

# Influence of *Bhavana* on pharmacognostical parameters of *Amalaki Rasayana* vis-a-vis *Amalaki* powder

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**Background:** *Rasayana* is an ancient concept of *Ayurveda*, attributed to tissue nourishment and rejuvenation. *Bhavana* is an important *Samskara* mentioned in classics by which even a small dose of a drug may be made to produce a very high result. *Amalaki Rasayana* is a herbal formulation mentioned in classics to treat various disorders. **Aims:** To screen the differences in pharmacognostical profile of *Amalaki Churna* before and after *Bhavana*. **Materials and Methods:** *Amalaki Rasayana* was prepared by levigating the *Amalaki* powder seven times with fresh *Amalaki* juice (squeezed from mature fruits, procured from local market). **Results:** After *Bhavana* significant changes were found in epidermal cells, mesocarp cells and fibres.

**Key words:** *Amalaki, Bhavana, pharmacognosy, Phyllanthus emblica, rasayana*

## INTRODUCTION

*Acharya Charaka* defines *Samskara* as transformation of the inherent attributes of a substance. This is done by dilution, application of heat, cleansing, churning, storing in a specific place, maturing, flavouring, impregnation, preservation, container, etc., *Bhavana* is one of the various types of *Samskara* mentioned in classics in which the powder of the drug is levigated with liquid media of same drug or drug with similar properties. It has been postulated in *Charak Samhita* that such preparation results in quicker and amplified action with minimum dosage.<sup>[1]</sup>

It is being realised that oxidative stress is responsible for causing a wide spectrum of disease by causing an imbalance between formation and neutralisation of free radicals which results in protein and DNA damage along with lipid peroxidation.<sup>[2]</sup> Human cells protect themselves from free radical damage by enzymes like superoxide dismutase, catalase and compounds like ascorbic acid, glutathione, etc.<sup>[3]</sup>

*Amalaki Rasayana* is one such herbal formulation prepared from *Phyllanthus emblica* Linn. (*Amalaki*) belonging to the family Euphorbiaceae. *Amalaki* is highly nutritious and is an important dietary source of Vitamin C, minerals and amino acids. Fruit also contains phyllemblin and curcuminoides. The fruit contained 482.14 units of superoxide dismutase/g fresh weight, and exhibited antisenescent activity.<sup>[4]</sup> The ascorbic acid content of the fruit has been assayed at approximately 1 g per 100 ml of fresh fruit juice and accounts for 45-70% of the antioxidant activity.<sup>[5]</sup> The Ayurvedic process of preparing the *Amalaki Rasayana* results in a 3-fold increase of ascorbic acid and an increase in the concentration of polyphenols. This procedure mixes dried fruit powder with fresh emblica juice for a few hours, and then the mix is dried and powdered again. This process is repeated, making this method of fruit processing nutritionally beneficial.<sup>[5]</sup>

This is the need of an hour to find out the possible reasons for such improved activity through differences in pharmacognostical parameters. Till date, there is no reference regarding impact of *Bhavana* on the pharmacognostical parameters of *Amalaki*. Hence, for the present study an attempt has been made for the same.

## Chemical Constituents

A good source of vitamin C; carotene, nicotinic acid, riboflavin, D-glucose, D-fructose, myoinositol and a pectin with D-galacturonic acid,

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D-arabinosyl, D-xylosyl, L-rhamnosyl, D-glucosyl, D-mannosyl and D-galactosyl residues, embicrol, mucic, indole acetic acid and four other auxins – a1, a3, a4 and a5, two growth inhibitors – R1 and R2; phylllembic acid and phylllembin (fruits) and fatty acids (seed oil); leucodelphinidin, procyanidin, 3-O-gallated prodelphinidin and tannin (bark); ellagic acid, lupeol, oleanolic aldehyde and O-acetyl oleanolic acid (root); tannins, polyphenolic compounds; 1,2,3,6-trigalloylglucose, terchein, corialgin, ellagic acid, alkaloids, phyllantidine and phyllantine (leaves and fruits). The dominant active constituent of *Amalaki* is a group of tannins derived from gallic and ellagic acids, which make up a large portion of the extractable non-nutritive constituents.<sup>[6]</sup>

Pharmacologically it has cardio-protective action,<sup>[7]</sup> hepato-protective action,<sup>[8-10]</sup> cholesterol-lowering effect,<sup>[11,12]</sup> anti-diabetic effect,<sup>[13,14]</sup> anti-cancer effect<sup>[15,16]</sup> and immuno-modulatory effect.<sup>[17]</sup>

## MATERIALS AND METHODS

### Collection and Preparation of Samples

Mature and fresh fruits of *Amalaki* (*Phyllanthus emblica*; Family: Euphorbiaceae) were procured from the local market of Jamnagar in the month of December. After removing seeds, fruits were cut into pieces. The pieces of were then made into paste with the help of industrial juicer and *Swarasa* (juice) was obtained by squeezing through clean cotton cloth.

The powder of *Amalaki* was levigated with fresh juice of *Amalaki* in an end runner. The process was repeated for six times. Afterwards, the material was sundried and powdered.<sup>[18]</sup>

### Pharmacognostical Evaluation

First, powder was subjected to organoleptic evaluation and then powder microscopy of both the samples was done without stain and after staining with Phloroglucinol + HCl. Micro-photographs were taken under Carl-Zeiss trinocular microscope that was attached with the camera.<sup>[19]</sup>

## RESULTS AND DISCUSSION

### Powder Microscopy of *Amalaki Churna*

#### Organoleptic Characters

Organoleptic characters like colour, taste, odour and touch were done. The results are depicted in Table 1.

The diagnostic characters of powder microscopy shows uniformly thickened epidermal cells (a), mesocarp cells

(b), fibres entangled with sclereids (c), crystals of silica (d), starch grains (e) and sclereids (f) [Figure 1].

### Powder Microscopy of *Amalaki Rasayana*

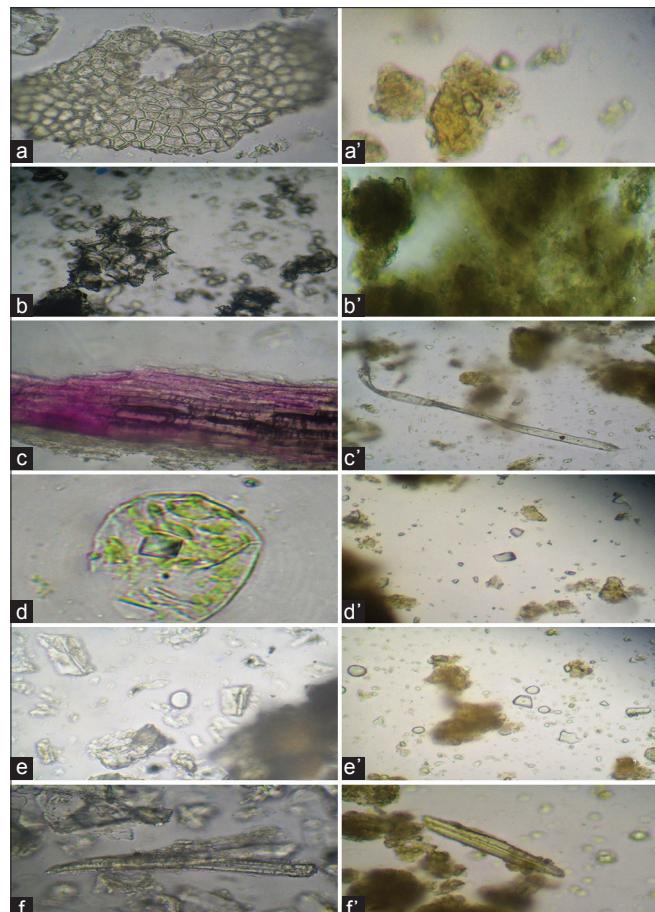
#### Organoleptic Character

Organoleptic characters like colour, taste, odour and touch were done. The results are depicted in Table 1.

The diagnostic characters of powder microscopy shows disturbed epidermal cells (a), ruptured mesocarp cells (b), fibres free from sclereids and somewhat the walls

**Table 1: Organoleptic characteristics of the powder of *Phyllanthus officinalis* before and after Bhavana**

Parameters	Amalaki Churna	Amalaki Rasayana
Colour	Yellowish brown	Dark brown
Taste	Sour, astringent	Sour ++
Odour	Faint	Faint
Touch	Smooth	Smooth, sticky



**Figure 1:** Comparative pharmacognostical characters of both samples. *Amalaki* Powder (Before Bhavana), *Amalaki Rasayana* (After Bhavana). (a) Epidermal cell of *Amalaki* Powder Before Bhavana. (a') Disturbed Epidermal Cells of *Amalaki* Rasayana; (b) Mesocarp cell; (b') Ruptured Mesocarp cell; (c) Crystals of Silica; (c') Crystals of Silica; (d) Fibres with Sclereids; (d') Fibres without Sclereids; (e) Starch grains; (e') Starch grains and Oil Globules; (f) Sclereids; (f') Sclereids

are ruptured (c), crystals of silica (d) starch grains and oil globules (e) and sclereids (f) [Figure 1].

## DISCUSSION

The organoleptic characters show that the colour of *Amalaki* powder was yellowish brown while *Amalaki Rasayana* was dark brown. Sourness also increased in *Amalaki Rasayana* in comparison to *Amalaki* powder. The increase in taste (*Rasa*) and colour (*Varna*) shows increase in potency i.e., *Baladhana* of drugs.<sup>[20]</sup>

The powder microscopy shows thickened epidermal cells in *Amalaki* powder which got disturbed after *Bhavana* in *Amalaki Rasayana*. Similarly, mesocarp cells seen in *Amalaki* powder also get ruptured after *Bhavana*. Even the fibres entangled with sclereids got free from them and found separately in *Amalaki Rasayana*. These changes suggest that as a result of *Bhavana* the intracellular content locked in the cellular compartment is freed which might result in increased bioavailability.

## CONCLUSIONS

Thus it is evident from the pharmacognostical evaluation that the cellular constituents changes found are due to the *Bhavana* which may increase the bioavailability and potency of the drug in various disease conditions. However, such needs to be validated only through clinical study and further requires detailed chemical aspects and research work.

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