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A Review of *Gomphrena serrata*

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ABSTRACT

Gomphrena serrata belongs to the family *Amaranthaceae* comprises many species which are used in nutrition and traditional folk medicine. More effective against diarrhea, hay fever, pains, carminative, bronchial asthma, diabetes, and dermatitis. The phytoconstituents present in this plant flavonoids, alkaloids, carbohydrates, saponins, tannins, proteins, amino acids, and phytosterols. The color, shape, size, odour, and surface characteristics were reported from the root and Leaf of *Gomphrena serrata*. The microscopic structures of cross-section revealed the presence of lignified xylem fibers, xylem vessels, cork cell, parenchyma cells, parenchymatous, collenchymatous, tracheids, and phloem. The plant also has many pharmacological activities like antibacterial, antimicrobial, anticancer and anti urolithiatic. Hence the review of the plant is useful in order to give information about Pharmacological importance and medicinal uses of the plant.

INTRODUCTION:

Plants are a rich source of bioactive constituents with diverse pharmacological properties and medicinal values. The extraction and characterization of phytochemicals from plants have resulted in the discovery of novel drug entities with high therapeutic value. (Reische DL, 1998). One of such plant is *Gomphrena serrata L* that belong to family *Amaranthaceae*. The family *Amaranthaceae* contains nearly 60-70 exotic species. The genus Gomphrena, with around 138 species, some of the important species include G. *boliviana*, *G. celosioides*, *G. globose*, *G. haenkeana*, *G. macrocephala*, *G. martiana*, *G. meyeniana*, *G. perennis*, and *G. pulchella*. All parts of this plant are widely used as a folklore medicine for the treatment of various ailments by Indian traditional healers, such as respiratory diseases like asthma, gastrointestinal conditions like diarrhea, gastric disturbances, piles, skin diseases like dermatitis, as antimicrobial, anticancer, antimalarial, analgesic, as tonics and carminatives and allergic conditions like hay fever etc. The current article is about the morphological, physicochemical properties and pharmacological actions of *Gomphrena serrrata.*

TAXONOMY[1]

Synonyms: *Gomphrena celosioides*, *Gomphrena decumbens*.

Botanical name: *Gomphrena serrata*

Family: *Amaranthaceae*

Genus: *Gomphrena*

Kingdom: Plantae

Order: Caryophyllidae

Species: *Gomphrena serrata*

Common name: Prostrate *Gomphrena*, Prostrate Globe Amaranth, Coastal Globe Amaranth.

Description:-

Leaves are opposite, 4 X 1 cm, Obovate, Obtuse, tomentose. Spikes 2x 1cm, oblong, supported by 2 basal bracts. Flowers many, densely packed: sepal 5, outer ones Lanceolate, 7mm long, strongly aristate, white -cottony hairy, inner smaller; stamens 5, filaments

combined into a tube: ovary Obovoid: style forked above. Achene membranous, circumscissile: seed one, 2x2mm, Muriculate, brown. Sterile flower with hooked, bristle like tepals. [2]

GENERAL HABITAT: [3]

Dry fields, Degraded deciduous forests and scrub jungles.

DISTRIBUTION: [3]

Global distribution: It will be widely distributed in the native of South America and also in tropical America.

Distribution in India: In Assam, Bihar, Gujarat, Kerala, Karnataka, Odisha, Tamilnadu.

ROOT:

Morphological characteristics of the root of *Gomphrena serrata*. [4]

It is a buff color, characteristic odor and taste and its texture are smooth and the thickness is 4-12cm.

Microscopy:

The transverse section of the root of *Gomphrena serrata* showed the presence of Cortex was made up of thin-walled parenchymatous cells along with very small intercellular spaces. And cork showed the presence of periderm i.e., 2-3 layered narrow, tangentially elongated cells with dark brown granular matter. Phelloderm is 1-2 layered rows of tangentially elongated thin-walled cells. The endodermis showed the presence of phloem and xylem. The phloem is

present in between the medullary rays. The medullary rays are parenchymatous and are uniseriate to tri seriate, majorly biseriate. Radially arranged vascular bundles were present in which, phloem is well developed and shows the presence of phloem fibers, which are non-lignified. It also showed the presence of phloem parenchyma. The xylem region was similar to phloem region and was also surrounded by uniseriate to tri seriate medullary rays. Xylem tissue consists of spiral xylem vessels, xylem fibers, and xylem parenchyma.

Phytoconstituents of *Gomphrena Serrata* Root

It contains flavonoids, volatile oil, alkaloids, tannins and phenols, saponins, steroids, Carbohydrates, acid compounds, glycoside, amino acids, and proteins.

Leaf:

Morphological Characteristics of Leaf of *Gomphrena Serrata*[(5)]

It is green in color having characteristic odor and taste and its texture is smooth and thickness of approximately 3cm.

Microscopic studies: [(5)]

The transverse section of *Gomphrena serrata* leaf passing through midrib is convexly protruding at the lower side slightly with more prominent ridged on the upper side showed uniseriate epidermal cells on both surfaces of the leaf, which was covered by thick cuticle. The epidermis is composed of rectangular shaped cells and contains an anomocytic type of stomata. There is uniseriate multicellular covering trichomes on the adaxial and abaxial surface of epidermal cells, relatively more on abaxial surface. The epidermal cells followed by 1-2 layered collenchymatous cells beneath upper epidermis and 2-3 layered collenchymatous cells above lower cells of collenchyma were thick walled and round in shape showing small intercellular spaces, followed by broad parenchymatous ground cells with intercellular spaces. Conjoint, collateral closed vascular bundles 4-5 were present in the ground tissue. The phloem consists of companion cells and sieve tubes and xylem consists of spiral annular thickened vessels, tracheids, fibres, and xylem parenchyma.

Circularly shaped petiole was observed in transverse section showing a layer of thickly walled epidermis with uniseriate multicellular covering trichomes. Followed by 3-5 layers of collenchymatous cells were present beneath the epidermal layer. Various sized

parenchymatous cells from the ground tissue with intercellular spaces. Vascular bundles are open, bilateral and arranged in a ring, which was present at the center of the petiole and nature is similar to that of the leaf.

Phytoconstituents of *Gomphrena serrata* leaf: [5]

It contains flavonoids, volatile oil, alkaloids, tannins and phenols, saponins, steroids, Carbohydrates, acid compounds, glycoside, amino acids, and proteins.

Pharmacological actions of *Gomphrena serrata*:-

Anticancer activity: The phytochemical analysis of chloroform extract of *Gomphrena Serrata* was studied and reported the presence of carbohydrates, glycosides, amino acids, phytosterols, flavonoids, phenolic, and terpenoids. They isolated the compounds oleuropein from *Gomphrena serrata*. The development of novel oleuropein as an anticancer agent and in-silico docking or computational studies are in the progress. [9]

Diuretic and *in-vitro* anti-urolithiatic activities: Evaluation of diuretic and *in-vitro* anti-urolithiatic activities of ethanolic leaf extract *of Gomphrena serrata.* He concluded that it was already reported that are natural products like steroids, saponins, glycosides which have been shown to possess various biological properties related to Diuretic and Anti-Urolithiatic activity. All the observations provided the basis for the conclusion that the alcoholic extract of the dried leaves of *Gomphrena Serrata* is endowed with Diuretic and Anti-Urolithiatic Activity. [10]

Anti-microbial activity; Dias et al. [6] screened the ethanolic extract and pure compound of *Gomphrena serrata* for antimicrobial activity by Kirby – Bauer method. The result showed signification activity against Staphylococcus aureus and Salmonella typhi. Dosumu et al. [11] found that ethyl acetate and methanol extract of G .serrata exhibited anthelmintic activities against *Pheretimia Posthuma*, Fasciola gigantica and Taenia solium. Higher anthelminthic and antibacterial activities were displaced in ethyl acetate extract. Methanol extract inhibited pronounced antifungal activity. [11]

Anti-inflammatory and Analgesic Activity: Anti-inflammatory and Analgesic properties of aqueous leaf extracts of *Gomphrena serrate* (*Gomphrena celosioides*) in rats and mice were

reported by Oladele et al. These two plants are having anti-inflammatory activity, which inhibit edema induced by carrageenan in the rat paws[12]

Antioxidant activity: The inflammatory process induced by carrageenan increased serum levels reactive oxygen species [13], such as thiobarbituric acid reactive substances (TBARS) which are markers of lipid peroxidation produced during stress in rats treated with carrageenan. These oxygen species are involved in the genesis of the inflammation and oxidative stress. Ethanol extract reduced TBARS in serum, suggesting an antioxidant activity of *Gomphrena serrate* (*Gomphrena colostomies*). [13]

CONCLUSION:

The studies on *Gomphrena Serrata* elaborate the biological and medicinal applications would support the traditional usage of the plant in village sides even now. The present study might be explored the medicinal importance of the plant for further studies.

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