

Research Article

Pharmacognostic and Preliminary Phytochemical Studies of *Celosia argentea*, L. Leaf

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ABSTRACT

Extraction of bioactive compounds from medicinal plants permits demonstration of their physiological activity. The plant selected for the study is *Celosia argentea* (family Amaranthaceae) which is used traditionally for dysentery, menstrual bleeding, fatigue, atherosclerosis and osteoporosis. The present study was aimed to evaluate the parameters to determine the quality of the plant *C. argentea*. These studies comprises of organoleptic, fluorescence analysis, Physico chemical analysis and preliminary phytochemical screening. The study contributes to the development of standardization parameters of herbal drugs used in our system of medicine.

Keywords: *Celosia argentea*, bioactive compounds, organoleptic, fluorescence analysis, Physico chemical analysis

INTRODUCTION

The tenet "Let food be thy medicine and medicine be thy food" advocated by Hippocrates nearly 2500 years ago is receiving renewed interest. In traditional societies nutrition and health care are strongly interconnected and many plants have been consumed both as food and for medicinal purposes^{1,2}. Eating vegetables and fruits has always been associated with health benefits, but the way in which they enhance health has become clear only in the recent decades.

Nowadays re-emerging connection between plants and human health especially depends on their antioxidant activities that may delay or reduce the hazardous effects of free radicals. The major causative for the generation of free radicals in food, drug and living systems is the oxidation process³.

Nearly one thousand species of plants with edible leaves are known. Leafy vegetables most often come from short lived herbaceous plants. India's flora comprises of 6000 species of plants used for consumption of which 0.70 metric tons are green leafy vegetables. Therefore, it is now believed that nutritional security entails not only consumption of a balanced diet to meet the needs of macro and micronutrients but also phytonutrients which may play a major role in promoting health and nutrition.

MATERIALS AND METHODS

Organoleptic Study

The leaf powder of *C. argentea*, was used for these studies. The colour variation and taste were the basis for this test⁴.

Fluorescence Analysis

The fluorescence properties were studied under Ultra-Violet (UV) light adopting method^{5,6}. The behaviour of

the leaf powder with different chemical reagents were studied and the fluorescence characters were observed under visible light and long UV light at 245 nm.

Physico chemical analysis

Physico chemical parameters of the powdered drug such as loss on drying, ash value, extractive value and crude fibre content were performed according to the standard method⁷ and as per WHO guidelines on quality control methods for medicinal plant materials⁸.

Preliminary Phytochemical Analysis

For the preliminary phytochemical analysis, the extract was prepared by weighing 100 gm of dried powdered leaf and were subjected to maceration with different solvents as per the polarity, methanol, petroleum ether and finally aqueous. The extracts were filtered in each step, concentrated and the solvent was removed by rotary evaporator. The extracts were dried over desiccators and the residues were weighed. The presence and absence of the primary and secondary phytoconstituents was detected by usual prescribed methods⁹.

Table 1: Organoleptic study of the *C. argentea* leaf powder

1	Colour	Light green
2	Odour	Pleasant
3	Taste	Bitter

Test of Alkaloids

Mayer's reagent: To 1 ml of the extract, 2 ml of Mayer's reagent was added. Appearance of dull white precipitate indicated the presence of alkaloids.

Test for Flavonoids

Table 2: Fluorescence analysis of the *C. argentea* leaf powders

S.No	Treatment with chemical reagents	Observation	
		Visible light	UV light
1	Powder as such	Light green	Light green
2	Powder + 1 N NaOH IN methanol	Dark green	Brownish yellow
3	Powder + 1 N HCl	Dark green	Light green
4	Powder + 50% H ₂ SO ₄	Dark brown	Reddish brown
5	Powder + ethanol	Yellowish green	Light green
6	Powder + 50% Nitric acid	Dark brown	Brownish yellow
7	Powder + ferric chloride solution	Brownish yellow	Dark green
8	Powder + chloroform	Dark green	Yellowish green
9	Powder + Picric acid	Yellowish green	Yellow
10	Powder + Methanol	green	Dark green

To 1 ml of extract, 1 ml of neutral ferric chloride was added. The formation of brown colour confirmed the presence of flavonoids.

Salkowski test : 5 ml of each extract was mixed in 2 ml of chloroform and conc. H₂SO₄ (3 ml) was carefully added to form a layer. A reddish brown colouration of the interface was formed to show positive results for the presence of terpenoids.

Table 3: Physico chemical evaluation of *C. argentea* leaf powder

S. No	Parameters	Values% w/w
1	Loss on Drying,	5.3
2	Total Ash value	5.56
3	Acid Insoluble Ash	1.33
4	Water Soluble Ash	2.58
5	Sulphated Ash	0.62
6	Water Extractive Value	62.2
7	Ethanol Extractive Value	17.5

Test for Quinone

To 1 ml of extract, a few drops of conc. HCl is added. An yellowish brown colour is observed which shows the presence of quinine.

Test for Starch

To 1 ml of extract, a few drops of iodine solution. Any characteristic colour change shows the presence of starch.

Test for Cellulose

To 1 ml of extract, a few drops of iodine solution is added followed by a few drops of H₂SO₄. Dark brown or red colour observed shows the presence of cellulose.

Test for Fixed Oil and Fat

To 1 ml of extract, a few drops of sudan III solution is added. A shining orange colour obtained shows the presence of fixed oil and fat.

Test for Tannin

To 1 ml of the extract, few ml of 5 per cent neutral ferric chloride was added. The development of a dark bluish colour indicated the presence of tannins.

Test for Phenols

To 1 ml of extract, lead acetate solution was added and the precipitate formation indicated the presence of phenolic compounds.

Test for Steroids

Liebermann-Burchard's test : The extracts were dissolved in 2 ml of chloroform to which 10 drops of acetic acid and 5 drops of conc. Sulphuric acid were added and mixed. The change of red colour through blue to green indicated the presence of steroids.

Test for Terpenoids

Table 4: Preliminary phytochemical Screening of various leaf extracts

Name of the compound	Petroleum ether	Chloroform	Methonol	Aqueous
Alkaloids	+	+	+	+
Flavanoids	+	+	+	+
Tannins	+	+	+	-
Phenols	-	+	+	+
Steroids	+	+	+	+
Terpenoids	+	+	+	+
Quinone	-	+	+	-
Starch	+	-	-	+
Cellulose	-	+	+	+
Fixed oil and fat	+	+	+	-

+ - present ; - - absence.

RESULTS AND DISCUSSION

Pharmacognostic Study

The phramacognostic characters of the leaf powder have been studied by screening the same through the following parameters.

Organoleptic Study

The investigation on organoleptic study of the leaf powders of *C. argentea* indicated the characters like colour, odour and taste. The colour of the dried leaf powder was light green. The taste and odour of the

powder were also tested. The taste of the leaf is bitter and on analysis the leaf powder gives a pleasant odour (Table 1).

Fluorescence Analysis

The leaf powder was treated with various chemicals exhibited various colours in day / visible light and UV light. When the powder treated with 1 N NaOH in methanol shows dark green colour in day light, brownish yellow colour in UV light. In 1 N HCl shows dark green colour in visible light and Light green colour in UV light. In 50% H₂SO₄ the leaf powder exhibited varied dark brown colour in visible light and reddish brown colour in UV light and the results are depicted in table 2.

Physico chemical Analysis

Analysis of physico chemical constants of the leaf powder *C. argentea* has been done to evaluate the quality and purity of the drug and establish identity of it. Ash values of the drug give an idea about the early matter or organic composition and other impurities present along with drug. The total ash content of the *C. argentea* 5.56%. The water insoluble ash is less than that of acid insoluble ash at and respectively. The water extractive value of *C. argentea* is more than that of ethanol extractive value.

Phytochemical Screening

Pharmaceutical preparations derived from natural sources such as vegetables often contain compounds that contribute to the antioxidant defense systems and apparently play a role in the protection against degenerative diseases. The phytochemical screening of various extracts revealed presence of alkaloids, cellulose, flavonoids, phenols, steroids, starch, terpenoids, and tannins (Table 4).

CONCLUSION

The comparative and multidisciplinary approach to the study of *C. argentea* does help in understanding their

identification and medicinal importance. The adulterants in drugs obtain from *C. argentea* can be identify by this investigation. Adulterants if any can be easily identified using these parameters.

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