

Purslane as a weed or wonder plant

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Abstract: -

Portulaca oleracea L., commonly known as Purslane, is a plant of remarkable nutritional, medicinal, pharmacological, and phytoremediation significance. It is highly nutritious, containing all essential minerals, vitamins, and proteins. Fresh Purslane comprises approximately 93% water, 3% carbohydrates, and 2% protein. It is particularly rich in dietary minerals, including potassium, magnesium, calcium, phosphorus, and iron, with potassium being the most abundant electrolyte. Among green leafy vegetables, Purslane boasts the highest content of vitamins. Additionally, it contains four distinct types of omega-3 fatty acids, which are essential for overall health, the prevention and management of various cardiovascular diseases, and the maintenance of a robust immune system.

Purslane (*Portulaca oleracea* L.) is well-suited for cultivation due to its high production efficiency and adaptability to tropical, subtropical, and underdeveloped regions. Its ease of cultivation and nutrient-rich profile make it an ideal crop for resource-constrained farmers in developing regions. Given its significant nutritional value, Purslane holds considerable potential for addressing food security and improving health outcomes in the context of a changing climate. Furthermore, its utilization can contribute to preserving agro-biodiversity and promoting sustainable development at local and regional levels.

Introduction:

Common purslane (*Portulaca oleracea* L.), a summer annual succulent belonging to the family Portulacaceae, comprises over 120 species. This herbaceous weed is highly adaptable to warm and moist environments and is recognized as a persistent annual species. Cosmopolitan in distribution, it ranks as the eighth most prevalent weed globally and is commonly found in riverbanks, riverbeds, gardens, and waste sites, thriving in

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sunny and warm conditions. Common names include garden purslane, common purslane, and Indian purslane. It is known by various regional synonyms such as Purslane (USA and Australia), Pigweed (England), Pourpier (France), and Andulam (Malaysia). Within India, it is referred to by diverse vernacular names, including *sanhti*, *punarva*, *paruppu keerai*, *gangavalli*, *kulfa*, and *Rudravanti* in Hindi; *Lonamala*, *Lonica*, and *Brihalloni* in Sanskrit; *Nunia-sak*, *Hah thegia*, and *Khutura* in Assam; *Motiloni* and *Ghol* in Gujarat; *Leibak Kundo* in Manipur; *Dahna* in Odisha; and *Nuner* in Kashmir. The genus name *Portulaca* is derived from the Latin word *porto* (milk), referring to the plant's milky sap, or *portula* (small door), describing the mechanism of its capsule opening. Recognized for its medicinal properties, it has been described as a "Global Panacea" by the World Health Organization.



Native to India and the Middle East, purslane is now cultivated across various regions, including Asia, Europe, and Africa, for use in human consumption, animal feed, and traditional medicine. It is unique in that it can thrive both in grasslands and agricultural fields, leading to its classification as a "weed with nutritive potential." Its nutritional value lies in its abundance of bioactive compounds, including omega-3 fatty acids, antioxidants, vitamins, and amino acids, which are essential for a healthy diet. Furthermore, purslane's adaptability to diverse biogeographical conditions and resilience to environmental stressors such as drought and salinity underline its suitability for introduction as a novel cultivated vegetable.

Botany

This weedy plant is taxonomically classified under the Subkingdom *Tracheobionta*, Superdivision *Spermatophyta*, Division *Magnoliophyta*, Class *Magnoliopsida*, Subclass *Caryophyllidae*, Order *Caryophyllales*, and Family *Portulacaceae* (commonly referred to as the Purslane family). The family *Portulacaceae* is relatively small, encompassing 21 genera and approximately 580 species with a cosmopolitan distribution.

Purslane (*Portulaca oleracea* L.), also known simply as *Portulaca*, is an annual, succulent herbaceous plant characterized by a

prostrate or decumbent growth habit and reaching up to 30 cm in height. The plant has branched, slightly reddish-green or purplish-green ascending stems that are smooth, juicy, and cylindrical. The leaves, typically 3 cm in length, are opposite, oblong, and fleshy. The root system consists of a thick taproot complemented by numerous fibrous secondary roots. The leaves are simple, sub-opposite or alternate, often forming clusters at branch tips, and are succulent with smooth margins.

Purslane produces small yellow flowers (20–30 in number) subtended by two bracts, forming multi-seeded capsules. The flowers, which are solitary and located at branch tips, bloom from May to September, opening exclusively in full sunlight. The fruits are capsules containing numerous black seeds that are small (less than 1 mm in diameter), rounded to egg-shaped, smooth, and brown to dark with a white attachment point. The seeds have a pleasant taste with a mild flavor and are dispersed through various mechanisms, including autochory (self-dispersal), anemochory (wind dispersal), zoochory (animal dispersal, particularly by birds), and anthropochory (human-assisted dispersal).

Seed germination in purslane is influenced by specific photoperiod and thermoperiod conditions. Freshly dispersed seeds exhibit no germination in darkness at any temperature, whereas older seeds

demonstrate temperature-dependent germination in the absence of light. Purslane utilizes the C4 photosynthetic pathway, enabling it to withstand high temperatures and intense sunlight. Under prolonged drought stress (21 days), the plant exhibits a Crassulacean acid-like metabolism, which further enhances its resilience to arid conditions.

Medicinal and other uses

Purslane (*Portulaca oleracea* L.) is a widely distributed medicinal plant valued for its dual role as an edible vegetable and a traditional remedy for a broad range of ailments. Due to its exceptional nutritional and therapeutic properties, it has been referred to as a "future power food" and a "new crop." In Ancient Egypt, purslane was recognized as a medicinal herb, attributed to its high levels of omega-3 fatty acids, α -tocopherol, ascorbic acid, β -carotene, and glutathione.

Traditional medicine in numerous cultures has utilized purslane for its febrifuge, antiseptic, and vermifuge properties, as well as for treating burns, headaches, and gastrointestinal, hepatic, respiratory, and arthritic conditions. The plant exhibits diverse pharmacological properties, including antibacterial, anti-ulcerogenic, anti-inflammatory, antioxidant, purgative, and wound-healing effects. It has also been employed as a cardiac tonic, emollient, muscle

relaxant, diuretic, and in the management of osteoporosis and psoriasis. Nutritionally, purslane surpasses many commonly cultivated vegetables due to its higher levels of β -carotene, ascorbic acid, alpha-linolenic acid (ALA), and antioxidants. Research indicates that it contains omega-3 fatty acids at concentrations five times greater than spinach.

Omega-3 fatty acids, a class of essential polyunsaturated fatty acids, are critical for human growth, development, cardiovascular health, and immune system maintenance. While fish is traditionally considered the richest source of omega-3 fatty acids, purslane has emerged as the richest vegetable source of alpha-linolenic acid, offering a vital alternative for vegetarians and vegans.

Historically, the medicinal value of purslane has been acknowledged across various cultures. In ancient Rome, it was used to treat dysentery, intestinal worms, headaches, and stomachaches. Theophrastus, regarded as the "father of botany," recommended purslane as an essential herb, while Pliny the Elder (A.D. 23–79), a Roman naturalist, regarded it as a reliable healing plant. The herb has been mentioned extensively in alternative medicine systems such as Ayurveda and Unani. Its use as a vegetable, spice, and medicinal plant has been recorded globally since ancient times, with its

earliest documented usage dating back to approximately 500 AD in China.

Traditionally, purslane has been characterized as sour and cooling, with heat-relieving and detoxifying properties. Internally, it is employed for conditions such as bacillary dysentery, hematochezia, bleeding hemorrhoids, and metrorrhagia. Externally, it is applied to manage bleeding. It is also utilized in treating hemoptysis, pulmonary diseases, and heart palpitations, with leaf decoctions offering therapeutic benefits. In American Indian medicine, purslane was used to treat colds, gout, and headaches, while its juice was applied for male genital inflammation. Infusions of the leaves in linseed oil were used as a liniment for stiff necks, and the plant was employed to manage excessive menstrual flow, stomachaches, and hemoptysis in Indian traditional medicine.

The juice of the plant combined with honey is recommended for coughs, while its bruised leaves are applied to the temples for heat and pain relief. Externally, it is used as a cooling application for erysipelas, and its infusion serves as a diuretic. The stem juice is effective for prickly heat and burning sensations in the extremities.

Culinarily, purslane is consumed extensively as a potherb and is incorporated into soups and salads, particularly in Mediterranean and tropical Asian cuisines. Its

tender stems and leaves are eaten raw, alone, or mixed with other greens. The plant is also cooked or pickled, further demonstrating its versatility.

Phytoconstituents in Portulaca

A number of phytochemicals have been isolated from *Portulaca oleracea* till date, including vitamins (Vitamin A, Riboflavin, Niacin, Pyridoxine, Vitamin C, Alpha-Tocopherol, Thiamin, Pantothenic Acid), Minerals (Phosphorous, Iron, Magnesium, Manganese, Calcium, Copper, Zinc, Selenium), Organic Acids(Alpha-Linolenic Acid, Docosapentaenoic Acid, Eicosapentenoic Acid, Docosahexanoic Acid, Catechol, Caffeic Acid, Oxalic Acid), Flavonoids (Apigenin, Kaempferol, Quercetin, Luteolin, Myricetin, Genistein, And Genistin, Portulacanonones), Alkaloids (Coumarins, Anthraquinone Glycoside, Cardiac Glycoside, Dopamine, Noradrenalin, Oleracins, Oleraceins, Trollisine, Aurantiamide, Scopoletin) Terpenoids (Portuloside A, Portuloside B, Portulene, Lupeol, Friedelane) polysaccharides, vitamins, sterols, proteins, and minerals.

Conclusion

Purslane species offer significant benefits and can be readily cultivated across tropical, subtropical, and temperate regions worldwide. In India and other parts of Asia, this species thrives abundantly, being present

in nearly all agroecological zones of the country. Its adaptability to diverse environmental conditions, including tolerance to heat, temperature fluctuations, salinity, and variable pH levels, allows it to grow effectively on a wide range of land types. Owing to its exceptional nutritional, medicinal, therapeutic, industrial, and pharmacological value, purslane has the potential to be developed on a larger industrial scale to meet the nutritional and health needs of the growing global population.

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