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Phytochemical and Taxonomical Studies of *Celosia argentea* L. (AMARANTHACEAE)

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ABSTRACT

In recent times, focus on plant research has increased all over the world and a large number of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Over the last few years, researchers have aimed at identifying and validating plant derived substances for the treatment of various diseases. Similarly it has been already proved that the correct identification and authentication of taxa is most important in plants science. The *Celosia argentea* L. has enormous traditional uses against various diseases. The present review aims to Phytochemical, Morphological and anatomical review of *Celosia argentea* L. In the present work phytochemistry and taxonomical enumeration of *Celosia argentea* L. is carried out.

Keywords: Phytochemistry, Morphology, Anatomy, *Celosia argentea* L., Amaranthaceae.

I. INTRODUCTION

Celosia argentea L. (Family: Amaranthaceae) is a common weed plant in India, profoundly used as Ayurvedic medicine, and used as medicine on Musculoskeletal disorder, calculii, burning and painful urination, dysuria etc.

Celosia argentea L. is an annual plant commonly known as plumed cockscomb or M fungu, also known as "Sitivara, Vitunnaka, Sunishannaka, Indivara" in Sanskrit and Survali, Safed murga in Hindi language. The plant is especially famous for its attractive bicolor flowers which are used in the treatment of skin disorders and body odour.

In recent trend the 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 process. (Pourmorad *et. al.*)
&Tracey (1955), Rastogi & Mehrotra (1999) and Johansen (1940).

II. MATERIALS AND METHODS

Collection and Identification

Celosia argentea L. (Family: Amaranthaceae) was collected from Aurangabad region of the Maharashtra. The survey of the study area was conducted during 2016-2017. Identification of the collected specimens was made with the help of standard Floras (Hooker, 1872-1897; Naik, 1998). Herbarium specimens are deposited in the Department of Botany, Shri Chhatrapati Shivaji College, Omerga. Library and Herbarium of Botanical Survey of India, Pune was consulted for review of literature and also for identification of the specimen.

Histochemical screening

Histochemical screening was performed as per standard methods given in by (Gangulee et. al. 1959), Evans (1996), Gibbs (1974), Harborne (1973), Peach

Anatomy with illustration

The T. S. of Root, Stem and leaf were taken by fine blade and the sections were stained by the method of double staining, and the illustration of all sections and habit of plant were made by 0.2, 0.4 and 0.6 tip Rotring Isograph Technical Drawing Pen on A4 sized drawing paper.

Qualitative analysis

Test for qualitative analysis of starch, protein, fat, tannin, saponin, glycosides and alkaloids was taken and confirm the presence or absence of compounds in plant parts *ie*. Root, Stem and Leaves.

Quantitative analysis

Total Ash values, Moisture contents, Sugar in root, alkaloids, Nitrogen, Potassium, Calcium, Phosphorus, Crude protein, free amino acid were calculated in percentage

III. RESULT AND DISCUSSION

Celosia argentea L. (Family - Amaranthaceae) is commonly known as plumed cockscomb or silver cocks comb in this region, flowering and fruits - September to March.

Non recorded uses: seeds used in kidney stone and fever and Recorded uses: The seeds used for treatment of jaundice, gonorrhea, wound and fever in this region.

Morphology

Celosia argentea is an erect herb with 0.4 – 02 m high bearing many ascending branches, leaves lanceolate with the excurrent, glabrous lamina and slender petiole. The primary steam having width 2 - 0.3 ± 0.1cm.Inflorences is dense spike.

Many flowers spike 2.5-20 ± 1.5-2.2cm., perianth segement 6-10 mm narrowly elliptic oblong acute to rather baunt, shortly mucronate with the excurreent midrib with 2-4 lateral nerves ascending more than half way up each segement margin highline filaments very delicate free part subquallinj the staminal sheath sinuses rounded with number with very minute ,intermediate teeth, anther and filament creamy to magenta stigma 2-3 very short and filiform style 5-7mm long ovary 4-8 ovulate capsule 3-4mm ,avoid to almost globular c.1.25-1.5mm lenticular black shin.

Micro-morphology

1) T. S. of Root

T.S. of Root shows uppermost layer is cork which is thick protective covering to the root cells with having diameter about 3-5 µm.

The cortical zone of T.S. of root composed of irregular cells which having measured about 5-6 x 6-8 µm.
After cortex there is presence of stele the, stele is composed of vascular strand.

The vascular strand is composed of phloem & xylem elements.

The xylem elements shows diameter about 4-5 x 4.5-5µm. was as phloem parenchyma shows various phloem elements with ranging about 1.5-2 x 2.5-3µm. in diameter.

The pith is present at the center of stele, pith is composed of 5-6 layers of parenchymatous cells & that cells were measured about 4-5 x 4.5-5.5µm.

2) T. S. of Stem

Stem shows uppermost layer is of epidermis, which is composed of thick walled compactly arranged barrel shaped cells. The epidermal cells ranging about 3.4 x 2.5-3 µm in diameter.

The epidermis is followed by cortex. The Cortes is composed of 4-7 layers of cells the critical cells

measured about 2.5-3 x 3-3.5µm. The cortex is followed by stele. The stele were delimiting by endodermis which is single layered compactly arranged cells, the endodermis is followed by 2 to3 layers of pericycle.

The pericycle is composed of phloem parenchymatous like cells. Below to pericycle there are patches of xylem elements surrounded by phloem parenchyma. The phloem parenchyma measured about 1-1.5 x 1.5-2 µm and the xylem elements were measured about 3-5 x 5-6 µm.

The pith is present at the center of stele which is composed of 4-5 layers of pith parenchyma. The pith parenchyma measured about 4-5x5.5-6µm.

3) T. S. of Leaf

The T.S of leaf shows bilayer of epidermis i.e. - upper epidermis & lower epidermis.

The upper and lower epidermis is composed of compactly arranged thick walled cells & both of epidermis is covered with cuticle. The upper epidermal cells were measured about 4-5x1.5-5µm.
Palisade cells were measured about 2-3 x 8-12µm.

The palisade cells were rich in chlorophyll. The spongy parenchyma is present is between two palisade layers which is also rich in chlorophyll

The vascular strand presents at the center of T.S which delimiting by bundles sheath cells.

The bundle sheath cells were surrounded to phloem xylem elements.

The xylem elements are of two types' protoxylem & metaxylem.

The metaxylem measured about 4-5 x 5-6µm & protoxylem measured about 1.5-1.7 x 1.8-2µm. The xylem elements surrounded by phloem parenchyma which is measuring about 2-3 x 3-3.5µm.

4) Trichome and Stomata

Celosia argentea shows the uniserate multicellular type of trichome present rarely on leaf margin, the Tetracytic type of stomata found in *Celosia* which is measured about 5-6 x3-4 µm.

Qualitative analysis

Root gave the positive test for the starch protein, fat, glycosides of alkaloid while negative test for tannin.
Stem reveals presence of the starch, protein, fat, tannin and saponin in cortical as well as in pith parenchyma.

Alkaloids in hypodermal collenchymatous while fats in pith parenchyma.

The fresh leaf of T.S. sections shows the starch, protein, fat, tannin, alkaloids and saponin in mesophyll tissue.

Table1. Qualitative analysis

Celosia argentea				
Sr. No.	**Test**	**Root**	**Stem**	**Leaf**
1	Starch	+	+	+
2	Protein	+	+	+
3	Fat	+	+	+
4	Tannin	-	+	+
5	Saponin	+	+	+
6	Glycoside	+	+	+
7	Alkaloids	+	+	+

Quantitative analysis

5) Phytochemical investigation

Total sugars

Total sugar content in root 2.1%, reducing sugar is found in 1.92% and non reducing sugar is 0.18%, stem 1.8%, reducing sugar is found in 0.88% and non reducing sugar is 0.92%, in leaf 2.9%, reducing sugar is found in 1.6% and non reducing sugar is 1.3%

Total alkaloids

Total alkaloids in root is found in 11.12%, in stem 8.2 % and leaf 9.8% is found

Nitrogen

Amount of nitrogen in root 2.1%, stem 3.2% and in leaf 5.3% is found

Potassium

Amount of potassium in root is 0.191%, stem 6.431% and in leaf 0.319% is found

Calcium

Amount of calcium in root 0.30%, stem 0.21% and in leaf 3.1% is found

Phosphorus

Amount of Phosphorus in root 2.1%, stem 7.8% and in leaf 9.1% is found

Crude protein

Amount of Crude protein in root 19.2%, stem 18.7% and in leaf 22.3% is found

Total free amino acid

Amount of Total free amino acid in root 0.2%, stem 0.3% and in leaf 2.1% is found

6) Physiochemical investigation

Table 2. Physiochemical investigation

Sr. No.	Parameter	Percentage of content in Plant Part		
		Root	Stem	Leaf
01.	Total ash	18.1%	20.1%	11.0%
02.	Water insoluble ash	15.0%	13.2%	10.1%
03.	Water soluble ash	03.1%	06.9%	00.9%
04.	Acid soluble ash	16.0%	17.0%	08.0%
05.	Acid in soluble ash	02.1%	03.1%	03.0%
06.	Moisture content	05.7%	06.1%	06.8%
07.	Total sugar	02.1%	01.8%	02.9%
08.	Reducing sugar	1.92%	0.88%	01.6%
09.	Non reducing sugar	0.18%	0.92%	01.3%
10.	Total alkaloids	11.12%	08.2%	09.8%
11.	Nitrogen	02.1%	03.2%	05.3%
12.	Potassium	0.191%	0.431%	0.319%
13.	Calcium	0.30%	00.21%	03.1%
14.	Phosphorous	02.1%	07.8%	09.1%
15.	Crude protein	19.2%	18.7%	22.3%
16.	Total free Amino acid	00.2%	00.3%	02.1%

E. Figurs

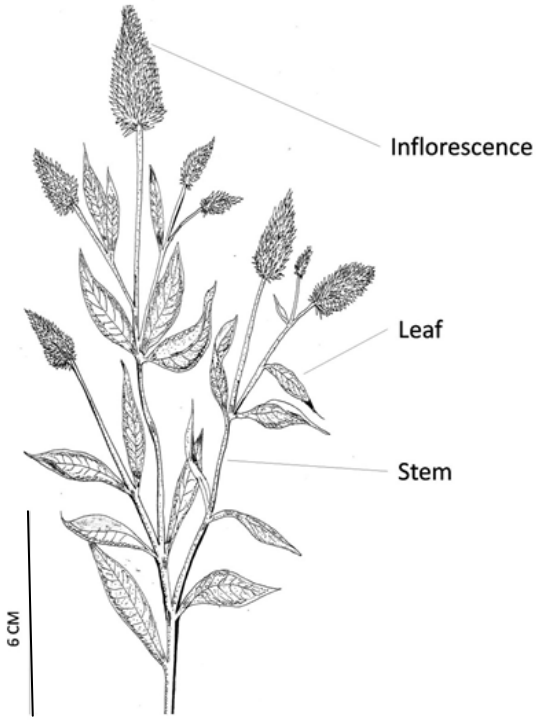

Figure 1. *Celosia argentea* (Habit)

Figure 2. Inflorescence

Figure 3. Habit Photograph

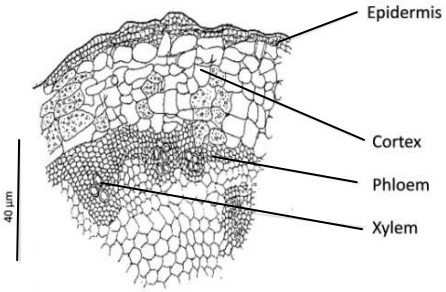

Figure 4. T. S. of Stem

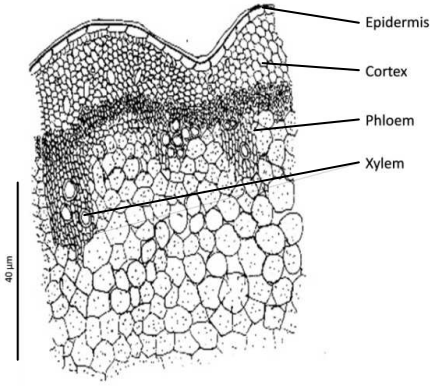

Figure 5. T. S. of Root

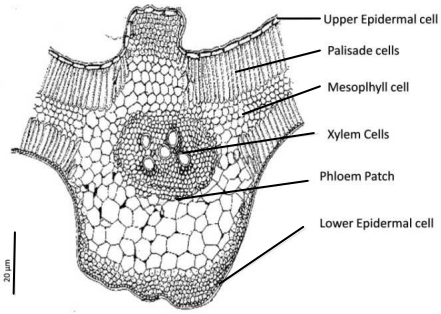

Figure 6. T. S. of Leaf

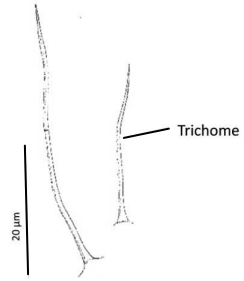

Figure 7. Trichome

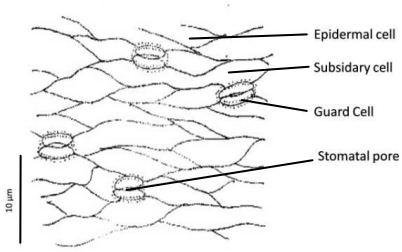

Figure 8. Stomata

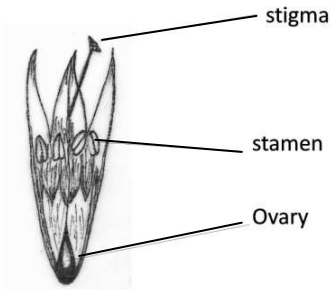

Figure 9. T. S. of Flower

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