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# Standardization of *TrikatuChurna* through Pharmacognostical & Physico-Chemical Analysis

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## ABSTRACT

Trikatu, is a compound herbal formulation containing three bitter herbs mixed together in equal quantities. Dried fruits of *Piper nigrum* (Maricha), *Piper longum* (Pippali) and dried rhizomes of *Zingiber officinale* (Sunthi) are used to prepare this miraculous formulation. It is prescribed in Ayurvedic system of medicine for treatment of tastelessness, digestive impairment, and diseases of nose and throat such as chronic rhinitis/sinusitis, skin diseases, asthma, cough, frequent urination, obesity, and Filariasis. Trikatu is also added in various Ayurvedic formulations with a view to restore the disturbed “*tridoshas- vatta, pitta and kapha.*” It calms down the increased *Vata* and *Kapha* and increases the *Pitta*. 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. Apart from traditionally known health benefits, Trikatu also possesses immunomodulatory, antiviral, expectorant, carminative, hypolipidemic, hypoglycemic, antiemetic, and anti-inflammatory potential. This study was undertaken to standardize the trikatu churna through pharmaceutical evaluation. The sample was subjected for phytochemical and various physico-chemical parameters like total ash (4.59%), acid insoluble ash (0.91%) LOD (10.06%), PH (10% Aq.sol) (5.46%), alcohol soluble extractive (8.64%), water soluble extractive (25%). Moreover it contains various phytochemical like phyto sterol, alkaloids, carbohydrates, phenol etc. Thus the physico-chemical analysis may provide guidelines for the standardization of powder formulation of trikatu churna.

**Key Words** *Trikatu Churna, Pharmacognostical evaluation, Physico-chemical analysis*

Received 20<sup>th</sup> August 21 Accepted 24<sup>th</sup> September 21 Published 10<sup>th</sup> November 2021

## INTRODUCTION

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<sup>1,2</sup>. 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



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tract and in the digestive channel. It also corrects impaired digestion and metabolism<sup>3,4</sup>. 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<sup>5</sup>. 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, obesity etc.<sup>6,7,8,9</sup>.

## MATERIALS AND METHODS

Trikatu Churna used in the research study was used as material for the present study. It was identified and authenticated by the Botany department, Gauhati University and further analyzed physico-chemically by Drug testing laboratory, Govt. Ayurvedic College, Guwahati.

### Preparation of the Trikatu Churna

Equal quantities of all the three acrid herbs, dried fruits of *Piper longum* Linn. (Long Pepper), *Piper nigrum* (Black Pepper), and dried rhizomes of *Zingiber officinale* are finely powdered separately in a mortar pestle or grinder. The fine powders of individual herbs are weighed in unequal quantities and mixed together properly. This mixture of powders is then sieved through sieve no. 80 to get extra fine powder which has more therapeutic value due to more surface area. The fine powder of Trikatu is then stored in moisture free airtight containers<sup>10</sup>.

### Dosage

Ayurvedic texts prescribe 1–3 g of Trikatu churna

to be consumed with honey or warm water for maximum therapeutic benefits.

### Chemical composition of *P. longum*

Piperine is the major and active constituent of long pepper. The piperine content is 3–5% (on dry weight basis) in *P. longum*. The fruit of *P. longum* contains a large number of alkaloids and related compounds, the most abundant of which is piperine, methyl piperine, iperonaline, piperettine, pellitorine, piperlongumine, piperlonguminine, asarinine, piperundecalidine, refractomide A, pipericide, piperderidine, longamide and tetrahydropiperine, tetrahydro piperlongumine, dehydropiperonaline piperidine, pregumidiene, brachystamide, brachystamide-A, brachystine, tetrahydro piperlongumine, and trimethoxy cinnamoyl-piperidine. Lignans Sesamin, pulvuatilol, fargesin, and others have also been isolated from the fruit of *P. longum*<sup>11</sup>.

### Chemical Composition of *P. nigrum*

*P. nigrum* contains lignans, alkaloids, flavonoids, amides, and other aromatic compounds along with approximate 3.5% of volatile oil. Components of essential oil include sabinene, pinene, linalool, limonene, and phellandrene. Piperine is an alkaloid and the chemical marker of *P. nigrum*. Chavicine which is an isomer of piperine is also present. Piperine and Chavicine are not responsible for the aroma of the black pepper. Piperine is responsible for pungency of the black pepper<sup>12</sup>.



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### Chemical Composition of *Z. officinalis*

Exhaustive chemical screening of ginger reveals that it contains over 450 compounds. The major composition of ginger rhizomes is carbohydrates (50–70%), lipids (3–8%), terpenes, phenolic compounds, amino acids, raw fiber, ash, protein, phytosterols, vitamins, and minerals. Volatile terpenoidal constituents of *Z. officinale* include zingiberene,  $\beta$ -bisabolene,  $\alpha$ -farnesene,  $\alpha$ -curcumene, and  $\beta$ -sesquiphellandrene. Phenolic compounds include gingerol, paradols, and shogaol. Gingerols and shagols are responsible for pungency of Ginger. These gingerols and shogaol are found in higher quantities of up to 20–25%. Other gingerol- or shogaol-related compounds (1–10%), which have been reported in ginger rhizome, include 6-paradol, 1-dehydrogingerdione, 6- gingerdione and 10-gingerdione 4- gingerdiol, 6-gingerdiol, 8-gingerdiol, and 10-gingerdiol, and diaryl heptanoids. The characteristic odor and flavor of ginger are due to a mixture of volatile oils such as shogaols and gingerols<sup>13</sup>.

## OBSERVATION AND RESULTS

### 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<sup>14</sup>. **The results of the study are given in Table 1, Table 2 and Table 3.**

### Microscopic Evaluation

Powdered Microscopy shows presence of starch grains, stone cells, calcium oxalate crystals, spiral vessels etc.

### Thin Layer Chromatography

TLC of ethanolic extract was carried-out in trial and error method. Three major spots were identified & R<sub>f</sub> value were determined.

**Table 1** Organoleptic evaluation of Trikatu Churna.

Morphological Characters	Trikatu Churna
Colour	Light brown
Odour	Aeromatic

**Table 2** Phyto-Chemical Screening

Test for Phenols	Present
Test for Alkaloids	Present
Test for Glycosides	Present
Test for Flavanoids	Present
Test for Steroids	Absent
Test for Tannins	Present
Test for Terpenoid	Absent

**Table 3** Physico-Chemical Evaluation

LoD(Loss on Drying)	5.69%
Total Ash	9.30%
Acid Insoluble Ash	0.80%
Alcohol Soluble Extractive	34.4%
Water Soluble Extractive	33.2%
pH Value (5% v/w aqua solution)	3.5

## 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 there should be no adulterants and thus the quality of the drugscan be lift up to the adequate standard. For this, proper identification of the plant excluding with



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the adulterant microscopically and morphologically is necessary<sup>15</sup>. 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.

may be used as the reference standard in advance research undertakings of its kind.

## 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



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