

## PHARMACOGNOSTIC STUDIES OF ANAGALLIS ARVENSIS L

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### Abstract

The morphological, anatomical, histochemical studies including preliminary chemical and fluorescence analysis of the powders of leaf and stem is presented.

Leaves are amphistomatic with papillate margins. Venation is palmate-acrodromous. Mesophyll is undifferentiated. Stem is quadrangular with hypodermal collenchyma abundant in the ridges. Vascular tissue is in the form of continuous ring with parenchymatous pith in the centre.

Total ash is 23.35% of which 8.5% is acid insoluble and water soluble is 2.5%. Successive extractive values in different solvents and their reaction to various test reagents is given.

Key words: Pharmacognosy, *Anagallis arvensis*

### Introduction

*Anagallis arvensis* L. belonging to the family primulaceae is a potent herb utilised in various indigenous systems of medicine. It has marked action on skin characterised by itching and tingling and expels splinters and warts (Boericke, 1978). It helps in curing inflammations, sores, pain in liver and kidney; an antidote to viperine poisons; and in leprosy, epilepsy and mania in Unani medicine (Kirtikar & Basu, 1980; Nadkarni, 1976).

In view of the above the present investigation is undertaken to outline pharmacognostic characters of the leaf and stem of the plant.

### Material And Method

The plant material under study was collected, authenticated and supplied by SMPCU, Ooty. Whole mounts of the leaves were prepared by boiling the fixed material in 10% KOH. Epidermal peels of the leaves were prepared by scraping the leaves with razor blade or a scalpel and staining them with 1% aniline blue in lactophenol, mounting in glycerine (Ramayya &

Rajagopal, 1968). Thin transections and longisections of leaf and stem were cut at 10-15  $\mu\text{m}$  thickness on rotary microtome and prepared to study the anatomical features following (Johansen, 1940). Handcut sections and epidermal peels of the parts studied were used for histochemical studies (Johansen, 1940; Youngken, 1951 and Gibbs, 1974). Powder studies are after Youngken (1951) and Gibbs (1974).

### Observations

**Morphology:** Annual, branched, 12.5-38 cm high, erect or procumbent; stem and branches 4-gonous, glabrous, Leaves 1-2.5 by 0.6-1.3 cm; sessile, opposite, ovate, acute, glabrous, venation palmate, acrodromous basal. Flowers axillary, solitary; calyx 6 mm long, divided nearly to the base; segments narrow, lanceolate, acuminate; corolla rotate blue. Capsule pea sized, operculately dividing about the middle; style persistent, seeds minute trigonous.

### Vernacular Name

English — Birds eye, pimperl  
Hindi — Jangmani, Jonkmari.

### Anatomy

#### LEAF

**Abaxial epidermis:** Cells 5-7 sided, anisodiametric to isodiametric; sides thin, sinuate, U and V-shaped; surface smooth but papillate at margins; irregularly arranged in vertical rows or variously oriented. *Cells 21,756 per sq. cm.* Costal cells linear; sides thin, wavy; surface striated.

**Adaxial epidermis:** Cells similar to those found on the abaxial except slightly large and with wavy to sinuate sides; *cells 14,400 per sq. cm.*

**Stomata:** On the abaxial anisocytic and tetracytic, few anomocytic; subsidiaries 3 or 4, indistinct, monocyclic,

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abutting and common types; oriented parallelly. *Stomatal frequency* 1,806 per sq. cm.

*Stomatal index*: 22.4, *Stomatal size*: 44-56  $\mu\text{m}$  long and 34-43  $\mu\text{m}$  broad.

Those on the adaxial similar to abaxial except subsidiaries common and abutting types, variously oriented. *Stomatal frequency*: 1056 per sq. cm. *Stomatal Index*: 21. *Stomatal size*: 35-49  $\mu\text{m}$  long and 21-28  $\mu\text{m}$  broad.

*Trichomes* absent.

*Transection*: Adaxially flat and prominently ribbed on the abaxial at midvein, 119-153  $\mu\text{m}$  long vertically and 108-142  $\mu\text{m}$  long horizontally; isobilateral. *Epidermis* 1-layered, undulated, of adaxial cells slightly larger, spherical to oval and barrel shaped; 7-9-18  $\mu\text{m}$  long and 5-7-9  $\mu\text{m}$  in breadth; abaxially smaller, 6-9-13  $\mu\text{m}$  long and 4-6-8  $\mu\text{m}$  broad; contents scanty, cells at the midvein adaxially smaller, 6-9—12  $\mu\text{m}$  in diameter and those on the abaxial larger, 16-20—30  $\mu\text{m}$  in diameter; cuticle thick; amphistomatic, stomata flushed with the epidermis; trichomes absent.

*Mesophyll*: Undifferentiated, with closely packed cells containing abundant chloroplasts; interrupted at midvein and secondary veins; ground tissue at midvein parenchymatous; cells large, polygonal to circular, 21-32-55  $\mu\text{m}$  in diameter, with small intercellular spaces; contents slightly dense, walls thin.

*Vascular tissue*: At midvein of a single arcuate bundle 66-75  $\mu\text{m}$  tangentially long and about 54  $\mu\text{m}$  radially wide, conjoint, endarch. Lateral wing bundles small, oval, collateral, conjoint and endarch. Tracheary elements of the mid-vein 14-20 in number in mid-vein, cells polygonal to circular, 16-27  $\mu\text{m}$  in diameter; secondary wall thickenings annular and helical, occasionally bordered pitted. Phloem reduced, with closely packed cells towards abaxial.

#### STEM

*Epidermis*: Cells linear, 4-8 sided; sides thin, straight to curved; surface striated, contents scanty; parallelly oriented to the axis.

*Stomata*: Tricytic, tetracytic and anomocytic; subsidiaries 3-4 Monocyclic, common and abutting types. Stoma elliptic in shape; guard cells densely cytoplasmic.

*Trichomes*: Absent.

#### *Transection*:

4-sided with winged angles. *Epidermis*: 1-layered, barrel shaped, oval to circular; cells over the ridges

22-35-54  $\mu\text{m}$  in diameter and those in the furrows 22-30-38  $\mu\text{m}$  in diameter. Contents slightly dense. Hypodermis in the ridges collenchymatous, in a group, cells polygonal, oval to circular, 17-28-33  $\mu\text{m}$  in diameter, lamellar; cytoplasm dense; furrows with 2-3 layered collenchyma; chlorenchymatous zone is below the collenchyma, cells polygonal, 22-33-43  $\mu\text{m}$  in diameter, thin walled with dense chloroplasts. Conical parenchyma is beneath chlorenchyma, cells oval to circular and polygonal, thin walled, 21-32-55  $\mu\text{m}$  in diameter, cytoplasm slightly dense. The young stems have 4-5 V. Bs at the angles with a prominent central parenchymatous pith. Vascular tissue of the mature stem in a continuous cylinder with a central pith. Tracheary walls of tracheary elements annular, helical and bordered pitted; annular rings free and interconnected, helices mostly double, few single. Pits oval to circular and polygonal, alternate, opposite or scaldriform fibers thick walled with the radial walls pitted. Xylem parenchyma amongst tracheary elements slightly thick walled with simple pits. Pith parenchyma cell circular to polygonal, 28-60  $\mu\text{m}$  in diameter; contents scanty with styloid or prismatic crystals.

#### Histochemistry

Lignin is present in xylary elements of midvein and lateral veins of leaf and stem. Suberin is present on leaf surface, collenchyma and sclerenchyma of stem. Alkaloids occur in parenchyma of midvein; hypodermis of stem. Proteins present in leaf mesophyll and in the parenchyma and collenchyma of stem. However Tannins, Starches, Resins and Calcium oxalate are absent.

#### Organoleptic Characters

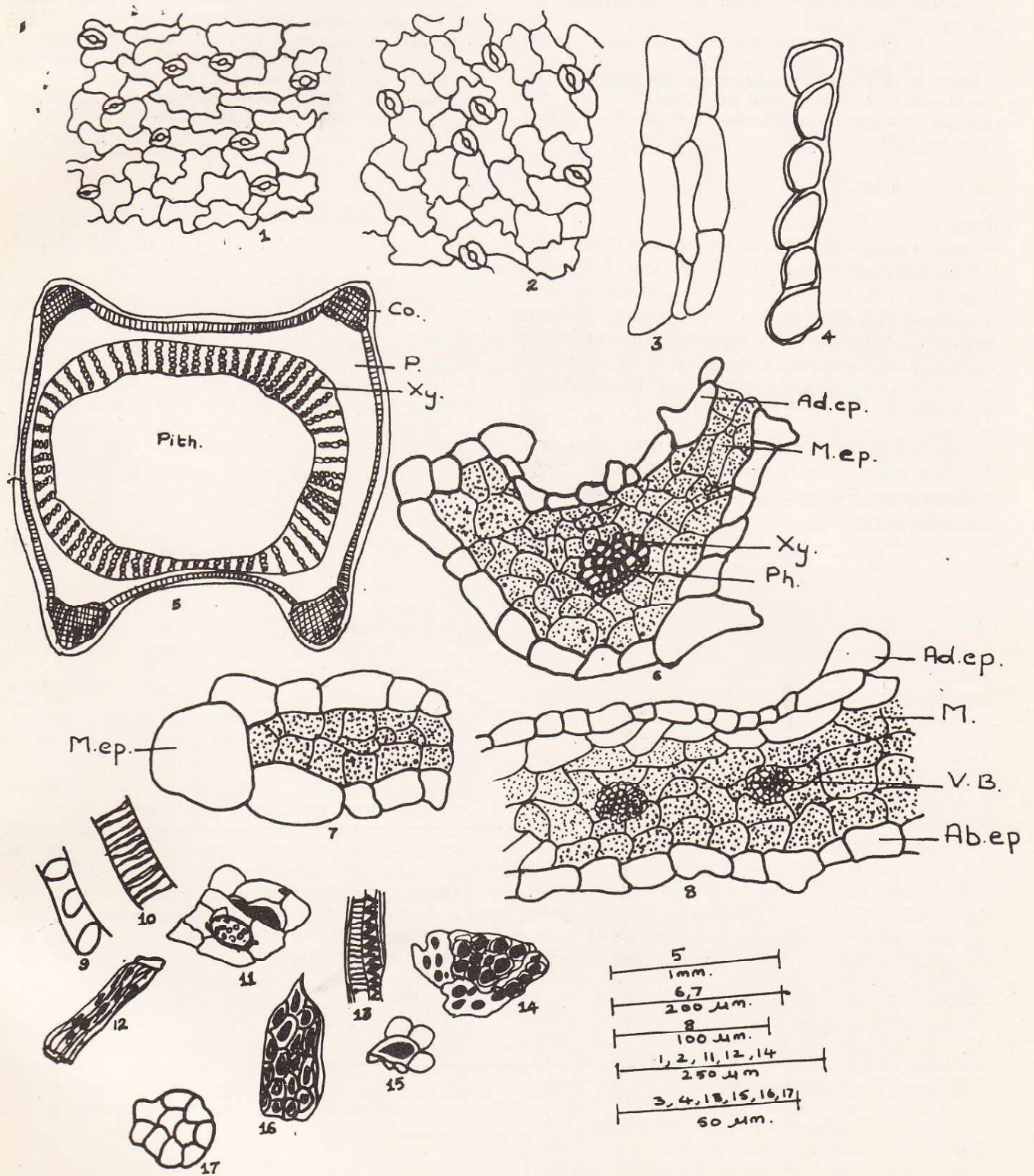
<i>Colour</i>	:	Pale green
<i>Taste</i>	:	No characteristic
<i>Odour</i>	:	Acrid
<i>Touch</i>	:	Coarse
<i>Ash value</i>	:	23.35%
<i>Acid soluble ash</i>	:	8.5%
<i>Water soluble ash</i>	:	2.5%

#### Successive Extractive Values

<i>Petroleum ether 60-80°</i>	:	6.7%
<i>Benzene</i>	:	3%
<i>Chloroform</i>	:	6%
<i>Alcohol</i>	:	14.2%
<i>Water</i>	:	1%

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**Figs.**

1-Abaxial epidermis, 2-Adaxial epidermis, 3-Costal cells, 4-Marginal papillate cells, 5-T.S. of stem, 6-T.S. leaf mid-rib, 7-T.S. leaf margin, 8-T.S. leaf lamina, 9-16 Powdered fragments, 9, 10 & 13-Tracheary elements showing annular and helical thickenings, 11-Mesophyll tissue, 12-Parenchymatous tissue, 14-Collenchymatous tissue, 15-Marginal cells, 16-Tracheary tissue, 17-Pith parenchyma.

Ab-ep-Abaxial epidermis, Ad.ep-Adaxial epidermis;  
 Co-Collenchyma; M.Ep-Marginal epidermal cells;  
 M-Mesophyll; P-Parenchyma; Ph-Phloem; Xy-Xylem;  
 V.B.-Vascular bundle.

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"No walk of life is, according to the testimony of all ages, more unanimously declared a conjectural art (ars conectoralis) than medicine. None, therefore, has less right to refuse a searching inquiry than this art, on which rests the highest good in life, human health."

S. Hahnemann  
 Preliminary notice to the  
 first edition of the "Organon"

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