless end products of metabolism or metabolic wastes. Study of these substances was pioneered by organic chemists of the nineteenth and early twentieth centuries' who were interested in these substances because of their importance as medicinal drugs, poisons, flavour and industrial materials. Diarrhoea is defined as, "A condition in which faeces are discharged from the bowels frequently and in the liquid form." When the bowel movement happens, two or three times a day, then the person is said to be suffering from diarrhoea. Diarrhoea that comes suddenly and lasts for no longer than a couple of days, is usually, referred to as "acute diarrhoea." Most people with acute diarrhoea recover on their own. Diarrhoea that lasts more than two weeks is thought as "chronic diarrhoea" (Zheng and Xing, 2009)

Diarrhoea is caused by-

- Bacterial infections can enter the body when they are ingested on tainted food or water. E.g. *E. coli*, *Salmonella*, etc.

- Hepatitis and Rota virus are too viral infections that have diarrhoea as a symptom of their presence.
- Simple intolerance to particular foods can cause diarrhoea. It is usually a component in the food such as colour, milk, sugars, etc.

Diarrhoea in children is dangerous, because they may react poorly to medications that are sold for treatment of the symptom. Diarrhoea in new borns and infants, can be lethal, because the dehydration that they experience can kill them very quickly. For this reason, treatment for children focuses primarily on rehydration.

India is a veritable emporium of medicinal plants and is bestowed with rich natural wealth due to its diverse ecological conditions. Indian forests are source of a large proportion of the world's recognized medicinal plants and constitute an enormous potential source of useful plant derived chemicals (Rastogi *et al.*, 2004)

The present study involves the preliminary phytochemical study of selected medicinal plants which are used by the people in villages and medicine practitioners to cure chronic diarrhoea in day to day life.

MATERIALS AND METHODS:

Collection of plant material

The plants selected for the study are *Achyranthus aspera* Linn., *Casuarina equisetifolia* (L) J.R. & G. Forst., *Ocimum americanum* Linn., *Phyllanthus asperulatus* Hutch., *Thespesia populnea* (L) Sol. ex Corr. were collected during month of November, 2015 from Dr. PDKV, Akola, in Akola district (MH). The plant material and specimens was identified by using standard floras like Cooke 1907, Dhore 2005, Naik 1989, Yadav and Sardesai, 2002. The voucher specimens were preserved in the institute herbarium library.

Table 1: List of plants selected for the study

Sr. No.	Name of Plant	Family	Vernacular Name
1	<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Aghada
2	<i>Casuarina equisetifolia</i> (L) J.R. & G. Forst.	Casuarinaceae	Saru
3	<i>Ocimum americanum</i> Linn.	Lamiaceae	Rantudas
4	<i>Phyllanthus asperulatus</i> Hutch.	Euphorbiaceae	Bhui amla
5	<i>Thespesia populnea</i> (L) Sol. ex Corr.	Malvaceae	Bhendi jhar

The collected plant material (stem, leaves and fruits) were washed with tap water and then distilled water. Then the material is shade dried for 4-5 days and grinded well to obtain homogenous fine grade powder. The 5gm powdered material soaked in each 50 ml of water and alcohol for 1 hour. The solvent was filtered and the preliminary tests were carried out.

Phytochemical Analysis:

For the phytochemical analysis of following Phytochemicals, prepared from the three types of solution that is leaves extracts with distilled water, alcohol and petroleum ether of above mentioned plants.

Preliminary phytochemistry:-

The preliminary phytochemical studies are done for detection of various constituents i.e. alkaloids, glycosides, carbohydrates etc. present in plant extract, which is responsible for the pharmacological activity. Chemical tests were carried out on the successive extracts separately using standard procedures to identify the constituents as described by (Harborne, 1973; Sofowora, 2000 and Krishnaiah *et al.*, 2009).

Test for Alkaloid:

Weigh about 0.2 gm of plant extract in separate test tube and warmed with 2% sulphuric acid for 2 min. and it was filtered in separate test tube and few drops of Dragendorffs reagent was added and observed for the presence of orange red precipitate for the presence of alkaloid.

Test for cardiac glycosides:

0.5 gm of plant extract in separate test tube with 2ml of glacial acetic acid containing of drops of ferric chloride solution and observe for brown ring formation at the interface, confirms the presence of cardiac glycosides.

Test for Terpenoids:

Weight about 2 ml extract in separate test tube and add 2 ml chloroform and 3 ml of sulphuric acid in it. A reddish brown colouration at interface confirms the presence of terpenoids.

Test for Reducing sugar:

1ml aqueous extract in 4 ml distilled water taken in test tube and shake well, filter the extract and add few drops of Fehling solution A and B and boil for 2 min. Orange red precipitate confirms the presence of reducing sugar.

Test for steroids:

To the plant extract add 2ml of acetic anhydride and add 0.5 gm of ethanol with 2ml of sulphuric acid. Violet to blue or green colour indicates the presence of steroids.

Test for saponins:

2gm of sample was added in 10 ml of distilled water and shaken well. Froth formation confirms the presence of saponins.

Test for Tannins and Phenolics:

1 gm of was added in 2 ml distilled water and heated in water bath, then filtered and 5% Ferric chloride was added. Dark green-black colour indicates the presence of tannins.

Test for flavonoids:

To 2ml of plant extract add 10% NaOH, yellow colour appears which faint on addition of concentrated HCl, which confirms the presence of flavonoids.

Test for carbohydrates:

A small portion of filtrate was treated with Molish reagent and sulphuric acid, formation of a violet ring indicates the presence of carbohydrates.

Test for proteins and amino acids:

Add few drops of Millon's Reagent to 2 ml of plant extract. White coloured precipitate confirms the presence of proteins.

Table No. 2: Preliminary Phytochemical analysis of *Achyranthes aspera* Linn.

Sr. No.	Phytochemical Tested	Solvent			
		Ethanol		Distilled Water	
		Leaves	Fruits	Leaves	Fruits
1	Alkaloids	+	-	-	-
2	Cardiac glycoside	-	-	-	+
3	Terpenoids	-	+	+	+
4	Reducing sugar	-	+	-	+
5	Saponins	+	+	+	+
6	Tannins	-	-	-	-
7	Flavonoid	+	+	-	+
8	Phenolics	-	+	-	-
9	Steroids	-	-	-	-
10	Protein & amino acids	+	-	-	+
11	Carbohydrates	+	-	-	-

Table No. 3: Preliminary Phytochemical analysis of *Casuarina equisetifolia* (L) J.R. & G. Forst.

Sr. No.	Phytochemical Tested	Solvent			
		Ethanol		Distilled Water	
		Leaves	Fruits	Leaves	Fruits
1	Alkaloids	+	-	-	-
2	Cardiac glycoside	-	+	+	+
3	Terpenoids	+	+	+	+
4	Reducing sugar	+	+	+	+
5	Saponins	+	+	-	+
6	Tannins	+	-	-	-
7	Flavonoid	-	+	+	-
8	Phenolics	+	+	+	+
9	Steroids	+	+	-	+
10	Protein & amino acids	-	-	-	+
11	Carbohydrates	-	-	-	-

Table No. 4: Preliminary Phytochemical analysis of *Ocimum americanum* Linn.

Sr. No.	Phytochemical Tested	Solvent			
		Ethanol		Distilled Water	
		Leaves	Stem	Leaves	Stem
1	Alkaloids	+	+	+	+
2	Cardiac glycoside	-	+	-	+
3	Terpenoids	+	+	+	+
4	Reducing sugar	+	+	-	-
5	Saponins	+	+	+	+
6	Tannins	+	-	+	-
7	Flavonoid	+	+	+	+
8	Phenolics	-	-	-	-
9	Steroids	-	-	+	-
10	Protein & amino acids	-	+	+	+
11	Carbohydrates	-	-	-	-

Table No. 5: Preliminary Phytochemical analysis of *Phyllanthus asperulatus* Hutch.

Sr. No.	Phytochemical Tested	Solvent			
		Ethanol		Distilled Water	
		Leaves	Fruits	Leaves	Fruits
1	Alkaloids	-	-	+	-
2	Cardiac glycoside	+	+	+	-
3	Terpenoids	+	-	+	-
4	Reducing sugar	-	-	+	-
5	Saponins	+	-	-	+
6	Tannins	+	-	-	+
7	Flavonoid	-	+	-	+
8	Phenolics	-	+	+	+
9	Steroids	-	+	+	+
10	Protein & amino acids	-	-	-	-
11	Carbohydrates	-	-	-	-

Table No. 6: Preliminary Phytochemical analysis of *Thespesia populnea* (L) Sol. ex Corr.

Sr. No.	Phytochemical Tested	Solvent			
		Ethanol		Distilled Water	
		Leaves	Fruits	Leaves	Fruits
1	Alkaloids	+	-	-	-
2	Cardiac glycoside	-	-	-	+
3	Terpenoids	+	+	-	+
4	Reducing sugar	+	+	+	-
5	Saponins	+	-	-	+
6	Tannins	+	-	-	-
7	Flavonoid	+	-	-	+
8	Phenolics	+	-	-	-
9	Steroids	+	+	+	+
10	Protein & amino acids	+	-	-	-
11	Carbohydrates	+	-	-	-

DISCUSSION AND CONCLUSION:

The preliminary phytochemical studies were carried out in the solvents viz. Ethanol and Distilled water.

In aqueous solvent of *Achyranthes aspera* Linn., the extract of leaves were studied the tests were positive for terpenoids, saponins whereas negative for alkaloids, cardiac glycosides, reducing sugars, tannins, phenolics, steroids, flavonoids, proteins and carbohydrates. In ethanolic solvent of *Achyranthes aspera* Linn., the extract of leaves were studied the tests were positive for alkaloids, saponins, flavonoids, protein and carbohydrates whereas negative for cardiac glycosides, terpenoids, reducing sugars, tannins, phenolics and steroids.

In aqueous solvent of *Achyranthes aspera* Linn. when the extract of fruits were studied the tests were positive for cardiac glycosides, terpenoids, reducing sugars, saponins, flavonoids and carbohydrates whereas negative for alkaloids, tannins, phenolics, steroids, and proteins. In ethanolic solvent of *Achyranthes aspera* Linn., the extract of fruits were studied the tests were positive for terpenoids, reducing sugars, saponins, flavonoids and phenolics whereas negative for alkaloids, cardiac glycosides, tannins, steroids, proteins and carbohydrates.

In aqueous solvent of *Casuarina equisetifolia* (L) J.R. & G. Forst., the extract of leaves were studied the tests were positive for cardiac glycosides, terpenoids, reducing sugars, flavonoids and phenolics; whereas negative for alkaloids, saponins, tannins, steroids, proteins and carbohydrates. In ethanolic solvent of *Casuarina equisetifolia* (L) J.R. & G. Forst., the extract of leaves were studied the tests were positive for alkaloids, terpenoids, reducing sugars, saponins, tannins, phenolics and steroids; whereas negative for cardiac glycosides, proteins, flavonoids and carbohydrates.

In aqueous solvent of *Casuarina equisetifolia* (L) J.R. & G. Forst., the extract of fruits were studied the tests were positive for cardiac glycosides, terpenoids, reducing sugars, saponins, phenolics, steroids and carbohydrates; whereas negative for alkaloids, tannins, flavonoids and proteins. In ethanolic solvent of *Casuarina equisetifolia* (L) J.R. & G. Forst., the extract of fruits were studied the tests were positive for cardiac glycosides, terpenoids, reducing sugars, saponins, flavonoids, phenolics and steroids; whereas negative for alkaloids, tannins, proteins and carbohydrates.

In aqueous solvent of *Ocimum americanum* Linn., the extract of leaves were studied the tests were positive for alkaloids, terpenoids, saponins, tannins, flavonoids, steroids and carbohydrates; whereas negative for cardiac glycosides, reducing sugars, phenolics and proteins. In ethanolic solvent of *Ocimum americanum* Linn., the extract of leaves were studied the tests were positive for alkaloids, terpenoids, reducing sugars, saponins, tannins and flavonoids; whereas negative for cardiac glycosides, phenolics, proteins, carbohydrates and steroids.

In aqueous solvent of *Ocimum americanum* Linn., the extract of stem were studied the tests were positive for alkaloids, cardiac glycosides, flavonoids, saponins and carbohydrates; whereas negative for terpenoids, reducing sugars, tannins, phenolics, steroids and proteins. In ethanolic solvent of *Ocimum americanum* Linn., the extract of stem were studied, the tests were positive for alkaloids, cardiac glycosides, saponins, flavonoids, reducing sugars and carbohydrates whereas negative for phenolics, tannins, terpenoids, steroids and proteins.

In aqueous solvent of *Phyllanthus asperulatus* Hutch. the extract of leaves were studied, the tests were positive for alkaloids, cardiac glycosides, terpenoids, reducing sugars, phenolics and steroids; whereas negative for saponins, tannins, flavonoids, proteins and carbohydrates. In ethanolic solvent of *Phyllanthus asperulatus* Hutch., the extract of leaves were studied the tests were positive for cardiac glycosides, alkaloids, saponins and tannins; whereas negative for alkaloids, reducing sugars, flavonoids, phenolics, steroids, proteins and carbohydrates.

In aqueous solvent of *Phyllanthus asperulatus* Hutch., the extract of fruits were studied, the tests were positive for terpenoids, saponins, tannins, flavonoids, phenolics and steroids; whereas negative for alkaloids, cardiac glycosides, reducing sugars, proteins and carbohydrates. In ethanolic solvent of *Phyllanthus asperulatus* Hutch. the extract of fruits were studied the tests were positive for cardiac glycosides, terpenoids, flavonoids, phenolics, steroids; whereas negative for alkaloids, reducing sugars, saponins, tannins, carbohydrates and proteins.

In aqueous solvent of *Thespesia populnea* (L) Sol. ex Corr., the extract of leaves were studied, the tests were positive for reducing sugars and steroids; whereas negative for alkaloids, cardiac glycosides, terpenoids, saponins, tannins, flavonoids, phenolics, proteins and carbohydrates. In ethanolic solvent of *Thespesia populnea* (L) Sol. ex Corr., the extract of leaves were studied the tests were positive for alkaloids, terpenoids, reducing sugars, saponins, tannins, flavonoids, phenolics, steroids, proteins and carbohydrates; whereas negative for cardiac glycosides.

In aqueous solvent of *Thespesia populnea* (L) Sol. ex Corr., the extract of fruits were studied the tests were positive for cardiac glycosides, terpenoids, saponins, flavonoids and steroids; whereas negative for alkaloids, reducing sugars, tannins, phenolics, proteins and carbohydrates. In ethanolic solvent of *Thespesia populnea* (L) Sol. ex Corr., the extract of fruits were studied the tests were positive for terpenoids, reducing sugars and steroids; whereas negative for alkaloids, cardiac glycosides, saponins, tannins, flavonoids, phenolics, proteins and carbohydrates.

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