

PHARMACOGNOSTICAL AND PHYTOCHEMICAL INVESTIGATION OF EUPHORBIA PROSTRATA

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Abstract- *Euphorbia prostrata* Ait Euphorbiaceae is a small, prostrate, annual green herb sometime purple tint in colour. It is widely distributed globally and used as anti-hemorrhoidal, anti-inflammatory, analgesic, hypolipidemic, antidiabetic, antidiarrheal, antiasthmatic and for various skin diseases. The microscopy of root shows the presence of obliterated cork cells, phelloderm, cortex, endodermis, phloem, me.dulary rays and xylem; the stem shows the presence of multicellular trichome, cuticle,cortex, endodermis, pericycle, phloem, latex canal, xylem and pith; the leave reveal the presence of multicellular, multiseriate glandular hairs, epidermis, vascular bundles, stomata anomoatic /anisoatic The vein islet number and vein termination number have also been determined. The powder study reveals the presence of epidermal cells, trichomes, parenchymatous cells, pollen grains, vessels, fibers and stomata. The water soluble, alcohol soluble and petroleum ether extractive values were determined. The total ash, water soluble ash, acid insoluble ash and sulphated ash were also observed.Preliminary phytochemical studies revealed the presence of flavonoids, tannins, glycosides and saponins the alcoholic extract of the plant. This is the first report on pharmacognostical studies on this plant.

Keywords: *Euphorbia prostrata* Ait., Euphorbiaceae, Pharmacognostic, Phytochemical evaluation

Introduction:

Euphorbia prostrata is a weed; it grows in the cultivated fields of wheat, rice or other crops and also in the gardens along with grass. It is commonly observed that during the removal of this weed, irritation on the hands of workers often occur. The character and uniqueness of such irritant compounds present in this *Euphorbia* species and its mechanism of action has not been previously investigated. Taking into account all these observations, the current study of irritant contact dermatological studies of *E. prostrata* was conducted. *E. prostrata* belongs to the family Euphorbiaceae; a large family of Dicotyledonous Angiosperms (Charles et al., 2007). Family Euphorbiaceae is widely distributed throughout both hemispheres and ranges in morphological form from largest dessert succulents to trees and even small herbaceous types (Cutler et al., 1987). *E. prostrata* is native to West Indies, but is now widely distributed throughout the tropics and subtropics (Turner, 1995). It occurs throughout tropical Africa and the Indian Ocean Islands (Singh, 1994). *E. prostrata* grows in gardens, on distributed grounds, in cultivated land and roadside, especially in sandy soils, from sea-level to high altitude (Carter and Leach, 2001). It is also found throughout India as a weed in the plains and at lower elevations (Nguyen and Sosef, 1999). The major constituents include anthraquinone glycosides, flavanoids, phenols, phlobotannins, polysaccharides, saponins, tannins and terpenoids. Alkaloids were not present in very high amounts (Singla and Pathak, 1991). A range of hydrolysable ellagitannins were isolated, including prostratin A, B, and C, euphorbins G and H, tellimagradin I and II, rugosin A, D, E and G from different fractions of extracts of the dried leaves. Flavanoids isolated from the aerial parts include: kaempferol, cosmosin (apigenin-7-glucoside), rhamnetin-3-galactoside, quercetin and quercetin 3rhamnoside. Other constituents of the aerial parts include the sterols β -amyryne acetate, *Euphorbia prostrata* Ait. (*Euphorbiaceae*) is small annual herb found all over India especially in foot hills of Himalayas. It is native to the West Indies and certain parts of South America and also widely naturalized in many other parts of the world. The two varieties found are red and green 1. These are branched prostrate with many stems spreading from the roots, slender upto 20 cm long, leaves green but occasionally purplish red 2. It is a reputed drug in the Indian System of Medicine and used in treatment of many diseases of skin 3, 4, digestive system 5, antiasthmatic 6, antidiabetic 7, haemorrhoids 8 etc. It is also used traditionally as snake bite remedy 9

Conflict of interest statement:

- There are no conflicts of interest.
- Figures



Scientific classification

Kingdom: Plantae

Clade: Rosids

Order: Malpighiales

Family: Euphorbiaceae

Genus: *Euphorbia* Species: *E. Prostrata* β -sitosterol, campesterol, stigmasterol and cholesterol.

Aerial parts also contain the terpene alcohol β -terpenol, gallic acid, corilagin, 1, 2, 3-tri-O-galloyl-D-glucose, geraniin, and various amino acids, including n-valeramide and N, N-dimethyl-4-benzoxylbutylamine. Roots contain a myricyclic alcohol and two triterpenes, taraxerol and tirucallol (El-Mahy, 2004; Yoshida et al., 1990). All parts of *E. prostrata* are used as traditional medicine around the globe. Its leaves are used as antidote for stings especially of wasp and scorpion sting. This weed is also used as anti abortive agent and for painful menstruation. In Uganda, pregnant women eat the boiled shoots, mixed with sesame to reduce the risk of miscarriage (Neuwinger, 2000; Kamatenesi-Mugisha and Oryem-Origa, 2007; Kokwaro, 1993; Ogwal, 1996). Leaf powder mixed with palm oil is rubbed on the head to treat headache. Crushed whole plant was eaten with bread against kidney stones. Around the Indian Ocean Islands, an infusion of the leaves or aerial parts was taken either alone or combined with other plants to treat diarrhea, dysentery and stomachache. It showed activity against *Shigella dysenteriae* type I induced diarrhea in rats (Watt and Breyer-Brandwijk, 1962; Kamgang et al., 2007). *E. prostrata* showed antibacterial activities as well as inhibitory effects against HIV-1 protease and hepatitis C virus protease (Hussein et al., 1999, 2000). It possessed anti-fungal activity against certain dermatophytes in experimentally infected animals (Pal and Gupta, 1979). In India, the latex was used to treat diabetes, as it was considered to have hypoglycaemic activities (Akhtar et al., 1984). Many species of family Euphorbiaceae are commonly used as sources of medicines by various tribal and ethnic communities in Pakistan.

MATERIALS AND METHODS

Plant :

E. prostrata plants were collected from the Botanical Garden, Government College University, Lahore and from different areas around and within Lahore. These were authenticated by Dr. Sultan, Herbarium, Department of Botany, Government College University, Lahore against specimen number G. C. Herb. Bot. 605. The herbaceous plants were dried under the shade at room temperature for about ten days. The dried plants were then pulverized to fine powder and stored in black polythene bags.

Instrument :

Instrument used in this research were distillation apparatus (Quick fit, England), electric balance (Sartorius), oven (Mettler, W. Germany), water bath, Soxhlet apparatus

Chemical:

All the chemicals used were of BDH analytical grade. The following chemicals were used, which were purchased from local market, H₂SO₄, acetic anhydride, aluminium chloride, anisaldehyde, vanillin, iodine, sodium sulphate (anhydrous).

Solvents:

All the solvents used were of BDH analytical grade. The following solvents were commonly used, which are purchased from local market. All the solvents were re-distilled before use: petroleum ether (40 to 60°C), chloroform, ethanol, methanol, glacial acetic acid, acetone, dichloromethane, hydrochloric acid, acetic acid, distilled water. Solvents Interaction: The pulverized dried *E. prostrata* plants (600 g) were extracted successively in petroleum ether (40 to 60°C), chloroform and methanol by using 2.0 L of each solvent for soaking. Maceration was carried in each solvent for 4 days at room temperature (25 ± 2.5°C). The solvent of each extracted material was removed under reduced pressure and the residues were weighed.

Development of plates:

The spots on thin layer plates were dried by air-dryer and developed in chromatographic jars. Inner side of the tank was made saturated with the solvent, after attaching the solvent soaked filter paper in it. 30 to 35 ml of solvent was poured into the tank, so that it rises 1 to 2 cm above from bottom of the tank. The plates were placed inside the tank and the lid was closed. The plates were allowed to develop. The solvent was run up to 1.5 cm from the upper edge of the plates. Solvent front was marked and after drying the plates with air-dryer, the spots were detected under UV light and with iodine. Different solvent systems were used for TLC of three solvent extracts that is, petroleum ether extract, chloroform extract and methanol extract.

Pharmacognostic Studies:

Macroscopic:

Macroscopic studies were done using simple microscope. The taste, odour, shape of plant parts of fresh and dried plant was observed 11

**Microscopic:**

Anatomical sections surface preparation of stem, root, leaves for the microscopy were carried out 11-13. The microscopical features were observed under Zeiss Trinocular Microscope (Germany). Quantitative microscopy of leaf was also carried out and upper and lower stomatal number, vein islet number and vein termination number were observed 14, 15. Powder Study: Plant was oven dried at 40±5°C to make it moisture free and powdered form with the help of electric grinder and powder was passed through sieve no. 60. Standard methods were followed to study the powder characteristics 11. Fluorescent study and various histochemical reaction studies were carried out on plant powder 15, 16.

Physical Evaluation:

The physicochemical parameters such as water, alcohol, petroleum ether soluble extractive values, percentage of total ash, water soluble ash, acid insoluble ash and sulfated ash, loss on drying, swelling index, foaming index, bitterness value, crude fiber content

and heavy metals concentration were performed and calculated as per WHO guidelines 17. Preliminary Phytochemical Studies: The dried plant was pulverized and 500 gm of plant sample was extracted successively with 4 litres ethanol using soxhlet apparatus for about 72 hours. Thereafter the marc was subjected to three consecutive aqueous extractions for 24 hours each. Each extract was concentrated and dried over anhydrous calcium chloride and kept aside for phytochemical investigation. The qualitative tests were carried out 12, 18

Results:



Macroscopically, the roots are brownish-black in colour, cylindrical in shape, feeble odour, slightly acrid taste with irregularly branched. Microscopically the root showed the presence of epidermis, air-chambers, fissure periderm, periderm, inner cortex, pith, phloem, xylem, vessels and xylem vessels. Microscopic examination of the powder showed the presence of parenchyma cells, parenchyma mass, periderm, cell inclusion, laticifer, lateral wall pith, perforation, xylem bundle and xylem elements. Ultra-violet and ordinary light analyses with different reagents were conducted to identify the drug in powder form. Physico-chemical evaluation established, Ash values - Total, acid insoluble, water soluble and sulphated ash values were 7.3%, 4.1%, 3.7% and 5.2%, respectively. Extractive values - Alcohol soluble, water soluble and ether soluble extractive values were 22.8%, 7.4% and 5.6%, respectively. Loss on drying was 3.3%. Preliminary phytochemical screening showed the presence of carbohydrate, glycoside, saponins, flavonoid, phytosterols, tannins and phenolic compounds

Conclusions:

The results of the study can serve as a valuable resource of pharmacognostic and phytochemical information. This will serve as appropriate, standards for discovery of this plant material in future investigations and applications and also contribute towards establishing pharmacopoeial standards.

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