Detailed Pharmacognostical and Pharmaceutical Evaluation of Combine Formulation of Triphala Yavakuta (1:2:4)

R.L.Y.U. Rathnayaka¹*, D.B.Vaghela², C.R.Harisha³, V.J. Shukla⁴
1. I.P.G.T& R.A, GAU, Jamnagar

ABSTRACT

Triphala is an important Ayurvedic formulation containing, Haritaki (Terminalia chebula Retz), Vibhitaki (Terminalia bellarica Roxb), Amalaki (Emblica officinalis L.) as a ingredients. All the constituents are available and prepared according to the reference present in Yoga Ratnakara Madhyaama Khanda. Triphala (Haritaki, Vibhitaki and Amalaki) classified as an important medicine of the Rasayana and Cakshusya group which is mainly indicated in Prameha, Sthoulya and Kustha and also it is believed to promote health, immunity and longevity. Though they are individually very potent drug and have their own specific mode of action on different disease conditions. Triphala the sense of its Rasa, Vipaka and to some extent its Prabhava is similar to its three contents but its Virya, Doshagnata and Guna are not exactly similar to the composing three drugs. This is due to Samyoga Samskara by which the clinical efficacy of particular drug changes several methods are adopted to prepare Triphala some uses equal proportions (1:1:1) some in different proportions (1:2:4). Till date there is only one scientific work has been carried out and less publication of 1:2:4 combination forms of Triphala. In the present study the Yavakuta formulation of Triphala was subjected to Pharmacognostical (microscopic), HPTLC, and pharmaceutical (evaluation of various physiochemical parameters) evaluation in order to prepare a preliminary profile of the formulation. The sample was subjected for various phytochemical parameters like water soluble extractive (55.8% w/w), alcohol soluble extractive (42.2% w/w), ash value (0.89% w/w), loss on drying (11.39% w/w), and the pH (5.0), HPTLC. The HPTLC, solvent system was Toluene:ethyl acetate (9:1), showed the presence of 5 spots at 254 nm and 2 spots at 366 nm. Thus the physiochemical and microscopic characters achieved may provide guidelines for standardization of formulation, Triphala Yavakuta combine formulation (1:2:4).

Keywords: Triphala Yavakuta, HPTLC, Pharmacognostical, Physiochemical Evaluation

*Corresponding Author Email: dr.udenirathnayake@gmail.com
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INTRODUCTION

Triphala is a drug widely used in many disorders due to its various pharmacological activities. Triphala is composed of the three myrobalans\(^1\) Terminalia chebula Retz. (Haritaki), Terminalia bellerica Roxb. (Vibhitaki) and Emblica officinalis Gaertn. (Amalaki) and is one of the most commonly used Ayurveda preparations\(^2\). It contributes to the balance of all the three Doshas Vata, Pitta and Kapha. Amalaki for Pitta, Vibhitaki for Kapha and Haritaki for Vata\(^3\). Ama, the accumulation of unwanted products or toxins in the body is the major reason for many diseases and physical conditions. The main advantages associated with Triphala are promotes good digestion, colon cleaning, blood purification, mental alertness, better eyesight etc\(^4\). Triphala is usually a combination of equal parts of all the three fruits in powdered form. But in classics depending upon the Doshic combination and disease condition proportion of these three drugs varies\(^5\). Triphala is known for its medicinal properties such as anti-aging, antianemic, antibacterial, anticancerous, antidiabetic, antidiarrhoeal, antimutagenic, antioxidant, antiparasitic, antiviral, cardio protective, hepatoprotective, hypcholesterolaemic, radio protective and colon cleanser. All of the three constituents of Triphala are active and shows slight difference in activities under different sets of environmental conditions but the combination all three showed a significant and efficient effect as compared to individual components. Triphla is rich in active ingredients like tannins, carbohydrates, saponins, ellagic acid, sorbitol and ascorbic acid\(^6\).

Till date there is only one scientific work has been carried out and less publication of 1:2:4 combination forms of Triphala. In the present study the Yavakuta formulation of Triphala was subjected to Pharmacognostical (microscopic), HPTLC, and pharmaceutical (evaluation of various physiochemical parameters) evaluation in order to prepare a preliminary profile of the formulation.

MATERIALS AND METHOD:

Collection of the drug:
Mature fruits of Haritaki, Vibhitaki and Aamalaki as Unequal quantities like 1:2:4 were procured from the Pharmacy of IPGT & RA, Jamnagar, India. Their characteristics were confirmed in the Pharmacognosy of IPGT & RA, Jamnagar, by correlating their morphological and microscopical features with relevant literature.

Preparation of the drug:
Collected dried fruits of Triphala (Haritaki, Vibhitaki, Amalaki) as Unequal quantities like 1:2:4 made into coarse powder with the help of manual grinder, and mixed together to get till well mixture.
Table 1: Ingredients of *Triphala Yavakuta* (Yo.Ra, Madyama Khanda 1)

| Sr No. | Sanskrit Name | Botanical Name           | Proportion |
|--------|---------------|--------------------------|------------|
| 1      | Haritaki      | *Terminalia chebula Retz.* | 1 Part     |
| 2      | Vibhitaki     | *Terminalia bellarica Roxb.* | 2 Part     |
| 3      | Amalaki       | *Emlica officinalis L.*   | 4 Part     |

**Pharmacognostical evaluation:**

Various characters like colour, odour, taste and touch are recorded by using sensory organs. Powder microscopy of the finished product was done without stain and after staining with Phloroglucinol+HCl micro photographs were taken under Carl- Zeiss Trinocular microscope attached with camera. By Powder microscopy observed the characters, determined the chemical nature of the cell wall along with the form and chemical nature of the content of the cells.

**Pharmaceutical evaluation:**

*Triphala Yavakuta* was subjected to physicochemical study in order to develop analytical profiles. In this phase following parameter were carried out - Loss on drying at 110°C, pH value, ash value, water soluble extractive, alcohol soluble extractive.

**High Performance Thin Layer Chromatography.**

In HPTLC study of *Triphala Yavakuta*, methanol extract of *Triphala yavakuta* was spotted on pre-coated silica gel GF 60254 Aluminium plate by mean of Camag Linomate V sample applicator fitted with a 100μl Hamilton syringe. The mobile phase consisted of Toluene: Ethyl acetate a ratio of 9:1 v/v. After development, densitometric scan was performed with a Camag TLC scanner III in reflectance in absorbance mode at 254 and 366 nm under control of Win CATS Software (V1.2.1.Camag). Then, the plate was sprayed with Vanillin Sulphuric acid followed by heating and then visualized in daylight. Densitogram curve of HPTLC of *Triphala Yavakuta* is given in plate no . The colour and Rf values of resolved spots of HPTLC were noted. (Table 4)

**RESULTS AND DISCUSSION**

**PHARMACOGNOSTICAL STUDY**

**Organoleptic Characters:**

Color, Odor, Taste, Touch and Texture and powder nature of *Haritaki*, *Vibhitaki*, and *Amalaki* were recorded by sensory characters and results were as follows.

| Table 2: Organoleptic characters of *Triphala Yavakuta*: Individual |
|-------------------------|----------------------|----------------------|
| Characters | *Haritaki* | *Vibhitaki* | *Amalaki* |
| Colour       | Yellowish Brown     | Yellowish Brown     | Dark Brown       |
| Odour        | Characteristic      | Characteristic      | Characteristic   |
| Taste        | Astringent & Bitter | Bitter & Astringent | Sour & Astringent |
Organoleptic characters of *Triphala* - Combine formulation:

Colour, Odour, Taste, Touch and Texture and powder nature of equal and unequal proportion of *Triphala* were recorded by sensory characters and results were as follows,

### Table 3: Organoleptic characters of *Triphala*: Combine formulation

| Characters | *Triphala (1:1:1)* | *Triphala (1:2:4)* |
|------------|-------------------|-------------------|
| Colour     | Yellowish Brown   | Dark yellowish Brown |
| Odour      | Characteristic    | Characteristic    |
| Taste      | Astringent        | Astringent        |
| Touch      | Fine              | Fine              |
| Texture    | Fine              | Fine              |

Plate 1: *Triphala Yavakuta* (1:2:4)

| Hartaki   | Vibhitaki | Amalaki | Triphala Yavakuta |
|-----------|-----------|---------|-------------------|

Microscopic characters:

Microscopic characters of individual raw drugs as such shows definite variation, the compound formulation in different proportion also varies microscopically this may be due to the effect of Panchamahabuta constitution. The main interaction of Panchamahabhuta are Pitted stone cells with wide lumen, fibers with wide lumen indicates that characters may be influenced by Vayu and Akash. The specific cells and characters were loosely arranged with the influence may be Jala. The clumping and dissolving nature of rosette crystals because of excess addition of Amalaki indicating influence of Agni ultimately integrate the potency of the formulation. The 1:1:1 shows less number of simple fibers, silica crystals and sclerides with lumen, trichome with tannin and clear rosette crystals. Whereas 1:2:4 results shows large number of simple fibers, silica crystals and sclerides with lumen, trichome without tannin and clumped rosette crystals. The characters which are less concentration with lumen, clumping nature of crystals and silica crystals mainly may due to variant ingredient proportion.
### Table 4: Powder microscopic characters of *Triphala* (individual and combine) drug

| Sl.no. | *Haritaki*       | *Vibhitaki*          | *Amalaki*          | *Triphala Yavakuta* (1:2:4) |
|-------|-----------------|----------------------|-------------------|----------------------------|
| 1     | Epicarp cells   | Fibers               | Fibers            | Large no of simple fibers  |
| 2     | Epidermal cells | Trichome base filled with tannin | Starch grains | Mesocarp cells            |
| 3     | Mesocarp cells  | Mesocarp cells       | Mesocarp cells    | Pitted stone cells         |
| 4     | Lignified fibres Tannin | Rosette crystals Sclerides | Stone cells Stone cell in group Silica crystals Tannin | Pitted vessels Rosette crystals clumped Large quantity of Sclerides, lumen Stone cells + pitted pharanchymatous |
| 5     |                  |                      |                   |                            |
| 6     |                  |                      |                   |                            |
| 7     | Pitted vessels  |                      |                   |                            |
| 8     | Starch grains simple and compound | Tannin | - | Trichomes without Tannin |
| 9     | Sclerides       | Stones + Trichome    | -                 | Large no of silica crystals |

### Plate 2- Powder microscopic characters of *Triphala Yavakuta*

- Rosette crystals of *Haritaki*
- Epicarp cells of *Amalaki*
- Epicarp cells of *Haritaki*
- Epicarp cells of *Vibhitaki*
- Fibers of *Amalaki*
- Lignified scleroid of *Vibhitaki*
- Lignified stones of *Amalaki*
- Lignified stones of *Haritaki*
Mesocarp cells of Amalaki | Scleroid of Amalaki | Trachoma of Vibhitaki | Scleroid of Vibhitaki
---|---|---|---

**Physicochemical analysis:**

Results of physicochemical analysis i.e. loss of drying, ash value, water soluble extract, alcohol soluble extract and pH value are shown in table 5.

| Sl No | Analytical parameter       | Results     |
|-------|---------------------------|-------------|
| 1.    | Loss on Drying            | 11.35% w/w  |
| 2.    | Ash value                 | 0.89% w/w   |
| 3.    | Water soluble extractive  | 55.8% w/w   |
| 4.    | Alcohol soluble extractive| 42.2% w/w   |
| 5.    | pH value                  | 5.0         |

**High performance thin layer chromatography (HPTLC):**

The color and Rf values of resolved spots of HPTLC were noted. (Table 6)

**Table 6: Rf values of Methanolic extract of Triphala Yavakuta obtained by HPTLC**

| Sample Name   | Visualize under short UV (254 nm) | Visualize under short UV (366 nm) |
|---------------|-----------------------------------|-----------------------------------|
|               | No. of spots | Rf value    | No. of spots | Rf value    |
| Yavakut of Triphala | 5            | 0.01, 0.08, 0.54, 0.69, 0.82 | 2            | 0.01, 0.54  |

Plate 3: HPTLC in Triphala Yavakuta

![254nm – 3D View](image1)

![254 nm - Peak View](image2)
DISCUSSION:

**Organoleptic characters:**
Organoleptic characters of individual raw drug vary in color, odor and taste. When they are combined together, quantitatively also there is a definite change in the characters. Here 1:2:4 mixture shows strong astringent, dark yellowish brown and characteristic taste, color and odor respectively.

**Microscopic characters:**
The 1:2:4 shows large number of simple fibers, silica crystals and sclerides with lumen, trichome without tannin and clumped rosette crystals. These changes may be due to variant ingredient proportion and also influence of *Panchamahabhuta* constitution. The efficacy of the drug too changes in both the combinations. Due to Acidic pH the crystals of *Amalaki* dissolved the crystals of *Haritaki* and *Vibhitaki*. So, *Amalaki* has *Chakshushya* action more than *Haritaki* and *Vibhitaki*.
On the basis of above special findings we selected *Triphala Yavakuta* ratio as 1:2:4. The HPTLC showed that 2 spots were found at 254nm and 5 spots at 366nm.

**CONCLUSION:**

So on the basis of above pharmacognostical, physico-chemical analyzing details, we can prove fact that individual and different proportions of *Triphala* act differently in many clinical conditions. This study scientifically reveals that the combines formulation (1:2:4 *Triphala Yavakuta*) shows genuinely of the finished product (representing *Haritaki*, *Vibhitaki* and *Amalaki*) but some of the characters are changed due to the combination, quantity and influence of Panchamahabuta constitution; this preliminary information can be used for reference in future for further research development.

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