

## IDENTIFICATION OF THE INGREDIENTS IN CURNA, KVATHA CURNA LEHYA AND RASAYANA – A SIMPLE MICROSCOPIC METHOD

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*Abstract: - Triphala Curna, Triphatladi Kvatha Curna, Inji Rasayanam and Manibhadra Lehya of Indian System of Medicine were examined microscopically and the methods of identifying their ingredients were reported as one of the quality control standards.*

### Introduction:

In Indian System of Medicine the standardization of compound formulations, poses a big problem to scientists as they contain large number of ingredients with wide range of chemical constituents. Therefore the quality control standards so far reported are mostly confined to the organoleptic characters and physical and chemical constants.

Recognizing the fact that the identification of the ingredients in the compound drugs is the most important aspect in evolving quality control standards, a study has been initiated in our Laboratory to identify the ingredients in Curna, Kvatha Curna, Lehya and Rasayana by applying a simple Microscopic Method.

The present paper deals with the identification of the ingredients in Triphala Curna, Triphaladi Kvatha Curna, Inji Rasayana and Manibhadra Lehya.

### Materials and Methods:

A good record of the powder analysis of the crude drugs (raw materials-ingredients) is essential before examining their presence in the compound formulations. So the ingredients of Triphala Curna, Triphaladi Kvatha Curna Inji Rasayanam and Manibhadra Lehya were first listed as follows:

No.	Sanskrit Name	Tamil Name	Botanical Name	Useful Part
1	Amalaki	Nellikai	Emplica officinalis Gaertn	Dried Fruit Rind
2	Ardrak	Inji	Zingiber officinale Rosc.	Fresh Rhizome

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3	Vibhitaki	Thanricai	Terminalia belerica Roxb	Dried Fruit Rind
4	Daru Haridra	Maramanjai	Coscinium fenestratum (Gaertn) colebr	Dried Stem
5	Guda	Vellam	Saccharum officinarum Linn.	Solidified Juice
6	Haridra	Manjala	Curcuma Ling Linn.	Dried Rhizome
7	Haritaki	Kadukkai	Terminaila Chebula Retz.	Dried Fruit Rind
8	Hema puspa	Avaram pu	Cassia auriculata Linn.	Dried Flowers
9	Jambu tvak	Navalpattai	Syzygium Cumini (Linn.) Skeels	Dried Stem bark
10	Jiraka	Sirakam	Cuminum cyminum Linn.	Dried Fruits
11	Trivrt	Sivathai	Operculina turpethum (Linn.) Silva manso	Dried Fruit Bark
12	Vamsaptra	Mungi Elai	Bambusa bambos Drude	Dried Leaves
13	Vidanga	Vaividangam	Embelia tejeriam-Cottom A. DC	Dried Fruits

Powder analysis of the above crude drugs, which were produced in the local market, was carried out individually as suggested by Trease and Evans (1966) and Johanson (1939) and their salient anatomical features were recorded using the microscope and camera lucida. Then the compound formulations were prepared as in Vaidya Yoga Ratnavali and Siddha Pharmacopoeia of IMPCOPS and they were observed under the microscope.

### OBSERVATION & RESULTS:

#### Powder Analysis of Crude drugs:

Individual crude drugs were powdered to 40-80 mesh and the powder was mounted on a slide in suitable reagent and it was examined under the microscope and their salient anatomical features were recorded as follows.

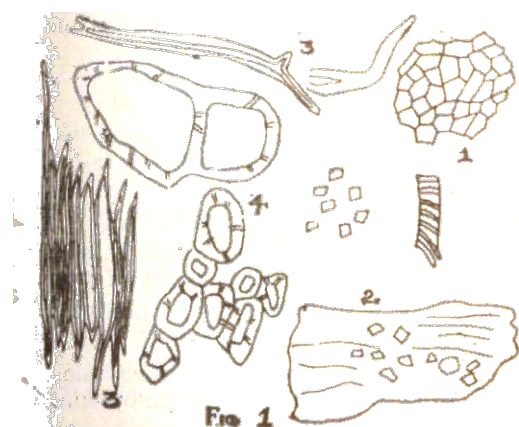


Figure 1. Powder Analysis of Amalaki

#### (1) AMALAKI: (Fig. 1)

I. This walled parenchymatous epicarp with polygonal cells of 8 microns in diameter.

II. Irregular masses of parenchyma with numerous prismatic crystals of 28-56 microns.

III. Laticifers of 1120 micron long and 12-20 micron diameter were found mostly in single or rarely in groups and then they were slightly bifurcated near the tips.

IV. Small stone cells

1. Epidermis Surface View 2. Parenchyma with Crystals 3. Laticifers 4. Stone cells



(2) ARDRAK (peeled): (Fig. 2)

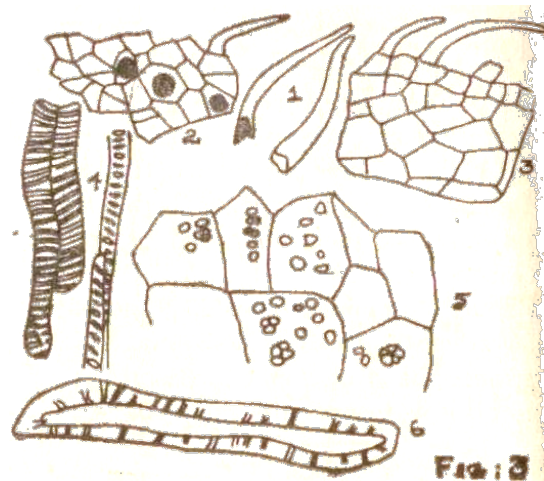
- I. Plenty of simple starch granules ovoid in shape and  $42 \times 28$  microns in size.
- II. Vessels spirally thickened, 70 microns in diameter and unstained with phlorofucional.
- III. Fibres quite long, non septate, often found in bands and unstained with phlorogucinol.

**Figure 2. Powder Analysis of Ardrak :**

- 1.Starch Granules 2. Parenchyma with oil globule 3. Fibre 4. Vessel

(3) VIBHITAKI (Fig. 3)

- I. Unicellular unbranched clothing trichomes of 68 microns with globular base harbouring tannin or parenchymatous epicarp in surface view with trichomes or with the basal remains of trichomes.
- II. Thin walled parenchyma of  $168 \times 84$  micron in average, with numerous irregular starch granules of 4-8 microns.
- III. Numerous stone cells.
- IV. Tracheids spirally or pittedly thickened.



**Figure. 3 Powder Analysis of Bibitaki:**

1. Trichomes 2. Epidermis in surface view with remains of Trichome base 3. Epidermis and ground Parenchyma 4. Tracheids 5. Ground Parenchyma with Starch Granules.



(4) DARU HARIDRA: (Fig. 4)

- I. Cork cells in surface view were angular in shape and 20 microns in diameter.
- II. Parenchyma cells contained plenty of compound starch granules mostly in twos, each 42 microns in size.
- III. Vessels oppositely pitted and yellow coloured.
- IV. Numerous bands of fibers with single line of pits and yellow coloured .
- V. Stone cells numerous and yellow coloured.

**Figure 4 Powder Analysis of Daru Haridra:**

1. Cork Surface View 2. Starch Granules 3. Cortical Parenchyma 4. Stone cells yellow Coloured. 5. Vessels yellow coloured. 6. Fibres yellow Coloured.

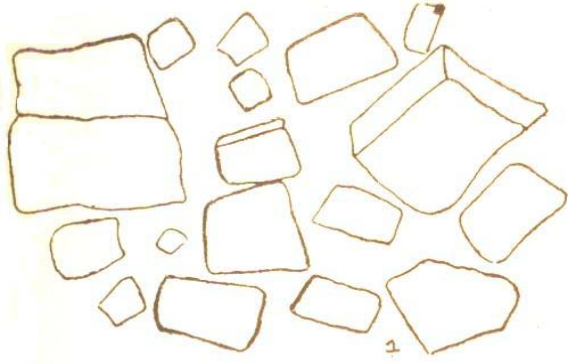


Fig: 5

(5) GUDA: (Fig. 5)

- I. Many rectangular crystals of sucrose in various sizes.

**Figure 5 Powder Analysis of Guda**

1. Sucrose Crystals.

(6) HARIDRA: (Fig. 6)

- I. Rectangular storied cork cells of  $40 \times 20$  microns.
- II. Parenchyma cells mostly found individually and at times in groups with yellow content and paste of starch cells measured to  $70 + 126 - 186 \times 42 - 56 - 126$  micron. Parenchyma cells at times harboured red coloured oil globules.
- III. Vessels spirally thickened.
- IV. Fibres non septate and 1382 microns long.

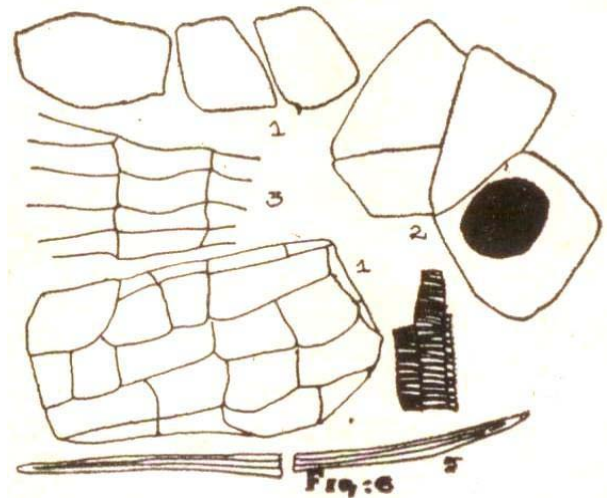


Fig: 6

**Figure 6 Powder Analysis of Haridra:**

- 1) Cortical Parenchyma Cells 2) Parenchyma with Reddish oil globules 3) Cork Cells 4) Vessels 5) Fibres.

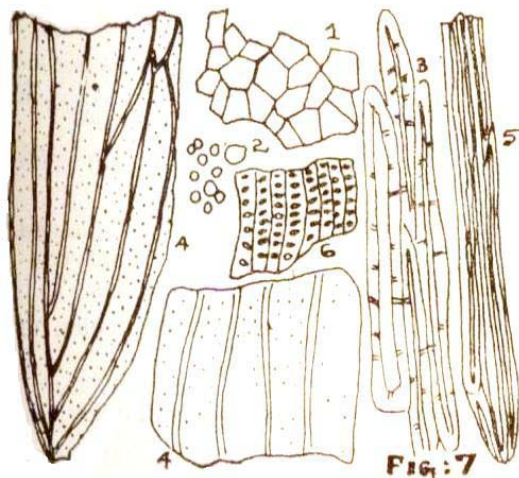


Fig: 7

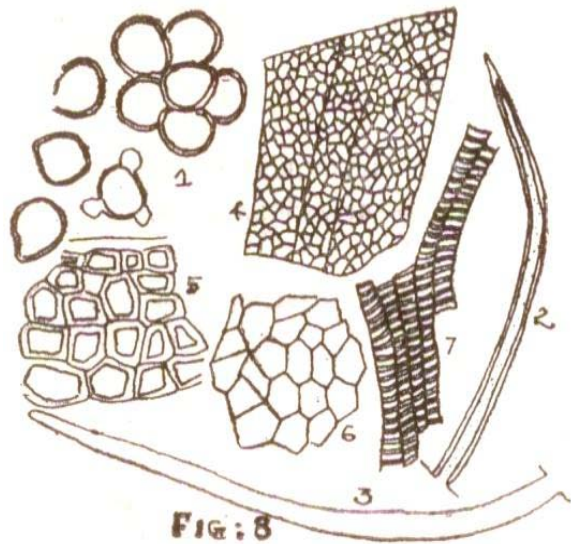
(7) HARITAKI: (Fig. 7)

- I. Parenchymatous epicarp with polygonal cells of 28 micron size.
- II. Starch granules few and small up to 28 microns dia.
- III. Laticifers articulated and simply pitted.
- IV. Fibres 420 microns long and 14 microns in diameter.
- V. Vessels pitted.
- VI. Stone cells 308 microns long 28 micron broad.

**Figure 7 Powder Analysis of Haritaki:**

1. Epidemmis Surface view 2. Starch granules 3. Stone cells 4. Laticifers 5. Fibre 6. Vessels





(8 HEMAPUSPA: (Fig. 8)

- I. Spherical pollegrains p of 56 microns in diameter and tricolpate.
- II. Thick walled and 490 microns long trichomes of pedicel, and 364 microns long and thin walled trichomes of ovary.
- III. Yello coloured, thin walled and parenchymatous petal fragments.
- IV. Thick walled sepal fragments.
- V. Reddish tissues of stems.

**Fig. 8. Powder Analysis of Hemapuspa**

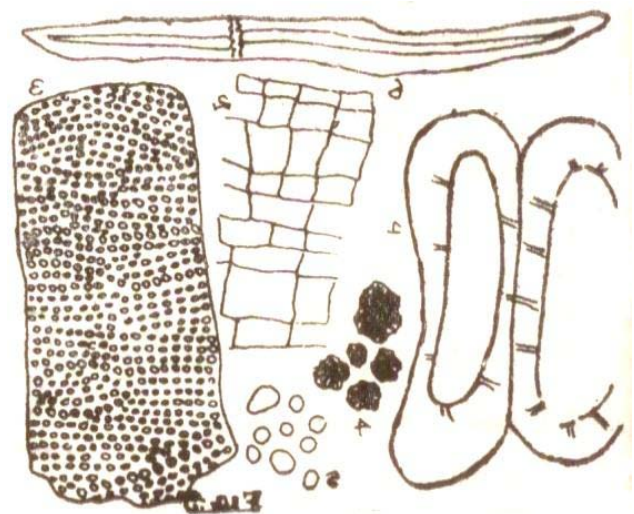
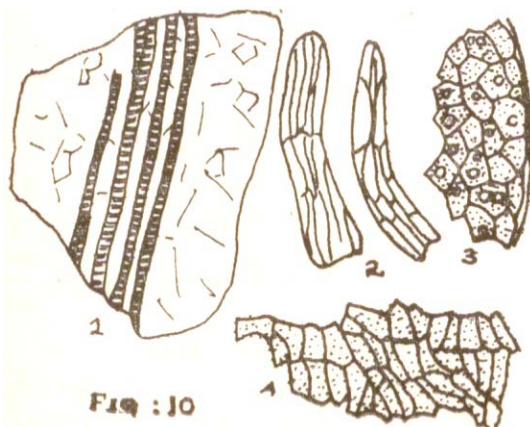
1. Pollen grains 2. Trichome of Pedicel 3. Trichome of ovary 4. Yello Petal 5. Sepal T S. view 6. Sepal Surface view 7. Tracheids

(9) JAMBU TVAK: (Fig. 9)

- I. Cork parenchymatous with alternative layers of small and big cells.
- II. Parenchyma 210 × 140 micron in size with simple ovoid or spherical starch granules of 28 microns.
- III. Calcium oxalate crystals were 28 microns in size.
- IV. Vessels alternately pitted.
- V. Fibres 1120 microns long and 14 microns in dia.
- VI. Plenty of big stone cells.

**Fig 9. Powder Analysis of Jambu Tvak**

1. Stone cells 2. Cork 3. Vessels 4. Calcium Oxalate crystal 5. Starch Granules 6. Fibre.

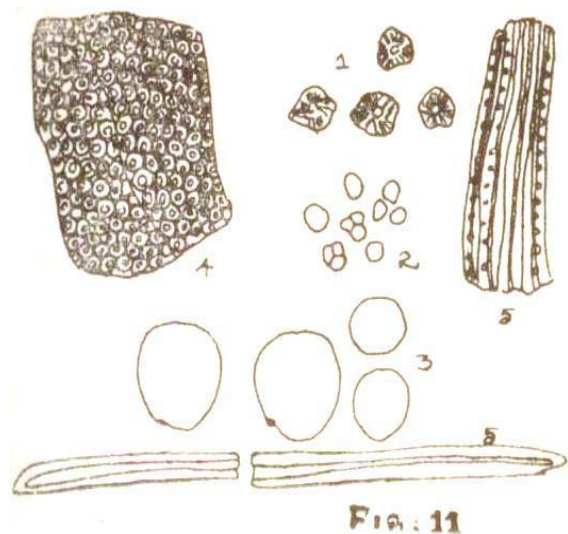


(10) JIRAKA (Fig. 10)

- I. Trichomes multicellular unbranched and clothing type in 140 × 42 microns size.
- II. Yellow coloured pericarp with spirally chickened veins.
- III. Endosperm with white coloured angular parenchyma which contain colourless oil globules.
- IV. Lignified and pitted cells of 84 × 16 micron.

**Figure 10. Powder Analysis of Jiraka**

1. Epicarp surface view 2. Trichome  
3. Endosperm 4. Pitted cells



(11) TRIVRT: (Fig. 11)

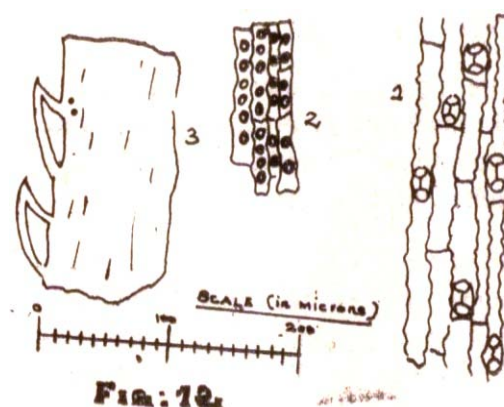
- I. Starch granules mostly in tetrads individual granules irregularly spherical or hemispherical in shape and 4– 8 micron in size.
- II. Resin bodies yellow or orange coloured found inside or outside the laticifers.
- III. Rosette of calcium oxalate crystals in 16 – 28 micron size found abundantly.
- IV. Vessels alternately pitted.
- V. Fibres frequently found in groups each with single row of pits.

**Figure 11. Powder Analysis of Trivrt.**

1. Calcium oxalate crystal 2. Starch granules 3. Resin bodies 4. Vessels 5. Fibre.

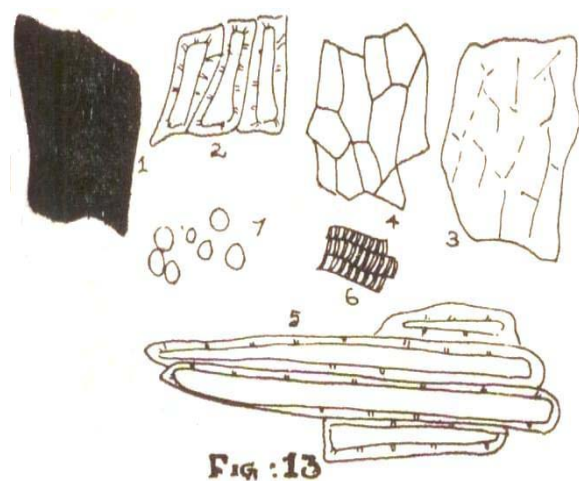
(12) VAMSAPATRA (Fig. 12)

- I. Upper epidermis of leaf, wavy walled with graminaceous stomata.
- II. Lower epidermis wavy walled with circular silica deposits.
- III. Leaf sheath with numerous unicellular and rigid trichomes of 98 micron length, all pointing upwards.
- IV. Fragments of leaf with parallel variation.



**Figure 12. Powder Analysis of Vamsa Patra:**

1. Upper epidermis 2. Lower epidermis  
3. Trichomes of leaf Sheath.



(13) VIDANGA: (Fig. 13)

- I. Black fragments of pericarp. Its stone cells columnar and in a single row measuring  $140 \times 28$  microns.
- II. Orange coloured and membranous tests.
- III. Few starch granules up to 24 microns in size.
- IV. Stone cells abundant.
- V. Tracheids annular or spirally thickened.

**Figure 13. Powder Analysis of Vidanga:**

1. Black pericarp 2. Pericarp epidermal stone cells 3. Reddish Tests 4. Testa cells 5. Stone cells 6. Tracheip 7. Starch granules.

## II. POWDER ANALYSIS OF COMPOUND FORMULATIONS:

After examining the salient anatomical features of the individual powdered crude drugs, the compound formulations Triphala Curna Triphaladi Kvatha Curna, Inji Rasayanam and Manibhadra Lehya were examined to detect the presence of their ingredients.

**(a) Triphala Curna:** This Ayurvedic Curna is a fine powder of the following three ingredients, all in equal proportion by weight and it is used as a stringent, laxative and antibacterial and it also relieves constipation.

Its ingredients are: 1. Bibitaki. 2. Haritaki and 3. Amali. This Curna was observed under the microscope and the following were observed.

- i. Unicellular unbranched and clothing tyrichomes of 68 microns long with globular base containing tannin, angular parenchymatous epicarp with coloured bases of trichomes and thin walled parenchyma with numerous starch granules confirmed the presence of Bibitaki.
- ii. Articulated and pitted laticifers confirmed the presence of Haritagi.
- iii. Irregular masses of parenchyma with numerous prismatic crystals and individual laticifers occasionally bifurcated at ends confirmed the presence of Amalaki.

Thus the inclusion of Three ingredients in this compound formulation could be justified.

**(b) Triphala Kvatha Curna:** This Ayurvedic Kvatha Curna is the coarse powder of the following eight ingredients, all in equal proportion by weight and its decoction is a mild laxative, decreases the amount of urine in diabetes insipidus and it is need as a vehicle for other medicines in all kinds of urinary disorders.

The ingredients are 1. Vibhitaki. 2. Haritaki 3. Amalaki. 4. Haridra. 5. Daru haridra. 6. Jambu twak. 7. Vamsapatra 8. Hema puspa. The Kvatha Curna was examined microscopic ally as follows:

- i. Presence of the 'Triphala' i.e. Vibataki Haritaki and Amalaki was indentified as did in Triphala Curna.
- ii. Yellow coloured parenchymatous cells of 70 – 126 -186 × 42 – 56 – 126 micron size and at times harbouring red coloured oil glubules, yellow coloured spirally thickened vessels and, of all, small pieces of rhizome which were visible to naked eye itself indicated the presence of Haridra.
- iii. Yellow coloured and oppositely pitted vessels, yellow coloured stone cells, yellow coloured bands of fibres confirmed the presence of Daru Haridra.
- iv. Parenchymatous cork with alternative layers of small and big cells, rosette of calcium oxalate crystals, alternately pitted vessels and bigger white stone cells confirmed the presence of Jambu twak.

v. Upper epidermis with wavy walled parenchyma and graminaceous stomata, lower epidermis with circular silica deposits, leaf sheath tissues with rigid trichomes and, of all small, green leaf bits with parallel venation which were microscopically visible indicated the presence of Vamsapatra.

vi. Spherical pollen grains of 56 micron trichomes of 364 – 390 microns yellow coloured petal tissues and of all small fragments of petals and stamens which were visible to naked eye confirmed the presence of Hemapuspa.

Thus the inclusion of all the eight ingredients in the Kvatha Curna could be identified.

**(c) Manibhadra Lehya:** This Ayurvedic Lehya is the Linctuse, prepared by adding the powder of the following ingredients in Guda Syrup. It is a laxative, very good anthelmintic and blood purifier. It is also useful in piles, chronic skin diseases and habitual constipation. Its ingredients are Guda 1200gms. Vidanga 100gms. Amlaki 100gms. Haritaki 100gms. and Trivrt 300gms.

The Lehya was dissolved in excess amount of water and filtered. The residue was observed under microscope and the following results were noticed.

i. Black fragments of pericarp. Its columnar stone cells in a single row in the sizes of  $140 \times 280$  microns and orange colored membranous testa, confirmed the presence of Vidanga.

ii. Starch granules in tetrads, spherical resin bodies. Rosette of Calcium oxalate crystals, alternately pitted vessels and bands of fibres with single row of bits confirmed the presence of Trivrt.

ii. Irregular masses of parenchyma with numerous Prismatic crystals, laticifers mostly found solitary and slightly bifurcated at ends confirmed the presence of Amlaki.

iv. Articulated laticifers with simple pits confirmed the presence Haritaki.

Thus all the 5 ingredients of the Lehya could be identified.

### **Discussion:**

The microscopic method is found to be very simple and inexpensive and it could successfully be applied to the compound drugs which contain not more than eight ingredients. This method could also be tried with compound drugs of several ingredients if projection microscope is used. Moreover the number of ingredients in the medicine is not the limiting factor but the diversity of ingredients in the medicine is important so that the contrasting anatomical features of the ingredients could easily be traced.

### **ACKNOWLEDGEMENT**

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