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Ramesh Pratap Chaudhary
Nova College of Pharmacy, Lucknow, Uttar Pradesh, India

Avinash Chandra
Nova College of Pharmacy, Lucknow, Uttar Pradesh, India

Punit Kumar Pandey
Nova College of Pharmacy, Lucknow, Uttar Pradesh, Lucknow, India

Dr. Zeeshan Ahmad Siddiqui
Nova College of Pharmacy, Lucknow, Uttar Pradesh, India

Corresponding Author:
Ramesh Pratap Chaudhary
Nova College of Pharmacy, Lucknow, Uttar Pradesh, India

Pharmacognostical and phytochemical studies on *Portulaca grandiflora*

Ramesh Pratap Chaudhary, Avinash Chandra, Punit Kumar Pandey and Dr. Zeeshan Ahmad Siddiqui

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Abstract
Portulaca grandiflora ariel plants is a perennial plant & grows on tropical or subtropical area and belongs to family of Portulacaceae. *Portulaca grandiflora* contain biologically active compounds and has various pharmacological actions.
Materials & Methods: Pharmacognostical and phytochemical studies involves study of macroscopic, microscopic, phytochemical screening & TLC of *Portulaca grandiflora.*
Result: All Pharmacognostical parameters of Kiss-me-quick were carried out. The morphological evaluations were done to ascertain the standard reference values for standardization of the plant materials whereas the microscopy, the section study of the leaves of Kiss-me-quick shows the presence of trichomes, xylem, fibers, crystal, phylum, and anisocytic type of stomata is present.

Keywords: *Portulaca grandiflora*, Pharmacognostical & phytochemical screening

Introduction
The term "herb" refers to a plant or plant component used medicinally to promote healing during illness and disease. In herbal medicine, this practice is also known as botanical medicine or phytotherapy in Europe [1]. A wide range of plant parts, such as leaves, stems, roots, seeds, fruits, flowers, or bark, are used as herbs because of their medicinal qualities [2]. These herbs can be used fresh, dried, powdered, made into tinctures, ointments, or oil extracts, and they can also be ingested in liquid form by decoction or infusion [3]. The number of plant species on Earth today is thought to be around 500,000, while the precise number varies depending on whether subspecies are taken into account. Approximately 5,000 of these plants have had their therapeutic qualities thoroughly examined by scientists [4].
Presently, there are 121 prescription drugs derived from just 90 plant species in use[5]. Notably, 80% of the global population continues to depend on plant-based medicine for healthcare needs [6].
The standardization of herbal medicines involves establishing a set of criteria or inherent attributes, consistent parameters, and precise qualitative and quantitative values that guarantee quality, effectiveness, safety, and consistency [6, 7]. It entails the development and consensus on technical specifications. These specifications are determined through experimentation and observation, aiming to define the specific characteristics exhibited by the particular herbal medicine [8, 9]. The standardization is a tool in the quality control process. According to WHO standardization and quality control of herbal plants is the process involved in the physicochemical evaluation of crude drug covering aspects, such as selection and handling of crude material, safety, efficacy and stability assessment of finished product, documentation of safety and risk based on experience, provision of product information to consumer and product promotion[10,11]. It is normally paid to such quality indices such as- Macro and microscopic examination, foreign organic matter, ash values, moisture content, extractive values, qualitative chemical evaluation, chromatographic examination etc.

Plant profile: *Portulaca grandiflora* refers to approximately 75 to 150 different species of annual or perennial plants that grow in tropical and semitropical areas around the world[13]. They vary widely in appearance depending upon the species. Some types of *Portulaca* plants are considered weeds, while others are cultivated as ornamentals or as edible greens [14, 15].

Fig 1: Whole plant of *Portulaca grandiflora*

Materials and Methods

Collection of plant material: The ariel part of *Portulaca grandiflora* was collected from the surrounding of Lucknow District, Uttar Pradesh The plants (*Portulaca grandiflora*) ariel part were identified and authenticated by Dr. R.S. Saxena, Reader & Head Botany Department, Meerut College, Meerut (U.P.) 250001 and submitted to the departmental library for the further reference (Ref. MCM/MTC/06/462 dated. 10.9.2015)

Preparations of plant extracts: The ariel plants were washed twice with distilled water to remove the contaminants and air dried in shade. The plants were cut into small pieces and coarsely powered. The coarse powder was passed through sieve No. 40 and extracted with petroleum ether (35-45 °C) and then extracted with ethanol (95%) by using Soxhlet apparatus for 8 hrs, after that water bath dried extracts were stored in dessicator till further use.

Pharmacognostical studies

Macroscopical Characters: The macroscopic characters examined by using the different physical properties like colour, odor, taste size, texture etc. [16].

Powder microscopy of leaf: The powder of the plant material was cleared with the chloral hydrate and stained with respective agents such as phloroglucinol and hydrochloric acid (1:1), iodine solution, sudan red III, ruthenium red and the plant sample was mounted free from bubbles on slide to determine the type of cells, and cell contents [17].

Determination of total ash: Weigh 2 grams of the ground, air-dried material and transfer it into a crucible that has been previously ignited and tared. Spread the material evenly within the crucible and gradually heat it to 500-600 ºC until it turns white, signifying the absence of carbon. Allow the crucible to cool in a desiccator for 30 minutes, then promptly weigh it. Calculate the total ash content in milligrams per gram of the air-dried material [18].

Acid insoluble ash

To the crucible containing the total ash, 25 ml of HCl was added and covered with a watch glass and boiled gently for 5 min. Watch glass was rinsed with 5 ml of hot water and liquid was added to the crucible. The insoluble matter was collected on ash less filter paper and washed with hot water until the filtrate was neutral. After that the filter paper containing the insoluble matter was transferred to the original crucible, dried on hot plate and ignited to constant weight. The residue was allowed to cool in a desiccator for 30 min. and weighed without delay. The content of acid insoluble ash was calculated in mg/g of air dried material [18].

Water soluble ash

To the crucible containing total ash, 25 ml of water was added and boiled for 5 min. The insoluble matter was collected in the ashless filter paper and washed with hot water. After that the filter paper containing insoluble matter was transferred to crucible. The crucible was ignited for 15 min. at a temperature not exceeding 450 °C. The weight of residue was subtracted in mg from the weight of total ash and content of water-soluble ash was calculated in mg/g of air-dried material [18].

Determination of Foreign organic matter

Spread the sample out in a thin layer, and separate the foreign organic matter by hand as completely as possible. Weigh it, and determine the percentage of foreign organic matter in the weight of drug taken [18].

Loss on drying

Take 4 g powder sample was weight in a previously dried and tared weighing bottle. The sample was dried in an oven at 100-105 °C. The loss of weight was calculated in mg/g of air dried material [18].

Determination of swelling index

The plant material was reduced to fineness passing from sieve No. 22 and was accurately weighed 4 g into a 100 ml glass stoppered measuring cylinder. Water (100 ml) was added and shaken thoroughly after every 10 min. for 1 hr. Then the mixture was allowed to stand for 3 hrs. at room temperature. The volume was measured in ml occupied by the plant materials. The mean value of individual readings was determined and calculated related to 4 g of plant material [18].

Foaming index

1 g of coarsely powdered drug was weighed accurately and transferred to a 500 ml conical flask containing 100 ml of boiling water. It was maintained at moderate temperature for 30 min. The boiling water was cooled and filtered into a 100 ml volumetric flask and added sufficient water. The decoction was poured into 10 stoppered test- tubes in successive portions of 1 ml, 2 ml, 3 ml, etc. up to 10 ml. The tubes were stoppered and shaked in lengthwise motion for 15 sec, two shakes per second. Allowed to stand for 15 min. and the height of foam were measured.

As the height of the foam in every tube is less than 1 cm, the foaming index will be 100. If a height of foam of 1 cm is measured in any test tube, the volume of plant material decoction in that tube (a) will be used to determine the index[18]. Foaming index will be calculated using the following formula Foaming index = 1000/a

Chromatographic analysis

The sample was spotted on the plate and dried for few min. simultaneously solvent system was prepared and allowed to stabilize for 30 min. The plate was developed in the solvent chamber and allowed to run up to three forth of the plate. Then it was removed and air dried. The plate was examined visually and the Rf value was calculated [19].

Results and Discussion

Microscopical Characters:

Table 1: Macroscopical Characters of Leaves

S. No	Organoleptic characters	*Portulaca grandiflora*
1.	Size	20-25 mm
2.	Surface characteristics, texture	Stem are hairy, mostly branching and reddish green colour
3.	Taste	Slightly bitter
4.	Colour	Bright green
5.	Odour	Characteristic

The size, surface characteristics, texture, taste, colour and odour of leaves were examined. It was found that *Portulaca grandiflora* has alternate, petiolate to subsessile, succulent, terete to slightly compressed, stem are hairy, with a reddish green colour to 10-15 mm long, acute petioles to 2 mm long. The size of the leaf was 20-25 mm having bright green colour.

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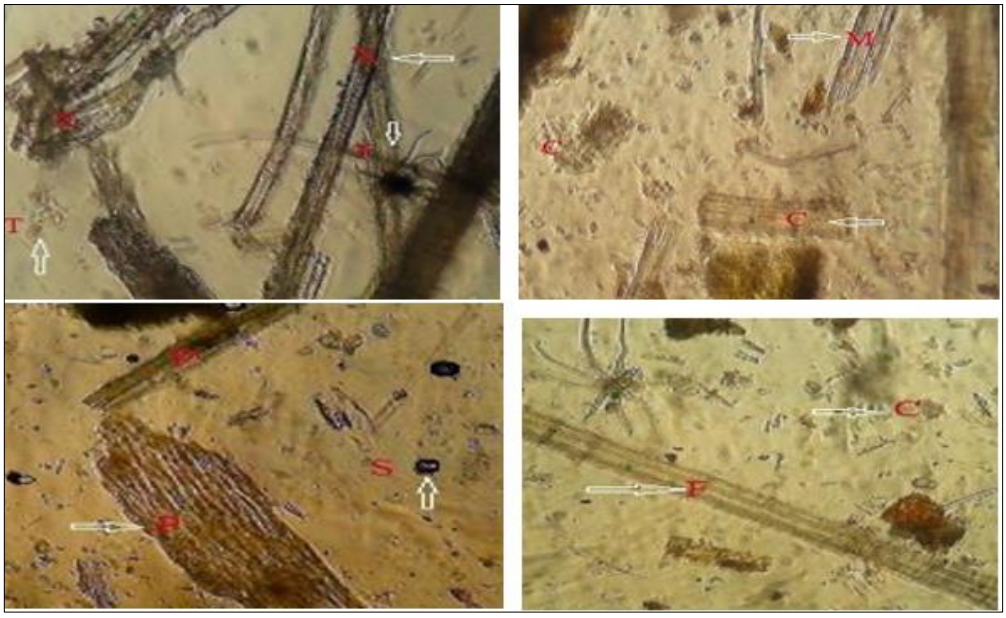

Fig 2: Powder study of Portulaca grandiflora
(F- Fibres, S-Strach grain, X-Xylum, T- Trichomes, C-Calcium oxalate, M-Medulary rays, V-Vessels, T-Tracheids, C-Cork cells, S-Sclereids)

5. Physico-chemical studies

Table 3: Physico-chemical Characteristics of of *Leucomeris spectabilis* (Leaves)

S. No.	Parameters	Results
1.	Foreign organic content	1.20%
2.	Moisture content	0.63%
3.	Swelling Factor	1.1 ml.
4.	Foaming Index	Less than 100
5	Ash Values Total Ash Acid Insoluble Ash Water Soluble Ash	 4.42% w/w 1.10% w/w 1.45% w/w

Table 5: Qualitative chemical examination of *Leucomeris spectabilis* extract

S. No.	Phytoconstituents	Test	Pet. ether extract	Ethanolic extract
1.	Alkaloids	Mayer's test	—	+ +
		Hager's test	—	+ +
		Wagner's test	—	—
		Dragendroff's test	—	+ +
2.	Carbohydrates	Molisch's test	—	+ +
		Benedict's	—	+
		Fehling's test	—	+ +
3.	Glycosides	Borntrager's test	—	++
		Legal test	—	+
		Kellar -Killiani test	—	++
4.	Steroids	Salkowski's test	—	—
		Sulfur powder test	—	—
		Liebermann Burchard test	—	—
5.	Proteins	Millon's test	—	+
		Biuret test	—	—
		Ninhydrin test	—	+
6.	Resins	Acetone-Water test	—	—
7.	Fats and Oils	Filter paper test	+	—
8.	Flavonoids	Shinoda test	—	++
		Sulphuric acid test	—	++
9.	Tannin	Ferric chloride test	—	—
		Matchstic test	—	—
10.	Phenols	Lead acetate test	—	+
		Gelatin test	—	++
11.	Mucilage	Rhuthenium red test	—	+

Where: (+ +) Strongly Present; (+) Mild Present; (—) Absent

Chromatographic analysis

Table 8: Thin layer chromatography analysis

S. No.	Drug sample	Extract	Rf value	Colour of spot
1	*Portulaca grandiflora*	Petroleum ether	0.29	Yellow
			0.52	Dark yellow
			0.64	Dark green
			0.76	Light green
			0.88	Green
2.	*Portulaca grandiflora*	Ethanol	0.25	Yellow
			0.29	Dark yellow
			0.47	Green
			0.62	Dark green

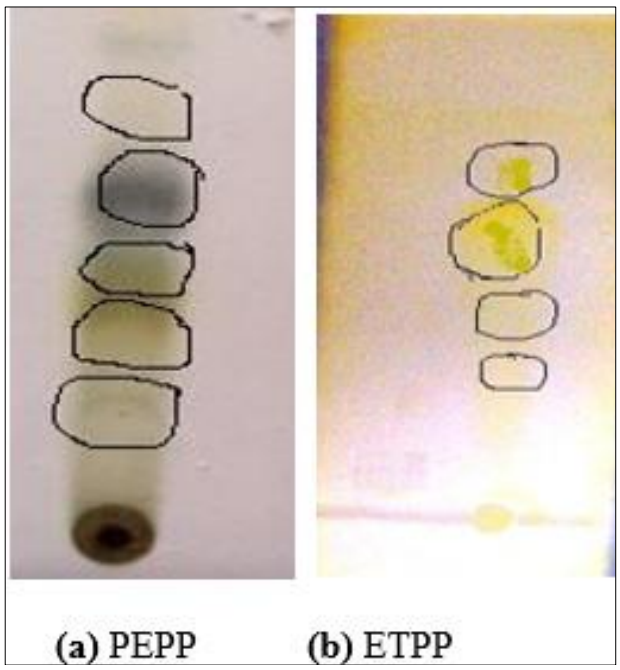

Fig. 3: Developed TLC plate with solvent system

The TLC of Pet. Ether and Ethanol extracts was developed using solvent systems; Toluene: Ethyl acetate: Diethyl amine (70:20:10). Detection of spots was done by Dragendroff's reagent. Five spots were detected in petroleum ether extract of *Portulaca grandiflora* Rf ranging from 0.29-0.88, and four spots in the ethanol extract having Rf ranging from 0.25-0.62.

Conclusion

In this present study the pharmacognostic and quality control parameters of *Portulaca grandiflora* were investigated. Morphological evaluations were conducted to establish standard reference values for plant material standardization. These evaluations included macroscopic examination of leaves and stems, powder microscopy, determination of total ash (acid insoluble and water soluble), loss on drying, swelling index, foaming index, and chromatographic studies. Powder microscopy revealed the presence of xylem, fibers, trichomes, crystals, phloem, and anisocytic stomata in the leaf sections of *Portulaca grandiflora Portulaca grandiflora.*

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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