PHARMACOGNOSTIC STUDY OF FLOWER BUDS OF *PUNICA GRANATUM L* (PUNICACEAE)

S. B. Barwal[1], Sunil A. Nirmal[*1], B. B. Talole[1], S. C. Pal[2] and Subhash C. Mandal[3].

[1]Department of Pharmacognosy, Pravara Rural College of Pharmacy, Loni, M.S., India.

[2]Department of Pharmacognosy, NDMVP College of Pharmacy, Nashik.

[3]Pharmacognosy and Phytochemistry Research Laboratory, Department of Pharmaceutical Technology, Jadavpur University, Kolkata.

*Address for Correspondence:

E-mail: nirmalsunil@rediffmail.com

ABSTRACT:

Punica granatum Linn (Punicaceae) is commonly known as 'Dalimb' in Marathi. *P. granatum* is a dark greenish large deciduous shrub or small tree, about 5-10 m high. In Pharmacognostic study of flower buds of *P. granatum*, macroscopy, microscopy, physical parameters and extractive values were studied**.** Flowers are 3.8-5 cm long and as much across, mostly solitary, sometimes apparently axillary and sessile. Calyx-tube companulate, adnate and produced beyond the ovary, coriaceous, lobe are 5-7 and Vulvate. Petals are 5-7, obovate, scarlet, wrinkled, and inserted between the calyx lobes. Stamens are very numerous, inserted on the calyx below the petals at various levels. Anthers are elliptic and deliscing longitudinally. Ovary is inferior, many cells are arranged in 2 concentric circles. Style is long and bent, where as stigma is capitate. Carpals early coalescing and occurring to unequal growth becoming arranged into 2 tiers, 3 in the lower and 5-9 in the upper. These findings will be useful towards establishing pharmacognostic standards on identification, purity, quality and classification of the plant, which is gaining relevance in plant drug research.

Keywords: *Punica granatum***,** Petals**,** sepals, Ash value, Extractive value, Moisture Content.

INTRODUCTION:

Punica granatum Linn. (Punicaceae) is a dark greenish large deciduous shrub or small tree, about 5-10 m in height. It is smooth and gray in colour. Leaves are opposite, 2.5-6.3 cm long, oblong-lanceolate, oblong-obovate, glabrous, entire, minutely pellucid-punctate, shining above, bright green- beneath, base is narrowed and having a very short petiole. Seeds are with a watery outer coat containing pink juice and sometimes red or whitish and a horny inner coat.[1, 2] Traditionally plant is

used in the treatment of asthma, diarrheoa, dysentery, tuberculosis and bronchitis. It also used in gargle, anthelmentic, and as an astringent.[1,3] The Pharmacognostic standardization is necessary for the plant as it s a very important plant and proper identification is necessary. Hence present work was carried out, which will help for proper identification of the plant.

MATERIAL AND METHODS:

Plant Material:

Fresh flower buds of *P. granatum* was collected from Ahmednagar district and authenticated by Mr. Mujumdar, Deputy Director, Botanical survey of India, Koregaon Road, Pune. The herbarium of plant specimen has been deposited at B.S.I., Pune (Voucher no. BSBP1).

Qualitative Investigation:

External features and organoleptic properties of flower buds, like color, odor, taste, shape and size were studied. [3]

Quantitative Investigation:

The moisture content, ash and extractive values of the powdered flower bud sample and the quantitative microscopy on the anatomical section of the flower bud was done. [4,5]

Phytochemical Evaluation:

The preliminary phytochemical investigation was done by the standard chemical tests. [5]

RESULTS AND DISCUSSION:

Flower buds of plant *P. granatum* were observed to be 1-3 cm in size and shape and is oblong. Flowers are Scarlet red colored and odorless with acrid taste. The petals are uniform in thickness except in veins. They are 40 mm thick and consist of two layers of epidermis and a single layer of medial cells. The veins of petals have small, collateral vascular bundle and parenchymatous ground tissue. The epidermal cells are squarish in shape and thick walled. The median layers of cells are rectangular and thick walled. The epidermis has radially oblong cells with prominent cuticle (Fig 1A & B). The filaments of the stamens are circular in sectional outline. The vascular elements are seen in central part forming a dark core. The ground tissue of the filament consists of small, circular, thick walled compact parenchyma cells. The staminal filament is 300 mm in diameter. The sepals are 120-150 mm thick. They have thick epidermal layers of radially oblong thick walled cells. The ground tissue is parenchymatous and compact. The ovary wall is 1.5 mm thick. It has outer and inner epidermal layers. The

outer epidermis is thick and stomatiferous. The cells are small and squarish in shape. The inner epidermis is slightly wider with radially oblong cells. The vascular strands are scattered in the ovary. The median strands are larger than outer portion, which are smaller and less prominent. The ground tissue consists of numerous layers of circular, thick walled compact parenchyma cells (Fig 1C). The vascular bundles are thick and prominent in its midrib region (Fig 1D). The anthers are dioceous with four chambers. The anthers wall has radially elongated cells with spiral thickenings. This layer is called endothecium. Outer coat of endothecium is a single layer of spindle shaped and these walled cells which constitute the endothecium have disintegrated during pollen development (Fig 1E). The pollen grains are elliptical in outline in polar view with wide vertically elongated aperture and it is 30 to 40 mm in size. In equatorial view, the pollen is circular with three colpi. It is 40 mm in diameter (Fig 2B). The seeds are duel shaped with seed coat. The seed surface is smooth and shining. It is dark brown and nutlike. It is 850 mm long and 450 mm thick at the wider end (Fig 2A). The physical constant evaluation is an important parameter in detecting adulteration or improper handling of the drug. Various ash values are important to determine purity of the drug i.e. the presence or absence of foreign organic matter. Since the plant *P. granatum* is useful in the traditional medicine for the treatment of some ailment, it is important to standardize it for use as a drug. The pharmacognostic constants for the flower buds of this plant, the diagnostic microscopic features and the numerical standards reported in this work could be useful for the compilation of a suitable monograph for its proper identification. The extracts obtained after extraction was characterized by preliminary phytochemical test for rough ideas of main constituents present in the extracts. Petroleum ether extract showed presence of steroids, triterpene acids and Chloroform extract contain steroids, triterpene acids and alkaloids, while alkaloids, saponins, flavonoids, tannins and carbohydrate were found in Ethanol extract. Aqueous extract showed presence of saponins, flavonoids, tannins and carbohydrate.

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Table 1. Physicochemical parameters of flower buds of *P. granatum*

Evaluation parameters	**Value (%w/w)**
Total ash value	4.25
Water-soluble ash value	1.50
Acid –insoluble ash value	0.50
Sulphated ash value	2.5
Water soluble extractive value	23.39
Alcohol soluble extractive value	33.21
Moisture Content	12.5
Foreign organic matter	0.50

Table 2. Observations of preliminary phytochemical tests of various extracts of *P. granatum* flower bud.

Phytochemical test for	Petroleum ether Extract	Chloroform Extract	Ethanol Extract	Aqueous Extract
Carbohydrate	-	-	+	+
Alkaloids	-	+	+	-
Flavonoids	-	-	+	+
Saponins	-	-	+	+
Glycosides	-	-	-	-
Steroids	+	+	-	-
Tannins	-	-	+	+
Tritepene acids	+	+	-	-

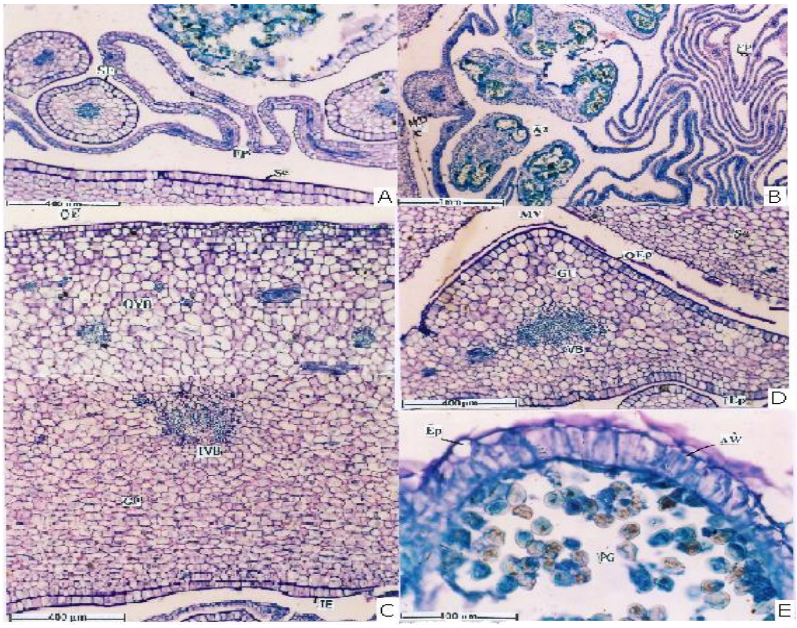

Figure 1. T. S. of flower bud of *P. granatum* showing (A) folded petals, anthers and midrib of Petal. (B) a portion folded petal filament of stamen and a portion enlarged showing the sepal. (C) T.S. of pericarp of the ovary. (D) Midrib portion of the petal. (E) T.S. of anther showing the endothecium.

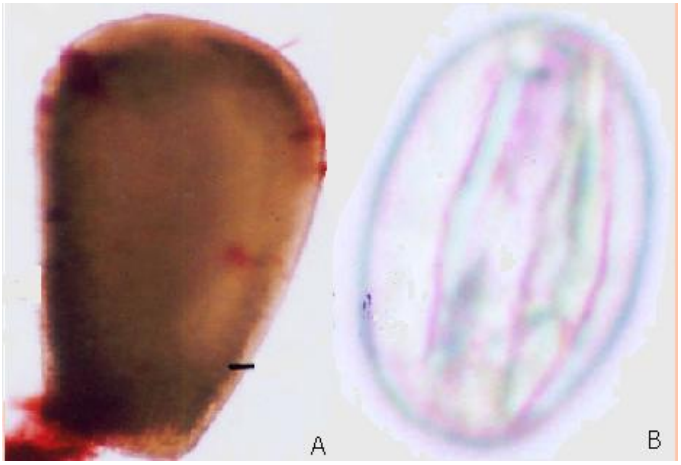

Figure 2. Figure showing (A) entire seeds in surface view. (B) Pollen grain in equatorial view of *P. granatum.*