



STANDARDIZATION OF *TRIKATU CHURNA* THROUGH PHARMACOGNOSTICAL & PHYSICO-CHEMICAL ANALYSIS

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Article Received on 29/12/2015

Article Revised on 18/01/2016

Article Accepted on 08/02/2016

ABSTRACT

Trikatu Churna is an Ayurvedic polyherbal formulation of the dried fruits of *Piper nigrum* L., *Piper longum* L. and rhizome of *Zingiber officinale*. It is a celebrated drug mentioned in the ancient books of Ayurveda used for the treatment of *Gulma* (abdominal lump), *Prameha* (Diabetes Mellitus), *Sthaulya* (obesity), *Pinasa* (cold and cough), *Shwasa-Kasa* (Asthma). It has hot and pungent nature, which means its intake results in production of heat in the body and increase digestive juices and bile salt secretion hence it increases the digestive fire. For this reason *Trikatu* in the form of *Churna* (powder) is selected for the management of *Agnimandya*. The present study was aimed at setting up a standard profile of *Trikatu Churna* through the Pharmacognostical and pharmaceutical analysis as per standard protocol. The observations were systematically recorded. Organoleptic features of coarse powder were harmonized with API. The pH value was 3.5, water soluble extract 13.4% w/w, methanol soluble extract 17%, ash value 6.1%, Acid insoluble Ash 1.26% and loss on drying 10.2%. HPTLC was carried out after organizing appropriate solvent system in which maximum 9 spots were distinguished at 254 nm and 8 spots at 366 nm.

KEYWORDS: *Agnimandya*, HPTLC, Pharmacognosy, Physico-chemical analysis, *Trikatu Churna*.

INTRODUCTION

Traditional medicine has a long history. It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses. There are published and unpublished data on research in traditional medicine in various countries, but further research in safety and efficacy should be promoted, and the quality of the research should be improved.^[1]

The *Trikatu Churna* is one of the classical Ayurvedic formulation used in Ayurvedic system of medicine. It consists of the fruits of *Pippali* (*Piper longum* linn.), *Maricha* (*Piper nigrum* linn.) and *Sunthi* (rhizomes of *Zingiber officinalis* linn.). It was powdered and mixed together in equal proportions to get a polyherbal formulation, *Trikatu Churna*. All these plant materials are used worldwide as spices and as a medicine also.^{[2],[3]} *Trikatu Churna* is the digestive tonic for the absorption of the other food in the body. It is also used as a rejuvenator and stimulant. *Trikatu* plays an essential role

in the treatment of wide variety of condition. It alleviates the aggravated Kapha in the respiratory tract and in the digestive channel. It also corrects impaired digestion and metabolism.^{[4],[5]}

Trikatu Churna improves digestion strength, balances Kapha Dosha, burns fats, reduces cholesterol levels, useful in skin disease, in running nose, allergic rhinitis, relieves anorexia, useful to relieve Ama, useful in diabetes.^[6] *Trikatu* has its primary effects in the upper GI tract, where it enhances the digestive fire necessary for the breakdown of food and absorption of nutrients.

However, the consumption of these spices would exert several health beneficial effects by the virtue of their innumerable therapeutic potentials, such as fever, asthma, cold, cough and other general health disorders.^{[7]-[8], [9], [10]}

The characteristic odor and flavor of ginger is caused by a mixture of zingerone, shogaols, and gingerols, volatile oils that compose one to three percent of the weight of fresh ginger.^[11] *Maricha* contains phytochemicals, including amides, piperidines, pyrrolidines and trace

amounts of safrole.^[12] Piper longum contains alkaloid piperine, piperlongumine, resin, gums, volatile oil and fatty oil.

MATERIALS METHODS

Trikatu Churna used in the research study collected from the Pharmacy of GAU was used as material for the present study. It was identified and authenticated by the Pharmacognosy department and further analyzed physico-chemically by pharmaceutical chemistry lab, Gujarat Ayurved University, Jamnagar.

Preparation of the *Trikatu Churna*

The *Trikatu Churna* is a fine powder of three herbs. It is prepared by mixing equal quantities of the powder of the dried fruits of *Piper nigrum*, *Piper longum* and rhizomes of *Zingiber officinale* and then sieved through muslin cloth. This *Churna* is stored in airtight container for further processing.^[13]

Pharmacognostical evaluation

The study was done by Powder Microscopy of *Trikatu Churna*. The identification was carried out based on morphological features, organoleptic characters and powder microscopy of the drugs as mentioned in API.^[14] Microphotographs were taken by using Carl-Zeiss Trinocular microscope (Plate-1).^[15]

Pharmaceutical analysis

Following parameters were analyzed for different physico-chemical parameters by today's routine methods at the pharmaceutical chemistry lab, GAU, Jamnagar. Parameters were selected on the basis of common parameters mentioned for powder in Ayurvedic Pharmacopoeia of India and CCRAS guidelines.^[16]

Physico-chemical Parameters^[17]

1. Loss on Drying
2. Ash Value
3. Acid insoluble Ash
4. Water Soluble extract
5. Methanol Soluble extract
6. pH

High performance Thin Layer Chromatography study (HPTLC)^[18]

Methanol extract of *Trikatu* was spotted on pre coated silica gel GF 254 aluminium plate as 5mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of a

Camag Linomate V sample applicator fitted with a 100 μ L Hamilton syringe. Ethyl acetate: water: Acetic acid (8:1:1) were used as the mobile phase. After development, Densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254nm and 366 nm under control of win CATS software. The slit dimensions were 6 mm \times 0.45 mm and the scanning speed was 20 mm per second. All HPTLC plates were scanned with filter fraction Savitsy-goloy 7, minimum slope 5, minimum height 10 AU, minimum area 50 AU and maximum height 990 AU with absorption unit.

OBSERVATION AND RESULTS

Organoleptic characteristics

Organoleptic findings of *Trikatu Churna* is given in Table 1.

Pharmacognostical study

Microscopic findings showed Brown content, Cork in surface, Olio-resin content, Parenchyma cells, with starch grains, Scalariform vessels, Simple fibres, Simple starch grains of Shunthi. Aluerone grains, Black debris, Brown content, Group of stone cells, Mesocarp cells, Oil globules, Prismatic crystals, Stone cells of *Maricha*. Bottle necked shaped stone cells, Group of stone cells, Simple fibre of Pippai. Microphotographs are shown in Plate 1. Results matched with the API and thus confirmed the genuineness of the raw drug.^[19]

Pharmaceutical Evaluation

Physico-Chemical parameters are given in Table 2. Results of HPTLC study is shown in Table 3. Densitogram of *Trikatu Churna* is shown in Plate 2.

Wrong dietary habits like *Adhyashana*, *Vishamashana* and wrong behavioral pattern like *Vegadharana* which lead to vitiation of *Tridoshas* independently or together which result in manifestation of disease *Agnimandya*. In *Ayurveda*, it is believed that *Agnimandya* is root cause for all diseases.^[20] like *Prameha*, *Sthaulya* etc. *Trikatu Churna* work in synergy to stimulate the digestive fire (agni) allowing for more efficient digestion in the stomach while promoting proper bile flow, healthy detoxification and fat metabolism. It inhibits the formation of gas and thus it helps in proper digestion of the food. It enhances the metabolic activity and rapid absorption of the nutrients.^[21]

Table 1: Organoleptic findings of *Trikatu Churna*.

Morphological Characters	<i>Trikatu Churna</i>
Color	Dark Brown
Odour	Pungent
Taste	<i>Katu</i>
Touch	Fine powder

Table 2: Physico-Chemical parameters of *Trikatu* powder.

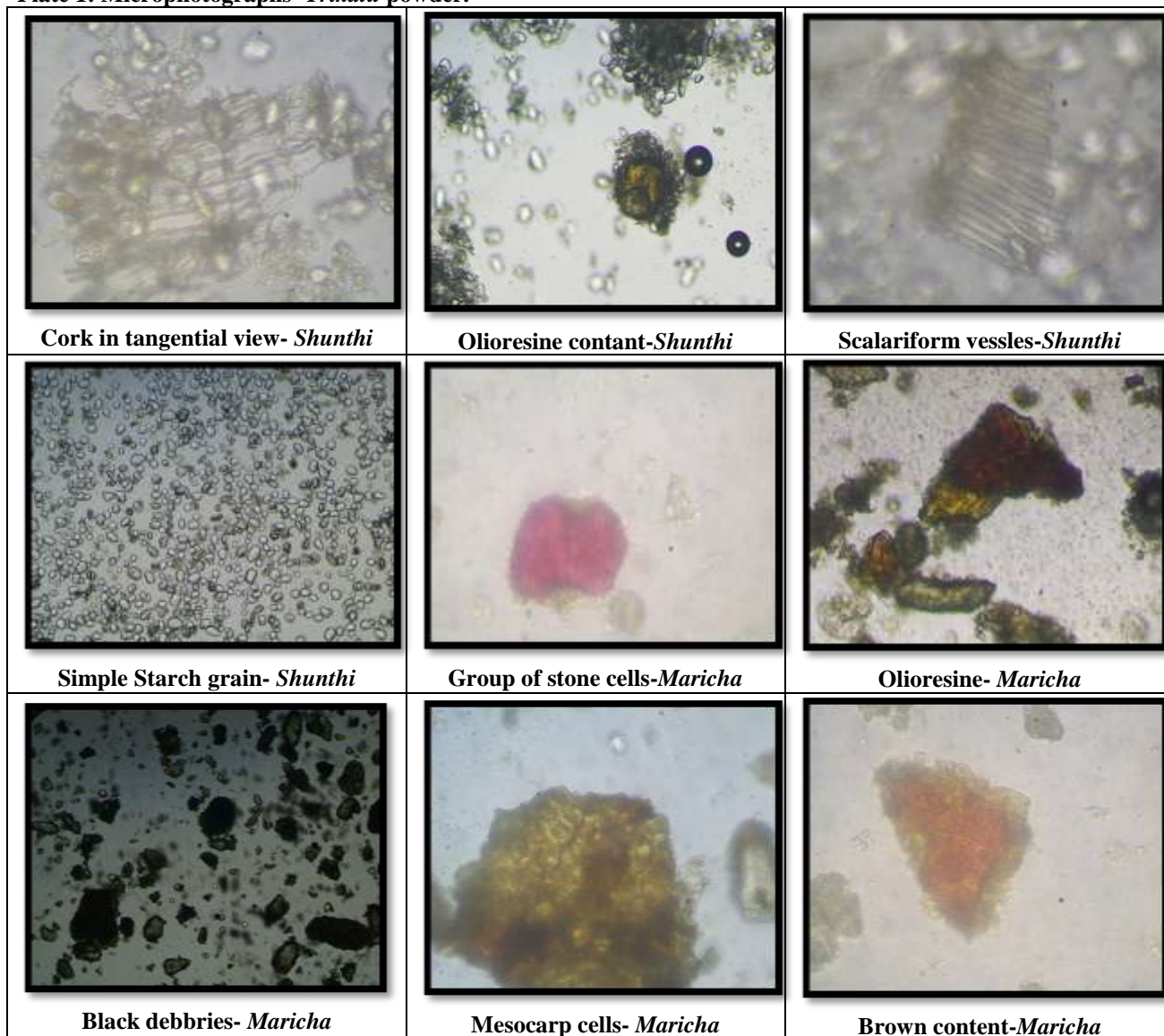
Sr. No.	Test	<i>Trikatu</i> Powder
1.	Loss on Drying at 110 ⁰ C	10.2% w/w
2.	Ash Value	6.1% w/w
3.	Acid insoluble ash	1.26% w/w
4.	Water soluble extract	13.4% w/w
5.	Methanol soluble extract	17w/w
6.	pH Value (5% v/w aqua solution)	3.5

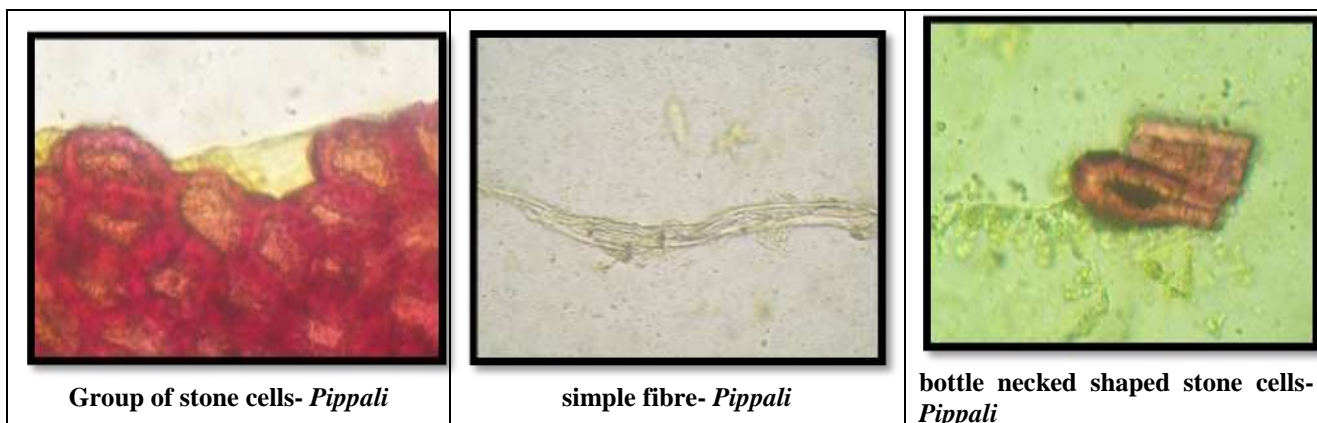
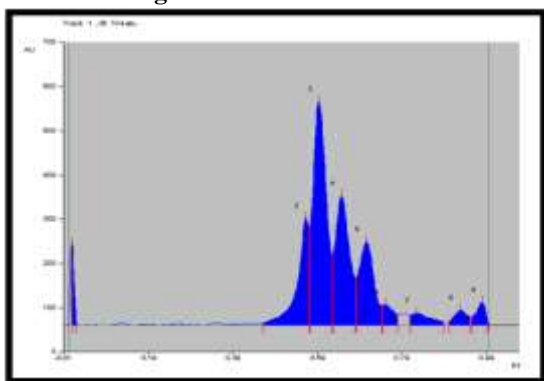
Table 3: showing consolidated data of HPTLC profile of *Trikatu* Powder.

Solvent System: Ethyl acetate: water: Acetic acid (8: 1: 1).

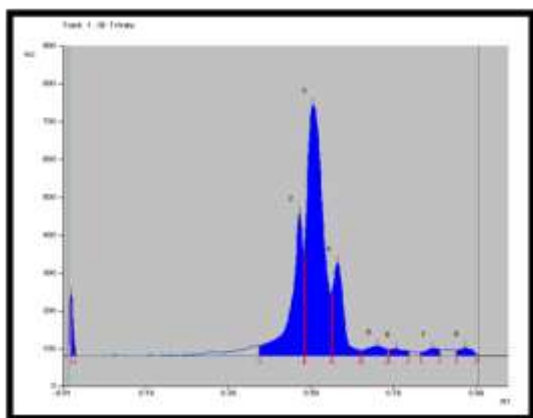
Condition	No. of spots	Max. Rf	Area
Short UV (254 nm)	9	0.01, 0.56, 0.59, 0.65, 0.71, 0.75, 0.82, 0.93, 0.98	973.5, 5815.5, 13728.8, 8439.9, 5735.4, 1052.5, 1124.7, 919.3, 979.4
Long UV (366 nm)	8	0.01, 0.56, 0.59, 0.65, 0.75, 0.80, 0.88, 0.96	782.7, 9277.0, 21500.4, 5502.3, 980.5, 574.3, 547.8, 580.2

Plate 1: Microphotographs- *Trikatu* powder.



Plate 2: Densitogram of *Trikatu*.

At 254 nm.



At 366 nm.

DISCUSSION

Medicinal plants are having great part of the *Ayurvedic* treatment as raw materials therefore the correct identification of those plants are quite necessary. The *Ayurvedic* system of medicine is facing another major problem that is quality control of crude drugs. To get the full therapeutic impact of the drugs it should be remained free from adulterants and thus the quality of the drugs can be lift up to the adequate standard. For this, proper identification of the plant excluding with the adulterant microscopically and morphologically is necessary.^[22]

The present study was undertaken to standardize *Trikatu Churna*, hence the material was subjected to minimum

Pharmacognostical and Pharmaceutical analysis. Pharmacognostical evaluation of *Trikatu Churna* showed that all the observed characters which are from all three ingredients used in the compound formulations showed that genuinity and purity of the finished product. Physico-Chemical parameters of *Trikatu Churna* like Loss on Drying, Ash Value, Acid insoluble ash, Water soluble extract, Methanol soluble extract, pH Value all were found to be within the normal range.

CONCLUSION

Pharmacognostical and physicochemical analysis of *Trikatu Churna* showed the specific characters of all ingredients which were used in the preparation. Pharmacognostical findings confirm the ingredients present in market sample. Raw drugs were cross verified with API and no major change was observed. When the finished product was analyzed under the microscope, it is inferred that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level. Though the groundwork essentials for the standardization of *Trikatu Churna* were covered in the current study, additional important analysis and investigations are required for the identification of all the active chemical constituents. The results of this study may be used as the reference standard in advance research undertakings of its kind.

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