International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 1521-1526 www.ijprajournal.com ISSN: 2456-4494

# Review on Celosia Argentia L.Plant

Nachiket . S. Dharamshetty, Dr.S.S.Patil, Mr.Parvez Shaikh
*(Mss maharashtra collage of pharmacy nilanga , latur)*

Submitted: 10-04-2022 Accepted: 28-04-2022

**ABSTRACT:** Celosia argentea L., Amaranthaceae, is widely used as traditional medicine with a long history in China. It is a unique source of Semen Celosiae whose contributions include purging the hepatic pathogenic fire, improving eyesight, and treating other eye diseases. Over 79 compounds from this plant were isolated and identified, mainly including saponins, peptides, phenols, fatty acids, and amino acids, of which saponins have been considered as the characteristic and active constituents of Celosia argentea. Experimental evidences manifested that Celosia argentea, with its active compounds, possesses wide-reaching biological activities such as hepatoprotection, tumor treatment, anti-diarrhea, anti-diabetes, anti-oxidant, anti-hypertension, and for treatment of a number of eye diseases. The objective of the study was to provide an overview of the ethno-pharmacology, chemical constituents, pharmacology, and related clinical applications of Celosia argentea, and to reveal their therapeutic potentials, and secure an evidence base for further research works on Celosia argentea.

**KEYWORDS:**
SemenCelosiaePhytochemistryCelosinPharmaology Toxicologyclinicalapplications.

## I. INTRODUCTION:

People have been using medicinal plants since the dawn of human history. For many of these plants, when and how exactly the isolation and extraction of their medicinal properties have started are unknown. A large number of wild and cultivated plants are being used for treating various disorders and diseases around the world, particularly in some developing countries. Even the uses of some medicinal plants have been supported by long-term practices and systemic theories. With the increasing knowledge of phytochemistry and pharmacology, people have come to clear understanding of the chemical compositions and mechanisms of medicinal plants.

Celosia argentea L., commonly called Qingxiang , is an annual herb that belongs to the Amaranthaceae family. Theoblate, black or reddish black seeds, commonly called Qingxiangzi in Chinese, are usually collected in autumn when the infructescence matures, then the plant is picked or cut, then dried, and the seeds are collected and then refined. The dried ripe seed is for clinical use. Semen Celosiae was initially recorded in Shen Nong Ben Cao which is deemed as the earliest classical herb in China, and is frequently used in traditional Chinese medicine for treating eye diseases, ulcer, to serve as anthelminthic, to treat trauma to blood, hygro-paralysis etc. According to records of traditional Chinese medicine theory, Semen Celosiae is reputed for purging hepatic pathogenic fire to improve eyesight Recently, with the increasing extensiveness of studies on chemical constituents of Chinese Medicinal Materials, the compounds of C. argentea are also being isolated and characterized, including saponins, peptides, phenols, fatty acids, amino acids, minerals, and so on. Modern pharmacological studies manifested that Semen Celosiae possesses miscellaneous bioactivities such as hepatoprotection ,anti-tumor,anti-diarrhea. In addition, with respect to its high-nutritive value, it is also highly consumed as a leafy vegetable in some areas.

C. argentea is reviewed on biological and pharmacognostic characterization, traditional and folk uses, chemical constituents, pharmacological activities, and toxicology, which will be significant for the exploitation of new drugs and full utilization of this plant. The possible tendency and perspective for future investigation of this plant are also discussed.

**Synonyms**:
Botonical Name: Celosia argentea linn.
English Name: Silver cockscomb, white cockscomb, flamingo feathers, wheat celosia.
Hindi Name: Garkha, garke.
Marathi Name: Kurdu kurda.
Taxonomical classification
Kingdom: plantae – plants
Subkingdom: tracheobionta – vascular plants
Superdivision: spermatophyta – seed plants
Division: magnoliophyta – flowering plant Class:

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 1521-1526 www.ijprajournal.com ISSN: 2456-4494

magnoliopsida – Dicotyledons Subclass: caryophylliadae
Order: caryophyllales

**Taxonomy:**
Division : Magnoliophyta
Kingdom : Plantae Clade :
Angiosperms Order : Caryophyllates Family : Amaranthacea
Genus : Celosia
Species : Argentea www.wjpps.com Vol 8, Issue 3, 2019. 491 Divya et al. World Journal of Pharmacy and Pharmaceutical Sciences.

**Morphology :**
Flower : In spikes, dense, cylindraical, pink turning white
Fruit : A Capsule, globose .seeds 12, reticulate
Leaf Apices : Acute
Leaf Arrangement : Alternate spiral
Leaf Bases : Cuneate
Leaf Margins : Entire
Leaf Shapes : Elliptic
Leaf Types : Simple
Habit : An erect, glabrous profusely branched annual herb.

**Cultivation:** As these plants are of tropical origin, they grow best in full sunlight and should be placed in a well-drained area. Full sunlight means they should get at least 8 hours of direct sunlight. For healthy growth plant them in the area where they get early morning sunlight and afternoon shade. In the afternoon the sunlight are mostly harsh especially in hot summer. Afternoon shade will save the plant from excessive heat.[5] The flowerheads can last up to 8 weeks, and further growth can be promoted by removing dead flowers.[4]

**Chemical constituents of Celosia argentea L.** :
The chemical components of Celosia argentea L. include:
2-descarboxy-betandin;
3-methoxytyramine;
4-O-β-D-apifuranosyl-(1→2-β-D-glucopyranosyl-2-hydroxy-6-methoxyacetophenone; amaranthin; betalimic
acid; celogenamide A, celogentin A-D,H, J and K,
celosin E, F, G, cristatain; dopamine; lyciumin A
methylate; lyciumin C methylate; morodin; nicotinic
acid;(S)-tryptophan.
Other chemical constituents of Celosia argentea L. also include:
Acetic acid, tartaric
acid, malic acid and citric acid, solanine, Alpha, β,gamachaconines, Minerals, protein and ascorbic acid,
oxalic acid. Some of these structures

**Pharmacological activities:-**
With our increasing knowledge of chemistry and improvements in related experimental conditions, we have begun to use scientific methods to unmask the truth about pharmacological mechanisms of various subjects such as C. argentea. Increasing attention on C. argentea's pharmacological activities and its mechanism on hepatoprotection, anti-infection, anti-tumor, anti-diarrhea, anti-diabetes, anti-oxidant, and its therapeutic effect on eye diseases indicated that C. argentea has enormous potential for further study and exploitation.

**Hepatoprotective effect:-**
As is known, liver is the most important channel of C. argentea for treatment functions. In the long-term administration practice, hepatoprotection is a main effect of C. argentea. The hepatoprotective effect of Semen Celosiae is supported by many modern scientific pharmacological studies. **Hase et al. (1996)** found that the celosian, an acidic polysaccharide from the Semen Celosiae, is a potent anti-hepatotoxic agent for chemical and immunological liver injury models in animals. Celosian is also an immunostimulating agent in addition to its anti-hepatotoxic effects (**Hase et al., 1997**). It induces tumor necrosis factor-α (TNF-α) production, the production of interleukin-1 beta (IL-1 beta), and nitric oxide (NO) in macrophage cell line J774.1 in a concentration-dependent manner (1–1000 μg/ml).

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 1521-1526 www.ijprajournal.com ISSN: 2456-4494

Moreover, celosian induces IL-1 beta secretion in human mononuclear cells. In addition, celosian also enhanced the gamma interferon (IFN-gamma) production activity of concanavalin A (Con A) in mice spleen cells although celosian alone did not significantly influence IFN-gamma production.Intragastric administration of celosin A and B with doses 1, 2, and 4 mg/kg per day to Kunming mice for three days significantly prevented the increase of AST, ALT, and ALP caused by $CCl_4$ effectively (**Xue et al., 2011**). Celosin C and D also significantly prevented the increase of AST, ALT, and ALP caused by $CCl_4$ effectively within a concentration of 1–4 mg/kg compared with the control group. At the same time, both celosins decreased the value of MDA significantly while those of GSH-PX, CAT, and SOD increased significantly (**Sun et al., 2010**). The hepatoprotection of celosin I and celosin II is similar to celosin A–D, and the oral administration of celosin I and celosin II prevented the increase of AST and ALT effectively but the decrease of ALP was not significant within the concentration of 2–8 mg/kg (**Wu et al., 2013**). The values of MDA, GSH-PX, CAT, and SOD were related to oxidization, and celosins could prevent such biochemical changes caused by $CCl_4$, suggesting that such hepatoprotective effects of celosins may involve their anti-oxidant activity. However, not all existing findings are clear, and further investigation is necessary.

**Therapeutic effect on eye diseases:-**

For a long time, Semen Celosiae has been used as an effective herb for treating eye diseases, especially in China and Japan. Compatible with other herbs (Radix rehmanniae, Radix Scrophulariae, Semen Plantaginis etc.), Semen Celosiae is being used to treat ceratitis, epipephysitis, iridocyclitis, opticatrophy, among others.**Huang et al. (2004b)** researched the effects of four Chinese herbs, which pass through the liver channel, on improving eyesight and on protecting oxidative injury of lens and apoptosis of lens epithelial cells, finding that by improving the anti-oxidant ability of lens, the water extract of Semen Celosiae could decrease the oxidative damage of lens, inhibit lens epithelial cells apoptosis, and reduce lens opacity, better than Catalin eye drops. Lens opacities in Semen Celosiae group were much lighter than that in Fenton group. The content of SOD, GSH and GSH-Px in the lenses of Semen Celosiae group were higher than Fenton group ($p < 0.01$). The rats of LEC apoptosis in the lenses of Semen Celosiae (30.0 ± 2.3) was significantly lower than that in $H_2O_2$ (92.0 ± 2.55) and pirenoxine sodium (56.0 ± 9.9) group ($p < 0.05$). Another study on these four Chinese herbs focused on their regulation of gene expression related apoptosis of LEC (**Huang et al., 2004a**), in which, both Bcl-2 and Bax in LEC were expressed, and the Bcl-2 was a higher one than Bax. Compared with the normal group, the expressions of both Blc-2 and Bax in the $H_2O_2$ group were changed, in which the Blc-2 expression decreased while the Bax expression increased (Ridit Test, $p < 0.01$), while compared with $H_2O_2$ group, the Blc-2 expression increased and the Bax expression decreased, which were more approximate to the normal ones and more potent than Pirenoxine sodium. Due to the absence of blood normal vessel, lens obtained the nutrient substance from circumstance. Under normal conditions, the concentration of amino acid in lens is higher than surroundings, especially the acidic amino acid such as glutamic acid. When the lens in the situation of cataract, the content of free amino acid has reduced, the content of trace elements such as zinc, selenium, and cuprum has also reduced. With respect to C. argentea in these constituents, it might improve eyesight by adjusting the metabolism in lens.**Liu et al. (2007)** observed the treatment of 20% water extract of C. argentea on senile cataract, compared with an effective drug, Catalin eye drops, the therapeutic effect of Semen Celosiae on senile cataract was not significant. Intimately, with iontophoresis group, the number of improvement by Semen Celosiae was eighteen eyes (Catalin eye drops: twenty eyes; the total eye diseases was twenty, respectively), while in the eyedropper application group, the number of improvements by Semen Celosiae was seventeen eyes (Catalin eye drops: nineteen eyes; the total eyes diseases was twenty, respectively). In both administration routes, there were no iriditis, cornea injury, or choroiditis side effects.

**Anti-tumor and immunomodulatory activities:-**

A number of studies revealed that C. argentea is a potent agent for tumor treatment. **Hayakawa et al. (1998)** researched the anti-metastatic effect of Semen Celosiae extracts, finding that intraperitoneal administration of Semen Celosiae extract for seven days before tumor inoculation significantly inhibited liver metastatis caused by intra-portal injection of colon 26-L5 carcinoma cells in dose-dependent manner. In vitro experiments showed that water extract of C. argentea also mediated macrophages to produce white blood cells to lodge (**Hayakawa et al., 1998**). The anti-tumor foundation of C. argentea is due to

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 1521-1526 www.ijprajournal.com ISSN: 2456-4494

the characteristic of immune regulation, including induced IL-12, IL-2and IFN-γ, resulting to the immune state of B dominance and activation of the cells to achieve the antitumor state. Co-culture of celosian and Con A increased IFN-y secretion two-fold compared with Con A alone, indicating that celosian not only activates macrophages but also affects T-cells function. Another study showed significant immunomodulating activity of aerial parts of C. argentea (**Devhare et al., 2011**). The 70% ethanol extract and water extract were screened for delayed type hypersensitivity, neutrophil adhesion test, and cyclophosphamide-induced myelosuppression to assess the effect on immunity in Swiss albino mice at the dose of 50 and 100 mg/kg, i.p.In the existing reports on antitumor activity of C. argentea, triterpenoid saponins are the most frequently reported class of compounds. Celosin A (**1**) was reported to be effective in the apoptosis of human cervical cancer HeLa cell l (**Huang et al., 2013**) and HepG2 Cell (**Cheng et al., 2013**). **Wu et al. (2011)** tested four triterpenoid saponins (celosin E–G and cristatain (**3**)) from Semen Celosiae for their antitumor activities toward five human cancer cell lines, finding that all four triterpenoid saponins had a certain degree of inhibition of cancer cells. The antitumor activity of cristatain was more potent than others, especially the cristatain I $C_{50}$ values on SHG44, HCT116, CEM, MDA-MB-435, and HepG2 that were 23.71 ± 2.96, 26.76 ± 4.11, 31.62 ± 2.66, 27.63 ± 2.93, and 28.35 ± 2.32, respectively, while the IC 50 values of celosin E, F, and G were all more than 100 µg/ml.

**Anti-diarrhoeal activity:-**

C. argentea could effectively inhibit castor oil induced diarrhea and charcoal meal induced diarrhea. **Sharma et al. (2010)** evaluated the anti-diarrhoeal effect of C. argentea leaves extract by using castor oil induced diarrhea, charcoal meal test, and PGE induced diarrhea models. Results suggested that the extract of C. argentea leaves inhibited diarrhea within a dose of 100 to 200 mg/kg and that it may act centrally and may inhibit PGE to give anti-diarrhoeal effects. The extract of C. argentea leaves showed protection against PGE2 induced enteropooling which might be due to the inhibition of the synthesis of prostaglandins, and decreased the propulsive movement in the charcoal meal study, particularly at the dose of 200 mg/kg, it becomes more efficacious than the standard drugatropine (2 mg/kg).

**Anti-diabetic activity:-**

In folklore practice, the decoction of Semen Celosiae has been reported to be useful in diabetes mellitus, and its systematic and scientific investigation has been conducted gradually. **Vetrichelvan et al. (2002)** studied the anti-diabetic activity of alcoholic extract of C. argentea seeds (ACAS), finding that ACAS showed positive reduction in blood glucose levels, and this effect was dose-dependent and reached a maximum level within 4–6 h. The fall in blood glucose in rats 6 h after the administration of ACAS showed 27.7% at 250 mg/kg and 38.8% at 500 mg/kg. The continuous treatment with ACAS for a period of fifteen days produced a significant decrease in the blood glucose levels of diabetic rats. Another study also supported this folklore practice, in which both ethanol extract and water extract of C. argentea possessed significant hypoglycemic activities, especially the butanol fraction and polysaccharides (**Shan et al., 2005**). The part of crude polysaccharides significantly increased plasma insulin levels in diabetic mice, more potent than glibenclamide (2 mg/kg). The crude polysaccharides also significantly increased the spleen weight of diabetic mice, while the butanol fraction and the alcohol part of the water extract showed a tendency to increase weight of the pancreas of the diabetic mice, presuming that the extract of C. argentea might be able to treat pancreas injury of the alloxan-diabetic mice and at the same time, might contribute to the other organs in relation to glycometabolism.

**Anti-infectious activity:-**

In early 1969, C. argentea was reported to exhibit antibacterial activity against Bacillus subtilis, S. aureus, Salmonella typhi, Escherichia coli, Agrobacterium tumefaciens, and Mycobacterium tuberculosis (**Bhakuni et al., 1969**). Further, **Gnanamani et al. (2003)** researched the antibacterial activity of C. argentea leaf extracts on eight burn pathogens, finding that the alcohol extract of C. argentae showed sensitivity in the order Shigella sp., Pseudomonas sp., Staphylococcu s sp., Streptococcus sp., Vibrio sp., Klebsiella sp., E. coli and Salmonella sp. Regretfully, the promising antibacterial compounds is not clear, and the goal of elucidating their active antibacterial compounds will be part of the focus of this study.

**Anti-oxidant activity:-**

The aqueous extract of C. argentea leaves attenuated cadmium-induced oxidative stress in the animals, with the best result at the dose of 400 mg/kg b.w. (**Malomo et al., 2011**). The inhibitation of $H_2O_2$, DPPH, and ABTS radicals by various parts extract of C. argentea was valued and the details of aerial part, seed, root for $H_2O_2$, DPPH, and ABTS

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 1521-1526 www.ijprajournal.com ISSN: 2456-4494

were 67.13 (0.8 mg/ml), 70.81 (100 µg/ml), 62.25 (100 µg/ml), 79.12 (0.8 mg/ml), 88.18 (100 µg/ml), 86.05 (100 µg/ml), 51.14 (0.8 mg/ml), 36.16 (100 µg/ml), and 30.80 (100 µg/ml), respectively (**Rub et al., 2013**). The anti-oxidant activity of the extract may be attributed to the phenolic and flavonoid components of the extract. The induction of anti-oxidant enzymes and scavenging of free radicals may account for the mechanism of action of the extract as an anti-oxidant.

**Anti-mitotic activity:-**

Anti-mitosis in the moroidin (**6**)/celogentin families in Semen Celosiae has been reported. It was reported that moroidin strongly inhibited the polymerization of tubulin, and the inhibitory activity ($IC_{50}$ 3 µM) of the tubulin polymerization by moroidin was more potent than that ($IC_{50}$ 10 µM) of colchicine (**Morita et al., 2000**). Next, related studies indicated that all of celogentins A–H, J, and moroidin possess a certain degree of anti-mitotic activity; some of them were rivals to vinblastine and are even more potent. Among them, celogentin C is the more potent in inhibiting tubulin polymerization than vinblastine (**Kobayashi et al., 2001**; **Hayato et al., 2003**). This difference of bioactivity among celogentins and moroidin might be related to the ring size and conformation suitable for interaction with tubulin.

**Other bioactivities:-**

What is more, C. argentea has been known to have other pharmacological activities. The alcohol extracts of C. argentea promote cell motility and proliferation of primary dermal fibroblasts at 0.1–1 µg/ml but did not alter these responses in primary keratinocytes. In an initial examination of molecular mechanisms, the C. argentea extract did not alter fibroblast and keratinocyte responses to the wound repair-associated epidermal growth factor receptor ligands. This may be due to mitogenic and motogenic promotion of dermal fibroblasts.

## II. CONCLUSION :-

Celosia argentea (Cockscomb) is an admired Asian, tropical, brilliant colors weed and documented for its diverse applications. This review has focused for collection of recent phytochemical and ethnopharmacological information about the plant. A number of chemical compounds including oleanane-type triterpenoid saponins (celosin H, I and J), cristatain, celosin E, celosin F, celosin G have been isolated from Celosia argentea. Phenols, flavonoids, diterpenes, saponins, alkaloids, glycosides, as well as micronutrients like Mg, Ca, S, P, K and Fe have been identified from the plant. This plant has potential pharmacological values screened various pharmacological activities, suchas anti-inflammatory, immune-stimulating, anticancer, hepatoprotective, antioxidant, wound healing, antimitotic (antitumor), antiviral, anti-microbial activity and skin depigmentation, antidiabetic, antinociceptive effect and antibacterial activities which are reported in different parts of the plant extracts. Finally this article reveals that, reported Celosia argentea has wide range of phytochemicals and therapeutical applications will be effective for the further research and progression. Thus, there remains a tremendous scope for further scientific exploration of Celosia argentea to establish their therapeutic efficacy and commercial exploitation.

**REFERENCES:-**

[1]. Barlocco D and Perez MJP (2002). Monitor: molecules and profiles, Drug Discov. Today, 7: 1064-1065.
[2]. Belanger J., Balakrishna M., Latha P., Katumalla S and Johns T (2010). Contribution of selected wild and cultivated leafy vegetables from South India to lutein and betacarotene intake. Asia Pac. J. Clin. Nutr., 19: 417– 424.
[3]. Bhakuni DS., Dhar ML., Dhar MM., Dhawan BN and Mehrotra, BN (1969). Screening of Indian plants for biological activity. Part II. Indian J. Exp. Biol., 7: 250–262.
[4]. Cheng QL., Li HL and Huang ZQ (2013). Study on apoptosis of HepG2 cell induced by celosin A from Celosia Semen and its mechanism. Chinese J. Exp. Tradit. Med. Form., 19: 200–204.
[5]. Devhare SV., Nirmal SA., Rub RA., Dhasade VV., Zaware BB and Mandal SC (2011). Immunomodulating activity of Celosia argentea Linn aerial parts. Lat. Am. J. Pharm., 30: 168–171.
[6]. Wunderlin RP, Hasen BF. Atlas of Florida vascular plants. www.plantatlas.usf.edu 2008.
[7]. GRIN. Species record of Celosia. Germplasm resources information network. United States Department of Agriculture. th 2014; Assessed on 4 Apr, 2014.
[8]. Ashok Kumar CK, Divya Sree MS, Joshna A, Mohana Lakshmi S, Satheesh Kumar DA. Review

[9]. on South Indian edible leafy vegetables. Journal of Global Trends in Pharmaceutical Sciences, 2013; 4(4): 1248-1256.
[10]. Qingbin W, Yan W, Meili G. Triterpenoid, saponins from the Seeds of Celosia argentea and their anti-
[11]. inflammatory and antitumor Activities. Chem. Pharm. Bull, 2011; 59(5) 666—671.
[12]. Verma H, Demla M. Standardization of whole plant of Celosia argentea Linn. International Journal of
[13]. Pharmaceutical Sciences and Research, 2012; 3(8): 2695-2699.
[14]. Markandeya AG, Firke NP, Pingale SS, Gawale SS. Quantitative elemental analysis of Celosia argentea
[15]. leaves by ICP-OES techniques using different digestion methods. International Journal of chemical and analytical sciences, 2013; 4: 175-181.
[16]. Stuart Jr GU. Philippine medicinal plants. (2016) Family. Amaranthaceae Palong-manok. Retrieved on 03/02/2017 from http://www.stuartxchange.org/Palong-manok.html
[17]. Globinmed. Celosia argentea. Global Information Hub On Integrated Medicine www.globinmed.com/index.php. 2011; Assessed on 13/9/2013.
[18]. Priya KS, Babu M, Wells A. Celosia argentea Linn. Leaf Extract Improves Wound Healing in Rat Burn Wound Model. The international journal of tissue Repair and Regeneration, 2008; 12(2): A35.
[19]. Priyanka G, Areej S, Manohar JP, Rukhsana AR. Pharmacognostic and phytochemical evaluation of
[20]. Celosia argentea. Pharmacognosy Journal, 2012; 4(33): 07-15.
[21]. Rajni B, Ranjan I, Deokule SS. Pharmacognostic and phytochemical investigation of Celosia argentea
[22]. Linn. International Research Journal of Pharmacy, 2013; 4(6): 138-144.
[23]. Gbadamosi IT, Alia AE, Okolosi O. In-vitro Antimicrobial Activities and Nutritional Assessment of Roots of Ten Nigerian Vegetables. New York Science Journal, 2012; 5(12): 234-240.
[24]. Rajendra MK, Nitin BG, Nanasaheb PD, Mangesh MK, Sudhir MV, Sneha AK. Use of Celosia argentea Linn aqueous Flower Extract as a Natural Indicator in Acid Base Titration International Journal of PharmTech Research, 2014; 6(1): 80-83.
[25]. Kumar Pradeep CB, Mohana KN. Phytochemical screening and corrosion inhibitive behavior of Pterolobium hexapetalum and Celosia argentea plant extracts on mild steel in industrial water medium. Egyptian Journal of Petroleum, 2014; 23(2): 201-211.
[26]. Kumar GG, Gali VA. Phytochemical screening of Abutilon modicum (del.ex dc.) and Celosia argentea
[27]. Linn. International Journal of Pharma and Bio Sciences, 2011; 2(3): 463.
[28]. Patel BA, Patel PU, Patel RK. Physicochemical and phytochemical investigations of seeds of Celosia
[29]. argentea Linn. International Journal of Pharmaceutical and Applied Sciences, 2010; 1(1): 124-126.
[30]. Urmila GH, Ganga Rao B, Satyanarayana T. Phytochemical and in-vitro antioxidant activity of methanolic extract of lactucascariola and Celosia argentea leaves. Journal of Drug Delivery & Therapeutics, 2013; 3(4): 114-117.