Research Article

Physicochemical and Preliminary Phytochemical Screening for Medicinal Plants

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ABSTRACT
Medicinal plants contain some organic compounds which provide definite physiological action on the human body. The present study was aimed at physico chemical and preliminary phytochemical screening of *Lactuca scariola* Linn, *Basella alba* Linn and *Celosia Argentea* Linn leaf extracts. The dried leaves powder was subjected to successive Soxhlet extraction using Petroleum ether, methanol and water. These solvent extracts were subjected to a preliminary phytochemical screening to detect the different chemical principles present viz., carbohydrates, proteins, amino acids, steroids, glycosides, alkaloids, flavonoids, tannins and phenolic compounds, fixed oils. The phytochemical evaluation revealed the presence of glycosides, saponins**,** phytosterols, phenolic compounds, flavanoids, tannins, carbohydrates and triterpenoids.The diversity of phytochemicals found suggests that that aqueous and methanolic solvent extracts of these tested plants contain medicinally important bioactive compounds and it justifies their use in the traditional medicines for the treatment of different diseases.

Keywords: *Lactuca scariola*, *Basella alba,Celosia argentea,* phytochemical, physico chemical.

INTRODUCTION

Phytochemistry or plant chemistry is concerned with the enormous variety of organic substances that are elaborated and accumulated by plants and deals with the chemical structured of these substances, their biosynthesis, turnover and metabolism, their natural distribution and biological function.[1] Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids. These compounds are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function.[2] They are regarded as secondary metabolites because the plants that manufacture them may have little need for them. They are naturally synthesized in all parts of the plant body; bark, leaves, stem, root, flower, fruits, seeds, etc. i.e. any part of the plant body may contain active components . The quantity and quality of phytochemicals present in plant parts may differ from one part to another.[3] In the present work, physico chemical and phytochemical analysis were carried out in plants of *Lactuca Serriola* Linn, *Basella alba* Linn and *Celosia Argentea* Linn leaf extracts.

MATERIALS AND METHODS

Plant Material

Lactuca scariola leaves were collected from Ravoor village, Gulbarga district ,Karnataka and leaves of *Celosia argentea and Basella alba* were collected from local market Bangalore. The samples were authenticated by Dr.Santhanu , botanist, Natural Remedies Pvt limited , Bangalore.

Preparation of extract

Collected leaves were shade dried, pulverized to a coarse powder and was extracted in Soxhlet extractor consecutively using solvents of non polar to Polar grade (Petroleum ether, Methanol and Aqueous), obtained crude extracts were evaporated to dryness in rotary evaporator.

EXPERIMENTAL METHODS

Phytochemical screening

The plant extracts were subjected to qualitative chemical investigation to test the presence of various phytochemicals in extracts.[4,5,6,7]

Fluorescence analysis of powders & extracts

Dried powder and extracts of the leaves were tested for their characteristic colours fluoresced both under visible(short) and ultraviolet (long,UV 365nm) lights after treating with chemical solvents including alkalis and acids.[8]

Physicochemical parameter

Determination of ash value

The ash remaining after complete ignition of medicinal plant material is determined by three different methods-Total ash, Acid insoluble ash and water soluble ash.

Acid insoluble ash is the residue obtained after boiling the total ash with dilute hydrochloric acid and igniting the remaining insoluble matter. This measures the amount of silica present especially as sand and siliceous earth. Water soluble ash is the difference in weight between the total ash and the residue after treatment of the total ash with water.

Total ash

Total ash was found by incinerating the known weight of the dried powdered at 500◦-600◦C. until freed from carbon, cooled and weighed. The percentage of total ash was calculated with reference to the air dried drug.

Acid Insoluble Ash

The Total ash obtained was boiled with 25 ml of 2N hydrochloric acid for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water, dried the filter paper, ignited and weighed. The percentage of acid insoluble ash was calculated with reference to the air-dried drug.

Water soluble Ash Value

The total ash obtained was boiled with 25 ml of water for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited for 15 minutes at a temperature not exceeding 450◦C. The difference in weight represents the water-soluble ash. The percentage of water-soluble ash was calculated with reference to the air-dried drug.[9]

Alcohol soluble Extractive value

Coarsely powdered leaves were subjected to maceration in a closed flask, it was filtered rapidly. Known amount of the filterate was evaporated to dryness and dried at 105◦C and weighed . The percentage of alchol soluble extract was calculated with reference to the air-dried drug.

Water soluble Extractive value

Coarsely powdered leaves were macerated with distilled water in a closed flask and filtered. Known amount of the filterate was evaporated to dryness and dried at 105◦C and weighed . The percentage of alchol soluble extract was calculated with reference to the air-dried drug.

Determination of Moisture content by loss on Drying

Moisture content determination is important , not only to know excess water, but also in conjunction with suitable temperature moisture will lead to the activation of enzymes and, gives suitable conditions to the proliferation of living organism. As most vegetable drugs contain all the essential food requirements for mould, insects and mites ,deterioration can be very rapid, once infestation has taken place.

Known weight of the powdered drug was dried in the oven at 100-105◦C for 1hour cooled and weighed, percentage of moisture content was calculated with reference to the air-dried drug.[10]

RESULTS

The Physiochemical Evaluation

Results of physiochemical evaluation for the three plant extracts have been tabulated in **Table 1**.

The fluorescence analysis of the powder and extracts of *Celosia argentea , Basella alba and Celosia Argentea* in various solvents and chemical reagents under visible(short) and ultraviolet (long,UV 365nm) lights and normal day light is given in **Table 2 to 7**.

Phytochemical screening

The Phytochemical screening for the methanolic extracts of *Lactuca Serriola* showed the presence of glycosides,saponins**,** phytosterols, phenolic compounds, flavanoids, tannins, carbohydrates and triterpenoids , and *Basella alba* aqueous extract showed the presence of glycosides, saponins, phenolic compounds, flavanoids, tannins, carbohydrates and triterpenoids.

Celosia Argentea methanolic extract showed the presence of glycosides ,saponins, phenolic compounds, flavanoids, tannins and carbohydrates, as tabulated in **Table 8**.

CONCLUSION

The results revealed the presence of medicinally important constituents in the plants studied. The presence of these

phytochemicals may contribute medicinal as well as physiological properties to the plants studied in the treatment of different ailments. Therefore, extracts from these plants could be seen as a good source for useful drugs.

ACKNOWLEDGEMENTS

The authors are thankful to Dr.L.V.G Nargund, Principle Nargund college of Pharmacy, Bangalore, for providing necessary facilities to carry out this research work.

Table 1: Physico-chemical evaluation

S.No.	Physico chemical properties	*Lactuca Serriola* (in %)	*Basella alba* (in %)	*Celosia Argentea* (in %)
1	Total ash	15.12	15.26	12.44
2	Acid insoluble ash	1.45	6.11	2.01
3	Water soluble ash	4.02	3.86	8.12
4	Alcohol Extractive value	17.99	23.95	9.96
5	Water soluble Extractive value	1.42	39.93	8.96
6	Loss on drying	9.28	8.87	8.86

Table 2: Fluorescence analysis of *Lactuca Serriola*

Reagents + Powder	Day light	Short wave length	Long wave length
Leaf powder	Green	Green	Greenish brown
Powder + water	Green	Dark Green	Greenish black
Powder + Ethanol	Blackish green	Green	Brownish green
Powder +dil HCl	Dark green	Brownish green	Brownish
Powder +dil.H_2SO_4	Green	Light green	Greenish brown
Powder +dil.HNo_3	Brownish green	Greenish brown	Brownish
Powder +dil.NaoH	Dark green	Blackish green	Brownish
Powder + alc.NaoH	Green	Green	Greenish brown
Powder +aq.KOH	Greenish brown	Dark green	Brownish
Powder +alc.KOH	Green	Blackish green	Brownish black

Table 3: Fluorescence analysis of *Basella alba*

Reagents + Powder	Day light	Short wave length	Long wave length
Leaf powder	Dark green	Green	Brownish
Powder + water	Dark green	Dark green	Brownish dark
Powder + Ethanol	Green	Greenish brown	Brownish green
Powder +dil HCl	Greenish black	Blackish green	Brownish
Powder +dil.H_2SO_4	Blackish green	Dark green	Brownish
Powder +dil.HNo_3	Dark blackish green	Brownish green	Brownish green
Powder +dil.NaoH	Blackish green	Dark green	Brownish red
Powder + alc.NaoH	Dark green	green	Brownish
Powder +aq.KOH	Brownish green	Brownish green	Brownish red
Powder +alc.KOH	Blackish green	Blackish green	Brownish

Table 4: Fluorescence analysis of *Celosia Argentea*

Reagents + Powder	Day light	Short wave length	Long wave length
Leaf powder	Greenish yellow	Light green	Brownish yellow
Powder + water	Light green	Light green	Light Brownish
Powder + Ethanol	Greenish yellow	Yellowish green	Dark yellowish brown
Powder +dil HCl	Dark brown	Light brown	Brownish yellow
Powder +dil.H_2SO_4	Light green	Yellowish green	Brownish
Powder +dil.HNo_3	Dark brown	Brown	Brownish yellow
Powder +dil.NaoH	Brownish	Light brownish black	Yellowish brown
Powder + alc.NaoH	Greenish brown	Greenish yellow	Dark yellowish brown
Powder +aq.KOH	Brown	Greenish brown	Yellowish brown
Powder +alc.KOH	Light greenish black	Light greenish brown	Brownish yellow

Table 5: Fluorescence analysis of *Lactuca Serriola* Leaf extracts

Extract	Nature of extract	Appearance in day light	Short wave length	Long wave length
Petroleum ether extract	Resinous and sticky Semi solid	Blackish	Blackish brown	Brownish red
Methanolic extract	Semi solid and nonsticky	Blackish green	Dark green	Brownish
Aqueous extract	Semi solid and nonsticky	Light brown	Brown	Brownish

Table 6: Fluorescence analysis of *Basella alba* Leaf extracts

Extract	Nature of extract	Appearance in day light	Short wave length	Long wave length
Petroleum ether extract	Resinous and sticky Semi solid	Blackish	Dark Green	Blackish
Methanolic extract	Semi solid and sticky	Blackish	Dark green	Greenish brown
Aqueous extract	Semi solid slightly sticky	Blackish	Black	Dark brown

Table 7: Fluorescence analysis of *Celosia Argentea* Leaf extracts

Extract	Nature of extract	Appearance in day light	Short wave length	Long wave length
Petroleum ether extract	Resinous and sticky Semi solid	Brownish green	Greenish	Brownish
Methanolic extract	Semi solid slightly sticky	Black	Dark blackish	Brownish black
Aqueous extract	Semi solid slightly sticky	Brownish	Brownish	Light Brownish

Table 8: Phytocontituents present in the leaf extracts of *Lactuca Serriola* Linn, *Basella alba* Linn and *Celosia Argentea* Linn

Tests	*Lactuca Serriola*			*Basella alba*			*Celosia Argentea*		
	PE	ME	AE	PE	ME	AE	PE	ME	AE
Alkaloids	-	-	-	-	-	-	-	-	-
Glycosides		+	+	-	-	+	-	+	+
Saponins	+	+	+	+	+	+	-	+	+
Phytosterols		+	+	-	-	-	-	-	-
Phenolic compounds	-	+	+	-	+	+	-	+	-
Flavanoids	-	+	-	-	+	+	-	+	+
Tannins	-	+	-	-	+	+	-	+	-
Carbohydrates	-	+	+	-	-	+	-	+	+
Tri terpenoids	-	+	-	-	-	+	-	-	-

PE:Petroleum ether extract, ME: Methanolic extract, AE:Aqueous extract
(+): Indicates the presence of chemical constituents.
(-): Indicates the absence of chemical constituents

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