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Pharmacognostical studies of *Portulaca olercea* Linn. Collected from polluted and unpolluted sites

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Abstract
Portulaca oleracea Linn. commonly known as Purselane belongs to family Portulacaceae. Samples of this plant were collected from polluted site and unpolluted site and were analyzed for dry weight, total ash, and acid and water soluble ash. In addition to this qualitative test for pharmacognostical parameters were conducted. Dry matter and total ash values were found to be high in the roadside samples growing as weed in nutrient poor soil. These plants were exposed to traffic exhaust on continuous basis. On the other hand these values were recorded to be comparatively less in plants cultivated in pots in unpolluted area of garden side. Qualitative test for pharmacognostical parameters tested positive for alkaloids, carbohydrates, protein, tannins, saponin, and flavonoids. The intensity of these tests was higher in the samples collected from polluted sites. Present piece of research work shows that *Portulaca oleracea* has potential to grow under poor conditions with relatively high concentration of essential secondary metabolites.

Keywords: *Portulaca oleracea* Linn. pharmacognostical parameters

Introduction
Portulaca oleracea Linn. is a small herb belonging to family Portulacaceae. It is widely distributed in different parts of India. It grows commonly in temperate, tropical and subtropical regions as weed along the waste land areas and also on road side. An annual prostrate herb with succulent stem and leaves, its cultivars are raised as ornamental plant in garden as well. Its sub-sessile, fleshy, obovate leaves have smooth margin, sub opposite or alternate phyllotaxy. Stem is prostrate and fleshy, green when young and reddish or purplish green at maturity. Root system is fibrous. Plant has bright yellow colour sessile flowers, terminal in position, surrounded by a cluster of four or five leaves. It produces a large number of minute, granular, black seeds.
Nutrional and medicinal pharmacognostic aspects of *Portulaca oleracea* have been studied and reviewed by various scientists [1, 2, 3]. In many parts of the world the vegetative parts are used as salad. It is slightly sour in taste and similar in taste to spinach. Levey (1993) [4] termed it as 'Power house of the future', while Kumamoto *et al.* (1990) [5] described it as a 'new crop'. In China, since ancient time the plant parts have been used for medicinal and nutritional purpose [6]. It was named as 'vegetable for long life'. According to World Health Organization, *Portulaca oleracea* is among the most exploited medicinal plant. It has been named as 'Global Panacea'. It has been used as folk medicine for the treatment of diarrhea, fever, sore gums, eye infection and urinary infection. It has hemostatic properties and is known for a wide range of pharmacological properties which have anti-inflammatory, antioxidant, antimicrobial, anti-inflammatory, anti ulcerogenic, anti-fertility, anti-nephrotoxic, anti-hyperglycemic, anti-hypertensive, wound healing, analgesic and bronchodilatory effect (Masoodi *et al*., 2011) [7]. It has a very high ascorbic acid content. Simopolous and Salem in 1986 [8] for the first time reported that purselane has the highest content of Omega-3 fatty acid in comparison to other vegetable crops. Later studies by Simopolous (1991) [9] stated that purselane consumption on regular basis may help to check the prevalence of heart diseases and cancer.
In this research work presented here, phytochemical screening of *Portulaca oleracea* has been conducted in two samples collected from polluted and unpolluted sites. A comparison of the phytochemical parameter on qualitative basis has been documented along with records of dry weight, ash contenet, acid and water soluble ash.

Material and Method
1. Samples of *Portulaca oreracea* were collected from following two sites:
Site I- Plants cultivated in pots for ornamentation purpose facing the garden side of Patkar College.

Site II- Roadside area facing air pollution from traffic exhaust of SwamiVivekanand Road, Goregaon (west), Mumbai.

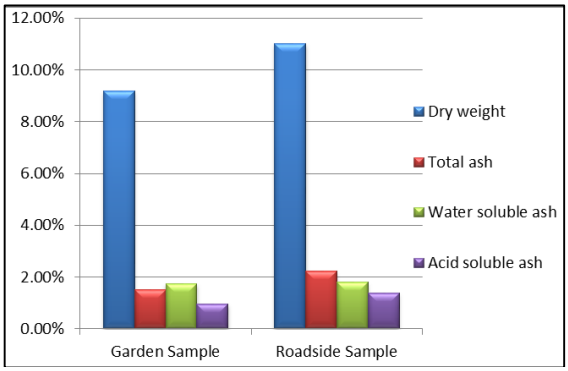
2. Preliminary investigation on pharmacognological values such as dry weight, ash content, and water and acid soluble ash was carried as per the method explained in the Indian Phamacopoeia (1996) [10].
3. In order to conduct the phytochemical screening, the qualitative tests for the presence of secondary compounds were conducted as per the procedures given by Kokate (1986) [11] and Harborne (1998) [12].

Results

Dry weight and total ash values were found to be high in the plant samples of *Portulaca oreracea* collected from Site II as compared to those collected from Site I (Table 1). Site II were roadside samples growing as weed in nutrient poor soil, exposed to air pollution generated by vehicle exhaust on continuous basis. On the other hand these values were recorded to be comparatively less in plants cultivated in pots in unpolluted area of garden side. Insignificant difference was recorded with respect to water soluble ash. However, the acid soluble ash was found to be higher in the samples collected from polluted area of Site II as shown in table 1 and histogram 1.

Table 1: Dry matter and total ash in the plant samples collected from Site I and Site II

S. No	Parameters	Site I % value in unpolluted /garden sample	Site II % value in polluted/ roadside sample
1.	Dry weight	9.2% on fresh wt basis	11.02 % on fresh wt basis
2.	Total Ash	1.5%	2.23%
3.	Water soluble Ash	1.75%	1.79%
4.	Acid soluble Ash	0.96%	1.38%



Histogram 1: Comparative analysis of dry matter, total ash, and water and acid soluble ash

Qualitative test for pharmacognostical parameters tested positive for alkaloids, carbohydrates, protein, tannins, saponin, phenolic componds, and flavonoids. The intensity of these tests was higher in the samples collected from polluted sites indicating that the secondary compounds must be present in higher concentration. Test for glycoside gave negative result indicating there absence in *Portulaca oleracea*.

Table 2: Test for pharmacognostical parameters

S. No	Parameters	Site I unpolluted / garden sample	Site II polluted/ roadside sample
1.	Alkaoid	+	+ +
2.	Proteins	+	+ +
3.	Carbohydrates	+	+ +
4.	Glycosides	-	-
5	Saponin	+	+ +
6.	Tannins	+	+
7.	Flavonoid	+	+ +
8.	Steroids	+	+ +
9.	Phenolic compounds	+	+ +

Discussion

Zhou *et al.* (2015) [13] in a review on Phytochemistry and Pharmacological of *Portulaca oreracea* compiled a quantitative data of carbohydrates, protein, vitamins (Folates, Niacin, Pantothenic, acid, Riboflavin, Thiamin, Vitamin A, Vitamin C), sodium, potassium, and various minerals (Iron, Magnesium, Manganese, Phosphorus, Zinc). Many other constituents have also been isolated from this plant, such as β-carotene, glutathione, melatonin, portulacerebroside A, catechol, and bergap [2].

A very high content of Vitamin C (29 mg/100 g); carotenoids (16 mg/100 g) has been seen in the young leaves of purselane (Anonymous, 2003) [14]. This might be the reason Levey (1993) [3] termed it as 'Power house of the future'.

In the present piece of research work, it is found that pharmacognostic parameters tested positive with high intensity in samples collected from polluted sites of roadside encountering not only air pollution from traffic emission but growing in nutrient poor soil as compared to the garden samples. It clearly shows that not only *Portulaca oleracea* is able to withstand harsh edaphic factors and air pollution, the phytochemical constituents are also relatively high under poor conditions of soil and climate. Masoodi et al. (2011) [7] stated that purselane might emerge as a potential crop of arid regions as it is adaptable to stress conditions of dry areas and salty soil. Present piece of research work also support the notion

that *Portulaca oleracea* has potential to grow under poor conditions with relatively high concentration of essential secondary metabolites.

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