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Phytochemical Analysis on Leaf Extract of *Celosia argentea* Land its Efficacy of Antioxidant and Anti Bacterial Activity

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Abstract: The present investigation was carried out to analyze the presence of bioactive potential of phyto constituents present in the aqueous leaf extract of *Celosia argentea*. Preliminary phytochemical analysis was done using various solvent extract. Radical scavenging activity of *Celosia argentea* L, aqueous leaf extract was measured for In-Vitro Antioxidant assay, Nitric Oxide Scavenging activity**.** The antibacterial potential of the aqueous leaf extract of *Celosia argentea* was evaluated using Gram positive bacteria: *Staphylococcus epidermidis, Bacillus cereus*. Gram negative bacteria: *E.coli, Klebssiella pneumonia.* The preliminary phyto chemical screening revealed that the leaf extract of *celosia argentea* contains alkaloids, saponins, tannins, phytosterol, proteins, flavonoids, aminoacids ,and glycosides. The extract showed strong antioxidant activity in Nitric oxide scavenging activity (IC_{50}:25.24±1.553). Significant antibacterial activity was obtained compare to the standard Ciprofloxacin.
Keywords: *celosia argentea*, Phytochemicals, Anti-oxidant assay: Nitric oxide scavenging activity.

Introduction

Plants are the major source of medicine: Today, a substantial number of drugs are developed from plants. A large proportion of such drugs have been discovered with the aid of ethno botanical knowledge of the traditional uses of the plant. The world Health organization (WHO) estimates that 80% of the world population, presently use herbal medicine for primary health care.

Traditional healers long have used plants to prevent or cure infectious disease. Many of these plants have been investigated scientifically for antimicrobial activity and a large number of plant products have been shown to inhibit the growth of pathogen microorganisms.So it is worthwhile to study plant and plant products for activity against resistant bacteria. Present day there is a growing interest in investigating the phyto chemical constituents of a medicinal plant and its pharmacological activity[9].

Celosia argentea L family Amaranthaceae is an annual tropical herb [5] which grows upto 1m tall, widely distributed in tropical countries. Its leaves are used internally for hematological and gynecologic dis orders and externally to treat infection, as disinfectant [7.] The whole plant is used to treat dysentery and dysuria. The petioles are used to treat sores, wounds, boils and swellings.[10]The seeds are used for the treatment of conjunctivitis.

Compounds isolated from the leaves of *Celosia argentea* have tyrosine inhibitory effect and super oxide scavenging activity[6.] Thus the present study highlight in phytochemical analysis, in vitro antioxidant activity and antibacterial potential of aqueous leaf extract of *Celosia argentea.*

Materials and Methods:

Collection of plant material:

The plant *Celosia argentea* was collected from Vellore district. The plant was identified taxonomically and authenticated by Plant Anatomy research center, Chennai, Tamilnadu, India.

Preparation of plant material:

The leaves collected were surface sterilized and was shade dried for more than a week. Then it was grinded into fine powder using mortar and pestle. The powder was stored at 4·C for further analysis.

Preparation of Extract:

Three different solvents were used in the current study viz aqueous, methanol and chloroform. Extraction was carried out using soxhlet apparatus. The mass obtained was 11% w/w with respect to the powdered material. The extract was dried under reduced pressure using rotary flash evaporator and stored in refrigerator for further studies.

Phytochemical Analysis:

Preliminary Phytochemical analysis, was done using various solvent viz., aqueous, chloroform, ethanol. Using various solvent extracts, of *Celosia argentea* leaves screening for alkaloids (Mayor's test), saponins (foam test), tannins, phytosterol(Salkowski test), Phenols (Ferric Chloride test),protein, flavonoids (Sodium Hydroxide test), Triterpenoids (Liebermann – Burchard test) , Carbohydrate (Molosch's test) amino acid and glycosides(Legal'stest), were carried out.[4]

In-Vitro Antioxidant activity:

Nitric Oxide Scavenging activity:

Sodium Nitropruside (SNP) solution was prepared by dissolving 5mML^{-1} of SNP in Phosphate buffered saline pH 7.3. This was mixed with various concentration of the aqueous leaf extract of*Celosiaargentea* and incubated at 25·C for 150 mins. After incubation, equal volume of the prepared solution and Griess reagent (1%) was mixed and incubated for 30 mins. The absorbance of the mixture was read at 550nm. Vitamin C served as standard and compared with extract.

$$\text{Radical scavenging (\%)} = \frac{\text{Control OD} - \text{Sample OD}}{\text{Control OD}} \times 100$$

Test organism:

Aqueous extract of *Celosiaargentea* was subjected to antibacterial assay by disc diffusion method using both gram positive and gram negative bacteria.

Gram positive bacteria: *Staphylococcus epidermidis, Bacillus cereus*.

Gram negative bacteria: *E.coli, Klebssiella pneumonia*

Antibacterial activity was studied using Disc Diffusion method.[2] The bacterial isolates were swabbed on the Nutrient agar plate. Sterile disc loaded with various concentration (50 µl/ml, 100 µl/ml, 150 µl/ml) of aqueous plant extract was allowed dry and placed onto inoculated nutrient agar seeded plates aseptically. Ciprofloxacin (5mg/disc) was used as standard. The plates were incubated at 18·C at room temperature . The zone of inhibition was recorded.

Results and Discussion:

Phytochemical analysis:

Preliminary phytochemical analysis revealed the best result in aqueous extract. Aqueous leaf extract of *Celosia argentea*, showed the presence of alkaloids, saponins, tannins, phytosterol, proteins, flavonoids, amino acids and glycosides. (**Refer Table :1)**

Table 1: Phytochemical Analysis using different solvent

Experiment	Aqueous Extract	Chloroform Extract	Methanol Extract
ALKALOID (Mayor's test)	+	-	+
SAPONIN (Foam test)	+	+	+
TANNIN	+	+	+
PHYTOSTEROL (Salkowski test)	+	+	+
PHENOLS (Ferric Chloride test)	+	-	+
PROTIEN	+	-	+
FLAVONOIDS (sodium Hydroxide test)	+	+	+
TRITERPENOIDS (Liebermann – Burchard test)	-	-	-
CARBOHYDRATE TEST– (Molosch's test)	-	-	-
AMINO ACID	+	-	+
GLYCOSIDES (Legal test)	+	-	+

In-Vitro Antioxidant activity:

Nitric Oxide Scavenging activity:

Nitric oxide proves to be a potent pleiotropic mediator of various phyological process such as smooth muscle relaxation, neuronal signaling, regulation of cell mediated toxicity.[1] The maximum percentage of inhibition of the standard vitamin C was found to be 52.76% at 500 µg/ml , Whereas the percentage of inhibition of aqueous leaf extract of *Celosia argentea*was 62.9% at its minimum concentration 100µg/ml. The screening of antioxidant activity shows that aqueous leaf extract of *Celosia argentea* is endowed with potentially exploitable antioxidant activity. (**Refer table:2)**

Table 2.Nitric oxide scavenging activity of *Celosia argentea*

S.N0	Concentrationnµg/ml	% of inhibition		IC50	
		Vitamin C	Celosia argentea	Vitamin C	Celosia argentea
1	100	27.1±0.815	66.5±1.315	12.26±0.654	25.2±1.553
2	200	36±0.816	70.2±1.314		
3	300	40.2±0.917	73.5±1.118		
4	400	42.4±1.118	76.5±1.115		
5	500	52±1.205	80±1.110		

Antibacterial Assay:

Gram positive bacteria: *Staphylococcus epidermidis, Bacillus cereus*.

Gram negative bacteria: *E.coli, Klebssiella pneumonia*

The present study shows that aqueous leaf extract of *Celosia argentea*had interesting activity against both gram positive and gram negative bacteria .[3] Maximum zone of inhibition of 27mm was observed against gram negative bacteria *E.coli*, at concentration 150µl/ml. This assay proves that aqueous leaf extract of *Celosia*

argentea has effective antibacterial activity compared to the antibacterial activity exhibited by the conventional drugCiprofloxacin (5mg/disc). (**Refer Table:3)**

Table:3 Anti bacterial activity of *celosia argentea*

S.No.	Organisms	Standard	50µl	100µl	150µl
1.	Staphylococcus Aureus	24mm	14mm	18mm	24mm
2.	Bacillus cereus	24mm	14mm	17mm	26mm
3.	Klebsiella Pneumonia	24mm	15mm	22mm	26mm
4.	Escherichia coli	24mm	15mm	24mm	27mm

Conclusion:

The research accomplishes that the leaf extract from *Celosia argentea*, has rich phytoconstituent potential. The invitro antioxidant evaluation of the extract showed that the aqueous leaf extract of *Celosia argentea*, which effectively showed the scavenging activity against nitric oxide (25.2±1.553). The antioxidant activity of the plant might be due to high polyphenolic compounds.[11]*Celosia argentea* leaf extract possess broad spectrum of activity against panel of bacteria responsible for the most common bacterial diseases. Thus this promissory extract of leaves from *Celosia argentea*, are endowed with highly exploitable antioxidant activities and antibacterial activity that could be employed as an alternative for the antibiotics in pharmacology and medical field.

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