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Review on Sea purslane

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Abstract

Sea purslane is a creeping, ornamental plant of family Aizoaceae. It is a perennial herb that grows throughout the world. Preliminary phytochemical screening of leaf showed the presence of alkaloid, coumarin, flavonoid, phenol, steroid, tannins, terpenoid, and sugar in the different extracts. The plant possess broad spectrum activity against gram positive and gram negative bacteria as well as significant antifungal and antioxidant activity. It possess a number of bioactive constituents like Phytol, Squalene, Vitamin E, Benzoic acid, Hexadecanoic acid, ethyl ester, Oleic acid, eicosyl ester.

Keywords: Sea purslane, *Sesuvium portulacastrum*, Aizoaceae

1. Introduction

There are twelve different species in the genus *Sesuvium* which are distributed in different parts of globe. A short taproot, numerous seeds, 2–5 stigmas, stem with adventitious roots at the nodes and uniflorous inflorescences are considered/believed the main features of the genus. *Sesuvium portulacastrum* L. (seapurslane) belonging to family Aizoaceae is one of the fast growing, herbaceous, perennial, dichotomous plant of this genus.

Sesuvium portulacastrum (godabari), was first published in 1953 as *Portulaca portulacastrum* by Carl Linnaeus. After six years Linnaeus displaced *Portulaca* into *Sesuvium* and it has remained same name ever since. *Sesuvium portulacastrum* also known as shoreline purslane or sea purslane is a sprawling perennial herb that can exist under stress conditions. As it is well conform to salinity and drought, *Sesuvium portulacastrum* is known to be halophytic species.

It is a frequent pioneer species in the backshore zone of coastal beaches, where sand movement is influenced by prevalent winds near the born crest ^[1].

1.1 Nomenclature

Sesuvium revolutum Pers, *Sesuvium repens* Wild, *Sesuvium pentandrum* Elladi, *Sesuvium portula* Crantz, *Sesuvium pedunculatum* Pers, *Sesuvium parviflorum* DC ^[2], *Sesuvium revoluti folium*, Ortega, *Sesuvium pedunculatum* Pers, *Sesuvium sessile* Pers, *Sesuvium sessiliflorum* Dombex Rohrb, *Portulaca portulacastrum* L, *Halimus portulacastrum* (L.) Kuntze ^[2, 3].

1.2 Taxonomic arrangement

Kingdom	Plantae
Subkingdom	Viridiplantae
Division	Tracheophyta
Subdivision	Spermatophytina
Class	Magnoliopsida
Superorder	Caryophyllanae
Order	Caryophyllales
Family	Aizoaceae
Genus	<i>Sesuvium</i>
Species	<i>Sesuvium portulacastrum</i> (L.)

1.3 Distribution

It is found in the northern, western and central parts of the world. The thick, fleshy leaves are borne on succulent, reddish green stems that branch regularly forming dense stands close to the ground. It grows in sandy clay, coastal limestone and sandstone, tidal flats and salt marshes ^[4] in different parts of the world. It is native to Africa, Asia, Australia, North America and South America Zimbabwe ^[5, 6, 7].

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1.4 Morphological characters



a) Habit

Sea purslane^[8] is a fleshy, perennial, herbaceous creeper that spreads and creeps along the ground by rooting from its joints to form mats or ground covers. The plant grows in damp, sandy locations such as mangroves, beaches, dunes, salt flats, and marsh edges.

b) Leaves

Leaves are narrow, simple, opposite resemble the shape of a spoon or paddle. They are ½" to 2" inches long with a fleshy texture and smooth surfaces. Leaf color is green with some occasional red and leaf bases are winged.

c) Flowers

These are pink or purple in colour^[9, 10].

d) Fruit

The plant bears small ovoid, 3/8" capsule (fruit) with numerous, shiny, black seeds.

e) Stem

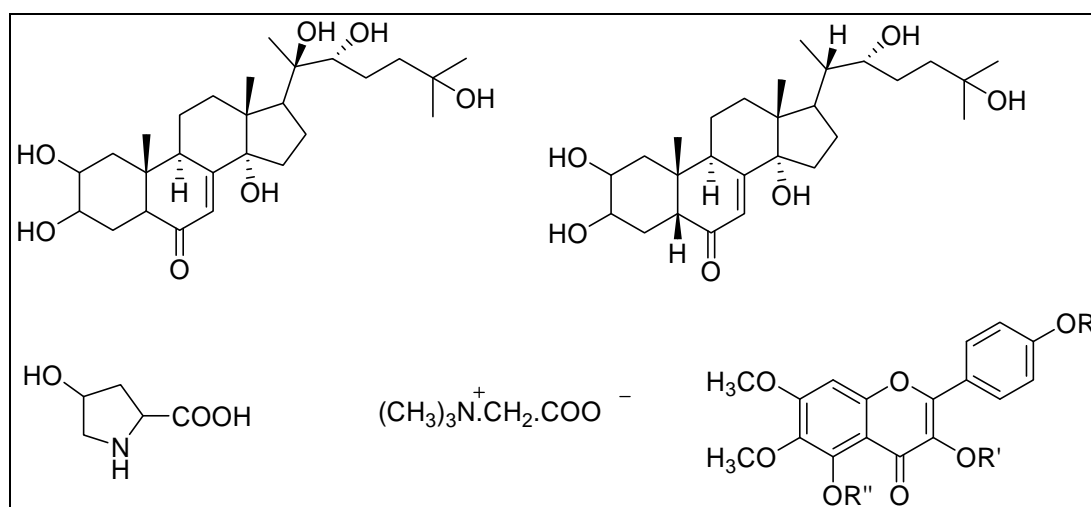
Stem is fleshy, reddish stems are 8" to 20" long. The branches coming off the stems are sparingly placed.

1.5 Traditional uses

The plant has a long history in folk medicine and was traditionally used in given salads due to its salty taste. Moreover it is used a remedy for fever, kidney disorders scurvy and in the treatment of various infections^[11, 12] and scurvy. The secondary metabolites from these plant species have been believed to have great potential substitutes for some synthetic raw materials in food, perfumery, cosmetics and pharmaceutical industries. The plant is grown as ornamental plants because of its flowers and succulent foliage of leaves. Traditional healers in Zimbabwe and South Africa use the plant to treat various infections and kidney disorders.

1.6 Phytochemical analysis

Phytochemical screening of the stems and leaves of *S. portulacastrum* indicates the presence of terpenoids, alkaloids, and tannins. *Sesuvium* is an important source of phytoecdysteroids (insect molting hormones) 20-hydroxyecdysone (20E) which may influence many biochemical and physiological processes during the various developmental stages of insects along with the small amount of ecdysone. Moreover *S. portulacastrum* also contain fatty acids whose composition is palmitic acid (31.18%), oleic acid (21.15%), linolenic acid (14.18%) linoleic acid (10.63%), myristic acid (6.91%) and behenic acid (2.42%). The major phytoconstituents of *Sesuvium portulacastrum* are *trans*-4-hydroxyprolinebetaine, praline and 3,5,4_-trihydroxy-6,7-dimethoxyflavone 3-glucoside^[13] indicates its use in osmoregulation^[14]. The essential oil obtained from of *S. portulacastrum* consist of pinene, camphene, *O*-cymene, limonene, 1, 8-cineole, terpinene, bornyl acetate, tridecane, *trans*-caryophyllene and humulene. Ecdysterones^[15, 16] amino acids^[17] and mineral Constituents, flavonols and flavonol glycosides^[18, 19].



1.7 Pharmacology

It has been utilize for the treatment of epilepsy, conjunctivitis, dermatitis, haematuria, leprosy and purgative, toothache and also as antimicrobial agent. Extract of this plant and the essential oil from the fresh leaves of *S. portulacastrum* showed antibacterial, antifungal as well as antioxidant activity. The

ethanolic extract of the medicinal plant *S. portulacastrum* showed potential against the causative agents and pathogens related to various gastrointestinal disorders leading to indigestion, dysentery, and diarrhea^[20]. Moreover the ethanolic extract of the medicinal plant *S.*

portulacastrum showed potential against the causative agents of nosocomial infections, *Staphylococcus aureus* and *E. coli*. The antibacterial activities of the three standard antibiotics (penicillin G, cefotaxime and vancomycin) were compared with ethanol extract and exhibited a broad spectrum activity against gram positive and gram negative bacteria [21].

Methanol extract of *Sesuvium portulacastrum* at the doses of 150 mg/kg and the altered glutathione peroxidase, glutathione reductase, superoxide dismutase, catalase restored and decreased glutathione levels towards the normal levels in a dose dependent manner in rats using Silymarin as standard drug [22].

The maximum zone of inhibition for *S. paratyphi*-B, and *B. subtilis*, *P. aeruginosa* (ESBL) and *E. coli* (ESBL) was 25 mm and 19 mm in ethanol extract; 16 mm *S. paratyphi*-A and *E. coli* and 15 mm for *P. vulgaris* in methanol extract; 21 mm for *E. coli* (ESBL) and 16mm for *S. aureus*, *S. paratyphi* and *S. aureus* (Methicillin sensitive) in ethyl acetate extract; 16 mm and 14 mm for *B. thuringiensis* and *E. coli* (ESBL) in benzene extract; 16 mm for *K. pneumoniae* and 10 mm for *S. paratyphi*-B and *E. coli* (ESBL) in petroleum ether respectively. The other pathogens showed the inhibition zone ranged between 9 mm to 5 mm. Antibacterial activity was comparable with that of positive control tetracycline (35 mm to 18 mm) against the organisms tested. In this study extracts of *S. portulacastrum* (L) established a broad-spectrum of antibacterial activity against both gram-positive and gram-negative bacteria.

The essential oil exhibited notable antibacterial activity against both Gram-positive and Gram-negative bacteria as well as significant antifungal and antioxidant activity [23].

Sesuvium portulacastrum, showed positive activity against human immunodeficiency viruses [24].

2. Conclusion

Sea purslane is a useful plant as it contains a number of secondary metabolites like glycosides, flavonoids, steroids. Moreover the literature survey showed tremendous therapeutic activities which were supported by its traditional uses. There is need to explore the plant based on constituent guided activity.

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