



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2019; 8(4): 367-372

© 2019 TPI

www.thepharmajournal.com

Received: 01-02-2019

Accepted: 05-03-2019

Dr. Benazir Khanam

Assistant Professor, Department of Obstetrics and Gynaecology, Jamia Tibbiya Deoband, Uttar Pradesh, India

Prof. Wajeeda Begum

Hod, Professor, Department of Obstetrics and Gynaecology, National Institute of Unani Medicine Bengaluru, Karnataka, India

Dr. Fateh Ali Tipo

Assistant Professor, Department of Kulliyat Umoore Tabiyah (Basic Sciences), Jamia Tibbiya Deoband, Uttar Pradesh, India

Pharmacological profile, phytoconstituents, and traditional uses of *Khurfa* (*Portulaca oleracea* L.): Unani perspective

Dr. Benazir Khanam, Prof. Wajeeda Begum and Dr. Fateh Ali Tipo

Abstract

Traditional medicine has always maintained its popularity worldwide. In addition for more than a decade, there has been an increasing use of complementary and alternative medicine in many developed and developing countries. Unani medicine plays an important role in the treatment of various diseases. A lot of medicinal plants, traditionally used for thousands of years, *Khurfa* (*Portulaca oleracea*) is one of them and has its biological effect.

The term *Portulaca* originates from Latin word “Portare” meaning to carry and “lac” meaning milk, referring to the milky sap of this plant. The species name *oleracea* originates from Latin, meaning, “pertaining to kitchen gardens,” referring to its use as a vegetable. It is widespread as a weed in temperate and tropical regions of the world and has been ranked the eighth most common weed plant in the world. Purslane has wide acceptability as a pot herb in Central Europe, Asia, and the Mediterranean region. The plant *khurfa* consists of dried whole plant of *Portulaca oleracea* in Unani system of medicine and has several pharmacological activities like astringent, haemostatic, anti-hemorrhagic, analgesic, hepato-protective, antioxidant, anti-inflammatory, anticancer, bronchodilator, wound healing, neuro-protective, hypochlolesterolemic and numerous extra biological actions. The objective of this review is to search literature for the pharmacological properties, phytochemical investigation, pharmacognostic studies and uses of *khurfa* (*Portulaca oleracea* L) in Unani system of medicine.

Keywords: *khurfa*, *Portulaca oleracea*, pharmacological, phytochemical, unani medicine

Introduction

In the Linneian binomial, *Portulaca* derives from the Latin word, *portula* = little door, perhaps from the type of dehiscence of the fruit while *olera*=vegetable, indicates the diffuse use as food of this species in the Classical World [1]. Purslane is listed in the World Health Organization as one of the most used medicinal plants and it has been given the term ‘Global Panacea’ [2]. In arabic it is called as *Baqalatul humqa* because it is found in the public place [3]. It is currently considered very interesting plant from a food point of view, and is included in the list of “World Economic Plants”. The genus is represented by the three species namely *Portulaca quadrifida*, *P. oleracea* and *P. pilosa*. The plant has significant religious importance ascribed to it due to its uses in “Gitiya” festival of eastern India [4]. Aboriginal Americans are believed to have used purslane as a potherb as well as for medicinal purposes [5]. It deserves special attention from agriculturalists as well as nutritionists [6].

Botanical name- *Portulaca oleracea* [6, 7]

Unani name: *Khurfa*

Local name: *Kulfa* [8]

Taxonomical Classification: [9, 10]

Kingdom: Plantae

Subkingdom: Tracheobionta

Class: Magnoliopsida

Subclass: Caryophyllidae

Order: Caryophyllales

Family: Portulacaceae

Genus: *Portulacae* L.

Correspondence

Dr. Fateh Ali Tipo

Assistant Professor, Department of Kulliyat Umoore Tabiyah (Basic Sciences), Jamia Tibbiya Deoband, Uttar Pradesh, India

Species: oleracea

Vernaculars: ^[11, 12]

Urdu: Khurfa, Sanskrat: Birhalloni, Lonica, Lonamla, Arabic: Bagalat-ul-humqa, Persian: Khurfa, English: Garden Purslane, Common Indian Purslane, Hindi: Khursa, Kulfa, Longa, Bengali: Barloniya, Badanjuni, Barnunia, Gujrati: Liu, Loni, Moti luni, Kannada: Dudagroi, Goni, Soppu, Lonica, Tami: Pasalai, Pukkirai, Kozhuppa, Malyaam: Koricchira, Kozhuppa, Marathi: Khufa, Punjabi: Lonak, Lonica, Manipuri: Leibak kundo, Chinese: Machin Hsien.

Mahiyat (Physical properties): It is a famous herb, of two varieties small and large, larger one is cultivated, and has round, thick, mucilaginous seeds. Stems are green, reddish contained moisture. Flowers are white and seeds are blackish. Second variety is wild type, its stems leaves etc. are smaller than larger variety, which is known as Lonia.^[8] It is of two types, one has large leaves and thick stem delicate and second one has small leaves and seeds and lying down on earth.^[13] The drug khurfa consists of dried whole plant of *Portulaca oleracea* an annual succulent, prostrate herb, 50 cm long, found throughout the country, ascending up to an altitude of 1500 m in the Himalayan region.

Roots: cylindrical, small, oblique, surface smooth, brownish-grey; secondary roots less in number, root hairs abundant in upper region, fracture short.

Stem: Almost cylindrical, swollen, at the nodes, ribbed, branched, 0.1 to 0.2 in diameter, fracture, short odour characteristics.

Leaf: Simple, sub-sessile, cuneiform, rounded and truncate at the apex; 0.3 to 2.5 cm long and 0.1 to 0.6 cm wide oblong, spatulate, smooth, greenish –brown.

Flower: A few, bright, yellow, at terminal heads sometimes in axillary clusture of 2-6, subtended by an involucre of 3-4 leaves; sepal 0.3 cm long, very delicate and soon falling off; stamens 8-12 style 5-6 fid, 0.35-0.4 cm long.

Fruit: An ovoid capsule, 0.3 cm long, dehiscent above the base.

Seed: Numerous reniform, black, minute 0.06- 0.07 cm across, dark brown. ^[14]

Part used: Whole plant except root, ^[8, 12, 13, 15]

Mizaj (Temperament): Moist in II, and cold in III ^[3, 8, 13, 16, 17, 18, 19]

Muzir (toxic): for eyes, spleen

Musleh (Antidote)

Leaves: mastagi, podina, ^[16, 17, 18] karafs
Seeds: qande safed (Sugar)

Miqdare khorak (Dose): 3-7 grms, ^[14]

Af'al (Actions): Mubarrid (cooling), Musakkin (sedative), Mudirr-i-bawl (diuretic), ^[14, 20] Dafi-i-atish (Quenching thirst), Dafi-i-ziabetus (antidiabetic), Munaffith (Vesicant), Dafi-i-qay (antiemetic), Daf-i-kharish (Anti-allergic), Habis-i-hayd

(haemostatic), Dafi-i-ishal (anti-purgative) Mufattit-i-hisat (lithotriptic) ^[13], Qabid (astringent) Dafi-i-warm (anti-inflammatory) ^[12], Muqawwi-i-bah (aphrodisiac) ^[16] Dafi-i-humma (Antipyretic) Dafi-i-Taffun (disinfectant), Dafi-i-Tashannuj (Antispasmodic), Qatil-e-Kirme shikam (Antihelminthic) ^[12], Dafi-i-ta'ffun (Antibacterial) ^[12, 21], Antifertility^[12],

Iste'malat (Unani Therapeutic uses):

1. Ibn sina told it has quwwat qabida so it is useful in chronic abnormal uterine bleeding.
2. Khurfa removes mole when its milk is rubbed.
3. Garm dard sar and sozish meda is relieved when drink or applied locally.
4. It is also beneficial for ashu-i-chashm and nafasuddam because of its astringent property.
5. It makes blood thick.
6. It is also useful for sourness of teeth because it provides smoothness.^[3, 16]
7. It is used in zu-santaria (in which blood mix with stool)
8. Also used in the disease of women in which blood comes abnormally.
9. All type of inflammation is cured by khurfa.
10. It is also beneficial in intestinal ulcer.
11. Jiryān khoon- its extract is used.
12. Gurda wa masane ki sozish relieved by its intake
13. Ulcers are washed when khurfa mixed with sharab.
14. Qay- it prevent it.^[16]
15. Roasted seeds administered orally leads to constipation; whereas unroasted seeds are have laxative action.
16. Seeds mixed with honey act as an aphrodisiac.
17. Seeds of purslane with of of khas leaves's sheera are helpful in enhancing the sleep.
18. Local application a is useful in all sort of skin diseases like burn wounds, scalds and boil.^[16,18]
19. Khurfa mixed with vinegar is beneficial for renal colic.
20. It has a characteristic to remove safra ^[18].

Habitat: *Portulacca* is found in all over India and up to 5,000 ft in the Himalaya and all temperate countries ^[11]. It is the eighth most common weed throughout the world growing in temperate, subtropical and tropical regions of high altitude 2.6 km above sea level. It is reported to found from 45° north to 40° south latitude. It is easily grown in warm moist places during summer and spring season, rapidly producing flowers, fruits and seeds after forty days of germination ^[22].

Ethanobotanical description: An annual, succulent, hairy, prostrate herb; thick tap root with marry fibrous secondary roots; prostrate growth habit, forming a mat up to 60 cm in diameter; stem glabrous, succulent, often reddish, primary and secondary branches can grow as long as or longer than the main stem, flowers sessile, axillary and in terminal clusters, opening only on sunny mornings, fleshy sepals about 4 mm long, 4-6 pale yellow petals slightly shorter than the sepals ^[5]. Stems are cylindrical, up to 30 cm long, 2-3mm in diameter, green or red, swollen, smooth, glabrous apart from the leaf axils, and diffusely branched, and the internode 1.5–3.5 cm in length. Flower initiates during May to September. They originate as solitary or bunch of two to five at the tips of stems. Abundant seeds are produced. ^[6]

Phytoconstituents- Nordrenaline, Dopamine ^[15], Omega-3 fatty acids ^[23], Gamma lenolenic acid ^[24], Olerecins, Ferulic

acid, Tocopherol ^[21], Carbohydrates, Protein Fat, Cholesterol, Folates, Niacin, Pantothenic acid, pyridoxine Riboflavin, Thiamin, Vitamin A, Vitamin C, Electrolytes, Sodium, Potassium, Minerals, Calcium, Copper, Iron, Magnesium, Manganese, Phosphorus, Selenium, Zinc,^[6] tannins, phosphates, urea, Saponins, Sitosterols, leavartenol, mono, di and triterpenes, free phenolic, reported from *P. oleracea* ^[22], Oleraceins, betacyanins, free oxalic acids, alkaloids, coumarins, flavonoids, cardiac glycosides, and anthraquinone glycosides ^[2, 6, 25, 26].

Actions: Refrigerant, alterative, antibacterial, antifungal, anti-uterine stimulant, diuretic, emollient ^[25, 26, 27, 28, 29]. Antitumour ^[8], antipyretic, disinfectant, antispasmodic, anthelmintic, wound-healing, analgesic, anti-inflammatory, ^[2, 30, 31] neuroprotective, hepatoprotective, antidiabetic, antioxidant, antifatigue, and anticancer ^[26] vermifuge, anti-scorbutic, skeletal muscle relaxant, bronchodilator, anti-asthma, and antitussive ^[2].

Traditional uses

1. Khurfa used in abnormal uterine bleeding as it has anti-proliferative activity on HeLa cells
2. It is used as antipyretic, antiplogistic.
3. The Chinese, Italians, French, and English consume this plant in salads.
4. It is also a good source for GLA (gamma linolinic acid).
5. It can be used in cosmetic ^[24].
6. Leaf Juice is used externally against minor injuries ^[7].
7. Also used as an article of diet in scurvy, liver complaints, dysurea, pulmonary diseases, and as a tonic.
8. It has been claimed that this plant is useful against snakebites, has sudorific activity and cures diseases of the bladder, kidneys, spleen, lungs, and blood system.
9. It is also used for dry cough, shortness of breath, immoderate thirst, and dysentery.
10. It has been used as vulnerary herb against sore nipples and mouth ulcers.
11. A poultice made from the leaves is applied to draw the pus out of infected sores and useful for burns and skin diseases.
12. The juice of the stem is reported to be an effective dressing for soothing prickly heat.
13. Unroasted seeds are taken as a sedative, demulcent, diuretic, to quench the thirst, and to provoke menses.
14. The plant has been described as good for the teeth, sooths ulcers of the stomach, reduces inflammation, and is used as a vermifuge.
15. The whole plant is regarded as being an aphrodisiac.
16. An aqueous extract, applied topically on the skin, proved to be very effective in relieving muscular spasms.^[27]
17. It is used in anemia, antidote, astringent, bactericide, bite (bug, snake), boil, burn, dermatitis, eczema, edema, emollient, fungicide, genital herpes, inflammation, pruritis, scald, sedative, swelling, wounds ^[29].
18. Leaf juice is used to treat earache ^[32].
19. Prevents heart attacks and intensify the immune system.
20. The fresh juice is used in the treatment of strangury, coughs, sores etc.
21. Poultice of leaves is used in burns.
22. Both the plant juice and the leaves are principally valuable in the treatment of insect stings and skin diseases.
23. A tea made from the leaves is effective in the

management of stomach aches and headaches.

24. Juice obtained from leaves is applied to earaches, to alleviate caterpillar stings.
25. Externally, leaves are helpful to treat the erysipelas, burns and applied tropically on swellings ^[2].
26. Its leaves are effective for diarrhea, postpartum bleeding, and intestinal bleeding ^[26].
27. The Tops and leaves are employed as anti-hemorrhagic poultices.
28. The roasted seeds are considered as anti-dysenteric.
29. Seeds application useful for burns and scalds ^[100].
30. The plant is used as anti- rheumatic and anti- fungal.^[94]
31. purslane is also used in the ailments of kidney and urinary bladder.^[33]
32. Used in scurvy and disease of liver, spleen, also employed in cardiovascular disease, dyuria, haematuria, dysentery, sore nipples and ulceration of mouth ^[34].
33. Whole plant used in piles, wound, abdominal disorders, bronchial asthma, and eye disease ^[35].

Pharmacological studies

It has been reported that *Portulaca oleracea* possess, analgesic hepato-protective, antioxidant, anti-inflammatory, anticancer, bronchodilator, wound healing, neuro-protective, hypochloresterolemic and numerous extra biological actions. Further pharmacological studies concerning these activities have been undertaken by various workers which are specified below-

Uterine bleeding control: The seeds are useful in controlling AUB. No side effects were reported and recurrence in treated patients was not found up to three months follow up. ^[22]

Anti- hemorrhagic effect: In Iranian folk medicine *Portulaca oleracea* L. commonly named purslane is used to treat abnormal uterine bleeding.

Anti-arthritic effect: Jagan *et al.* had reported the anti-arthritic activity of petroleum-ether extract of *Portulaca oleracea* Linn by Freund's adjuvant arthritis model in male wistar rats. This study reveals anti-arthritic activity of aqueous extract of *Portulaca oleracea* ^[9].

Neuropharmacological effect: Ethanolic extract of *P. oleracea* var. *sativa*, on intraperitoneal administration, showed a significant reduction in the locomotor activity in mice, antinociceptive activity in rats using tail flick method. The anti-nociceptive activity of the extract in rats was attenuated by naloxone pre-treatment indicating the involvement of opioid receptors. It indicates that *P. oleracea* var. *sativa* have effect on both the central and peripheral nervous system ^[31].

Anti-inflammatory and analgesic effect: Ethanolic extract of the aerial parts (dried leaves and stem) of purslane showed significant anti-inflammatory and analgesic activities after intraperitoneal and topical but not oral administration when compared with the synthetic medicine, diclofenac sodium as the active control.

Antimicrobial effect: Aqueous and ether extracts of purslane showed property against gram-negative bacteria. The antifungal activity of *P. oleracea* extracts against hyphal growth of various fungi was evaluated. The antifungal activity

of every fraction of *P. oleracea* was evaluated based on the dynamic hyphal growth response curves of test fungi *Aspergillus* and *Trichophyton* and the yeast *Candida*.^[36] Ramesh & Hamumantapa had reported the phytochemical and anti-microbial activity. The results of study supported the folklore usage of the studied plant and suggest that, this plant extract posses compounds which is having antimicrobial agent in the form of drugs for the therapy of infectious diseases caused by pathogens^[11, 28, 31].

Antitussive effect: Study by Boroushaki *et al.* showed the antitussive effect of aerosols of two different concentrations (2.5% and 5%) of boiled extract of *P. oleracea* plant in citric acid aerosol induced coughs in guinea pigs and compare it with codeine (0.03 g/ml) and saline. Both concentrations of boiled extract and codeine caused significant reduction in number of citric acid induced coughs compared to saline ($p < 0.001$)^[11].

Wound healing activity: Wound healing activity of purslane was studied by *Mus musculus* JVI-1. Wound tightening and tensile strength measurements were used to consider the effect of the plant. The outcome obtained indicate that *P. oleracea* enhance the wound healing process by diminishing the surface area of the wound and increasing the tensile strength^[11, 36].

Antihypertensive activity: It was concluded that the K^+ ion content of *P. oleracea* is at least partly responsible for the relaxant effect shown on the isolated rat diaphragm. An aqueous extract of *P. oleracea* leaves and stems produced a dose related relaxation of guinea pig fundus, taenia coli and rabbit jejunum and a dose dependent contraction of the rabbit aorta.

Anti-fertility activity: Alcoholic extract of *P. oleracea* seeds after S.C. (subcutaneous) administrations of 15, 20 and 30 doses (1 dose=50 mg/mouse per alternate day) were observed on the reproductive organs of male albino mice. It produced mass atrophy of spermatogenic elements. The administration (S.C.) of alcoholic extract of *P. oleracea* seed induced an effective impairment of spermatogenesis^[36].

Anti-implantation and abortifacient properties: In a study Albino rats were orally given crude extracts of aerial part of Purslane at the dose of 500 mg and 250 mg / kg of body weight / day, for 7 days, and effect on anti-implantation and abortifacient activity was investigated. The treatment of petroleum ether crude extract has shown 20% and 30% diminution in implantation activity at low (250) and (500) high doses respectively.

Antioxidant activity: Sanja *et al.* evaluated the in-vitro antioxidant activity of the methanolic extract of *Portulaca oleracea*. The methanolic extract shows significant in vitro antioxidant activity in a higher dose than standard antioxidant^[11].

Antioxidant activity of Phenolic compounds isolated from *P. oleracea* crude extract and fractions exhibited significant antioxidant activity investigated by lipid peroxidation inhibiting capacity using TBARS (Thio barbituric acid reactive substances) assay technique^[22].

Gastric antiulcerogenic activity: Aqueous and ethanolic

extracts of *P. oleracea* were studied in mice for their capability to prevent gastric lesions induced by HCl or absolute ethanol. In addition, effect on gastric acid secretion was also measured. Both extracts showed a dose-dependent reduction in severity of ulcers. These results suggested that *P. oleracea* has gastroprotective action and validates its use in folk medicine for gastrointestinal diseases.^[36]

Antibacterial activity: A significant broad spectrum antibacterial activity was reported against some selected organisms like *Escherichia coli*, *Pseudomonas aeruginosa*, *Neisseria gonorrhoea* (Gram-ve), *Staphylococcus aureus*, *Bacillus* like *Escherichia coli*, *Pseudomonas aeruginosa*, *Neisseria gonorrhoea* (Gram-ve), *Staphylococcus aureus*, *Bacillus subtilis*, and *Streptococcus faecalis* (Gram+ve) by researchers.

Bronchodilator activity: Study conducted by Boskabady *et al.* reported that boiled aqueous extract of *P. oleracea* showed a relatively powerful relaxant (bronchodilatory) effect^[11].

Intestinal parasitological activity: In one study cognitive measure of salience in free-listing tasks, which reveals five plants commonly used to treat intestinal worms. In which *Portulaca* was also included and shows effective treatments for controlling intestinal parasite loads.

In urinary problems: The study was based on ethnobotanical interviews carried out in Trinidad and Tobago with thirty male and female respondents. *P. oleracea* was one of the plants having adequate data to support their traditional use for urinary problems.

Anti-phenolic endocrine disruptors: *Portulaca oleracea* has the capability to efficiently eliminate bisphenol A (BPA) from water which is known as an endocrine disrupting compound (EDC) having estrogenic properties, thus suggesting that *PO* is a promising material for practical phytoremediation of landfill leachates and industrial waste water contaminated with the tested EDCs.

Hypoxia tolerance activity: The results showed that the PO extracts enhanced the EPO mRNA and protein expression in the mouse cortices. Histological analysis indicated that the extracts reduce the inflammatory damage of the mouse brain. MTT assay outcomes showed the purslane extract raised the viability of the cells below the tested hypoxic conditions and decreased the degree of LDH in the culture medium in a dose-dependent manner demonstrating that the PO extract had shielding effects on hypoxic nerve tissue^[36].

TNF- α and IL-6 inhibitory activity: The effects of drug-carried serum of the different parts of *Portulaca oleracea* on cytokine TNF- α and IL-6 secreted by adipose cell in vitro method was explored. It shows improvement in the disorder of lipid in different degree by lowering the levels of TNF- α and IL-6 that adipose cell secreted in vitro.

Anti-nephrotoxic activity: Aqueous and ethanolic extracts of *P. oleracea* were investigated on cisplatin-induced renal toxicity and changes in renal function. The protective effect of aqueous and ethanolic extracts before cisplatin injection was comparatively same and these effects were dose dependent.^[22]

Hypocholesterolemic effects: Ahmed and his coworkers carried out investigation of hydroalcoholic extract of *P. oleracea* leaves on serum lipids of rabbits, fed with hypercholesterolemic diet. It was found out that serum total cholesterol and atherogenic index decreased in all groups treated with *P. oleracea* extract with respect to positive control group thus indicating that plant may be useful for treatment of hypercholesterolemia.^[22, 36]

Skeletal muscle relaxant property: The skeletal muscle relaxant properties of an aqueous extract of *Portulaca oleracea* were examined. Interpretation indicated that the aqueous extract possesses exclusive skeletal muscle relaxant properties which do not show to involve interference with cholinergic mechanism and that the mechanism of action of the extract may involve interference with Ca²⁺ mobilization in skeletal muscle.^[36]

Use in cosmetics: Traditionally its fresh juice and decoction is used topically in cosmetics preparations due to its antimicrobial, anti-inflammatory and wound healing activity.

Insecticidal and wormicidal activity: The seeds and leaves of *P. oleracea* were reported for highly significant wormicidal and insecticidal activity^[22]

Hepatoprotective activity: Treatment for CCl₄ hepatic damaged rats with 70% alcohol extract of *P. oleracea* significantly restored the hepatic marker enzymes and total bilirubin to its near standard values representing hepatoprotective activity.

Anti-hyperglycemic activity: The oral administration of the homogenates of *P. oleracea* reduced the blood sugar level of alloxan-diabetic rabbits to normal.

Antidiabetic activity: It was demonstrated that treatment with PO seeds could improve the impaired glucose tolerance, lipid metabolic disorders, and liver functions attenuate hyperinsulinemia, elevate insulin sensitivity and reduce both body weight and BMI of type -2 diabetic subjects^[37].

Anticonvulsant activity: The aqueous extract of *P. oleracea* leaves was trailed for anti convulsant activity in healthy albino mice. Extract significantly reduced the duration of tonic hind limb extension in maximal electroshock. It also delays the beginning and decrease the period of clonic convulsion induced by pentylene tetrazole in a dose dependent manner^[6].

Antitumor activity: The anti-tumor effects in vivo of unique polysaccharide component (POP) from *Portulaca oleracea* was analyzed and it was found that POP could significantly inhibit the growth of transplantable sarcoma 180 and potentiate the animal's immune responses including an increase in the number of white blood cell (WBC) and CD4 (+) T lymphocytes, as well as the ratio of CD4 (+)/CD8 (+). It is suggested that the anti-tumor effect elicited by POP could be associated with its immune stimulating properties^[26].

Cardiac problems: The omega-3 fatty acids prevent heart attacks. Another substance levartenol increase blood pressure and decrease heart rate, and strengthens immune system.

Conclusion

The above detailed description of portulaca plant is mentioned in classical Unani literature hundreds of years ago. It has various pharmacological activities. Its medicinal uses are scientifically proven today in the light of scientific evidences so it can be concluded that khurfa can provide a safe and best alternative to modern allopathic drugs in nearby future. Further human studies are needed to use in daily clinical practice.

References

1. Bosi G, Guarrera PM, Rinaldi R, Mazzanti MB: Ethnobotany of purslane (*Portulaca oleracea* L.) in Italy and morphobiometric analyses of seeds from archaeological sites in the Emilia Romagna Region (Northern Italy). *Plants and Culture: seeds of the cultural heritage of Europe*. 2009, 129-39.
2. Okfor IA, Ezejindu DN. Phytochemical studies on *Portulaca oleracea* (Purslane) Plant. *Global Journal of biology, agriculture and Health Sciences* 2014; 3(1):132-6.
3. Kabeeruddin HM, Ilmul Advia Nafeesi. Aijaz publication New Delhi, 2007, 93.
4. Kumari J, Singh CTN. *Portulaca oleracea* L. sp. Pl a small herb of religious and medicinal significance. *Journal of Medicinal Plants Studies*. 2016; 4(4):196-7.
5. Miyanishi K, Cavers SPB. The Biology of Canadian weeds. *Portulaca oleracea* L. *Canadian Journal of Plant Science*, 1980, 953-63.
6. Kamaluddin M, Juraimi AS, Hossain MD, Nahar MA, Ali ME, Purslane Weed (*Portulaca oleracea*): A Prospective Plant Source of Nutrition, Omega-3 Fatty Acid, and Antioxidant Attributes. *The Scientific World Journal*, 2014, 1-6.
7. *Medicinal Plants in folklores of Northern India*. Vol II: CCRUM, Ministry of H&FW, 1995, 397.
8. Kabeeruddin GM, Makhzanul Mufradat bamani Kitabul Advia. *Idara Kitabus Shifa*, New Delhi; 2007; 82:207-268.
9. Azuka OI, Mary BA, Abu. OLM. A review on *Portulaca oleracea* (Purslane) plant—Its nature and biomedical benefits. *International Journal of Biomedical Research*. 2014; 5(2):75-80.
10. Al-Sheddi ES, Farshori NN, Al Oqail MM, Musarrat J, Al-Khedhairi AA, Siddiqui M A. *Portulaca oleracea* Seed Oil Exerts Cytotoxic Effects on Human Liver Cancer (HepG2) and Human Lung Cancer (A-549) Cell Lines. *Asian Pacific Journal of Cancer Prevention*. 2015; 16(8):3383-87.
11. Sultana A. Rahman K. *Portulaca oleracea*: A global panacea with ethanomedical and pharmacological properties. *International Journal of Pharmacy and Pharmaceutical Sciences*. 2013; 5(2):33-9.
12. Prajapati NS, Kumar U. *Agro'S Dictionary of Medicinal Plants*. Agrobios (India), 2005, 270.
13. Hakeem MAH. *Bustanul Mufradat*.: Idarae Kitab-ul-Shifa, New Delhi, 2002, 92, 269, 345, 509.
14. *The Unani Pharmacopoeia of India*. Department of Ayurveda, Yoga, & Naturopathy, Unani, Siddha and Homeopathy (AYUSH), Government of India Ministry of Health and Family Welfare Vol. IV. Part I. New Delhi; 2007, 80-83.
15. Chatterjee A, Pakrashi SC. *The Treatise on Indian Medicinal Plants*. National Institute of Science

- Communication and Information, New Delhi, 2005; 1:99-101.
16. Ibn Baitar, Al Jamiul Mufradatul Advia wa Aghzia. CCRUM, New Delhi, 1999; 1:257-9.
 17. Inta D. Tazkira Uloom Albalab wal Jame-e-Lil Ajayab. CCRUM, New Dlehi, Vol I, 2008: 148-9.
 18. Ghani H N. Khaza Inul Advia. Idarra Kitab-UI-Shifa, New Delhi; YNM: 667-68.
 19. Khan H M. Muheete Azam. CCRUM, New Delhi, 2012: 449-50.
 20. Medicinal Plants in folklores of Northern India. CCRUM Ministry of H&FW. 1995; 2:397.
 21. Syed S, Fatima N, Kabeer G. *Portulaca L*: A Mini Review on Phytochemistry and Pharmacology. International journal of Biology and Biotechnology 2016; (4): 637-41.
 22. Mohamed AI, Hussein AS. Chemical composition of purslane (*Portulaca oleracea*). Plant foods for human nutrition 1994: 1-2.
 23. Amelio FSD. Botanicals A Phytocosmetic Desk Reference. Washington DC: CRC Press; 1999: 245
 24. Kumar CKA, Revathi K, Mohanalakshmi S. A review on Edible Herbs as Haematinics. International. Journal of Pharmacy 2012; 2(2): 48-49.
 25. Rafieian-Kopaei M, Alesaeidi S. *Portulaca oleracea*: A Review Study with Anti-Inflammatory and Muscle Relaxant perspective. Indian Journal of Medical Research and Pharmaceutical Sciences 2016; 3(11):51-5.
 26. Rashed AN, Affi FU, Disi AM. Simple evaluation of the wound healing activity of a crude extract of *Portulaca oleracea L.* (growing in Jordan) in *Mus musculus*. Journal of Ethnopharmacology, 2003, 131-6.
 27. Chowdhary CV, Meruva A, Naresh K, Ranjith Kumar A. A Review on Phytochemical and Pharmacological Profile of *Portulaca oleracea Linn.* (Purslane). IJRAP 2013; 4(1):34-7.
 28. Sudha K, Mathanghi SK. Traditional underutilized green leafy vegetables and its curative Properties. International Journal of Pharmacy. 2012; 2(4):786-93.
 29. Jaradat NA, Zaid AN, Al-Rehani R, Alqub MA, Hussein F, Hamdan Z, *et al.* Ethanopharmacological survey of medicinal plants practiced by traditional healers and herbalists for treatment of some urological diseases in the West Bank/Palestine. Complementary and Alternative Medicine 2017; 17:225.
 30. RAD. MA, Sajidi S, Domina G. First data on the taxonomic diversity of the *Portulaca oleracea* aggregate (Portulacaceae) in Iran. Turkish Journal of Botany 2017: 1-7.
 31. Rajasab AH, Isaq M: Documentation of folk knowledge on edible wild plants of North Karnataka. Indian Journal of Traditional Knowledge. 2004; 3(4): 422-9.
 32. Saxena N B, Saxena S. Plant taxonomy. Merut: Pragati. Prakashan, Ed 5th, 2006, 242.
 33. Ambasta SSP. The useful plants of India. National institute of science communications, New Delhi, 1986, 486.
 34. Shiddalmallayya N, Yasmeen Gopalkumar K, Hundred common forest medicinal plants of Karnataka in primary healthcare. Indian journals of traditional knowledge. 2010; 9(1):93.
 35. Masoodi MH, Ahmad B, Mir SK, Zargar BA, Tabasum, *Portulaca oleracea L.* A Review. Journal of Pharmacy Research. 2011; 4(9):3044-48.
 36. Gong F, Li F, Zhang L, Li J, Zhang Z, Wang G. Hypoglycemic effects of crude polysaccharide from Purslane. International journal of Molar sciences, 2009, 886.