



## Pharmacognostical and physico-chemical evaluation of *Rasnapanchaka kwatha* used in post-chikungunya chronic inflammatory rheumatism: A polyherbal formulation

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### Abstract

**Introduction:** Chikungunya is a vector borne disease caused by CHIK – virus which is an arbovirus. These viruses are transmitted to humans by infected mosquitoes of the *Aedes aegypti*. Studies shows that musculoskeletal problem remain present for weeks, months and years after onset of chikungunya fever. *Rasnapanchaka kwatha* mentioned in *Bhaisajyaratnavali* as a therapeutic formulation to treat *Asthi-Majjagata Vata*. *Rasnapanchaka kwatha* contains *Rasna* (*Pluchea lanceolata* DC.), *Guduchi* (*Tinospora cordifolia* Willd.), *Erand* (*Ricinus communis* Linn.), *Devadaru* (*Cedrus deodara* Roxb.), *Shunthi* (*Zingiber officinale* Roxb.) *Rasnapanchaka kwatha* was used to as *Shamana* therapy in Post-Chikungunya Chronic Inflammatory Rheumatism.

**Method:** *Rasnapanchaka kwatha* was subjected to Phrmacognostical analysis such as microscopic study and pharmaceutical study.

**Results:** Microscopic characters were found of *Rasna*, *Guduchi*, *Erand*, *Devadaru* and *Shunthi*. Results obtained in pharmaceutical parameters of *Rasnapanchaka kwatha* powder like loss on drying 3.55 % w/w, Ash value 8.32 %, Alcohol soluble extract 3.98 % w/w etc. are within limit mentioned by Ayurvedic Pharmacopoeia of India.

**Conclusion:** From the study, data developed can be espoused for laying down the standards for *Rasnapanchaka kwatha*.

**Keywords:** chikungunya, pharmacognocny, pharmaceutical analysis, *Rasnapanchaka kwatha*

### Introduction

Chikungunya virus (CHIKV) is an alphavirus from the *Togaviridae* family that causes acute arthropathy in humans and other animals [1, 2]. Transmission usually starts with an infected mosquito bite after which the virus infects fibroblasts and macrophages in the dermis [3]. After an incubation period of 3–7 days, it is disseminated through the lymphatic system and blood-stream to epithelial and endothelial cells, and other tissues and cells [4]. The virus replicates causing viraemia, fever, rash, myalgia, arthralgia, and arthritis [5]. At this point, the acute phase is established, lasting for approximately 2 weeks and characterized by the appearance of immunoglobulin type M (IgM) (persisting for up to 3 months) followed by the production of immunoglobulin type G (IgG), which provides anti-viral immunity for years [6]. After the acute phase, CHIKV infection can progress to a chronic stage where rheumatic symptoms can last for several months to years [7]. In May 2015, the World Health Organization defined a person with chronic chikungunya as a “person with previous clinical diagnosis of chikungunya after 12 weeks of the onset of the symptoms presenting with at least 1 of the following articular manifestations: pain, rigidity, or edema, continuously or recurrently [8].” Chronic arthralgia (i.e., “suspected chronic chikungunya arthritis” or “CCA”) is a common complication post CHIKV-infection. Some studies [9] have reported that 40 to 60% of patients with acute chikungunya experience significantly impaired quality of life in the long term.

An underlying diseases is reflected in a person with signs and symptoms produced by the *Tridoshas* (Biological humour of body responsible for the diseases) [10]. In later stage of Post chikungunya there is seen *Vata* and *Kapha* Dosha dominancy. A compound formulation is prepared by selecting the drugs having specific action against the *Doshas* involved in the pathogenesis of disease. *Rasnapanchaka kwatha* [11] is one such *kasayam* (decoction) made out of five drugs which includes *Rasna* (*Alpinia galangal* wild.) *Amrutha* (*Tinospora cordifolia*.Willd.) *Devadaru* (*Cedrus deodara roxb*) *Eranda* (*Ricinus communis* Linn) and *Shunthi* (*Zingiber officinale* Roxb.) This is an important compound formulation mentioned in Ayurvedic classics for diseases of various *Sandhi- Asthi-Majjagata Vatam*, also in conditions of *Sarvangavatam Vatam*. *Rasnapanchaka kwatha* mentioned in *Bhaisajyaratnavali* in *Amavat Chikitsa* [12]. Contain of *Rasnapanchaka kwatha* having *Katu*, *Tikta Rasa* therefor it is useful for *Dosha Pachan* who is elevated.

So, current study is anticipated to evaluate *Rasnapanchaka kwatha* powder through pharmacognostic and physico-chemical study.

### AIM

To authenticate the *Rasnapanchaka kwatha* as per pharmacopeial (Ayurvedic Formulary of India and Ayurvedic Pharmacopoeia of India) method and to evaluate the quality of drug.

## Materials and Methods

### Collection and preparation of the drug

All drugs were collected from the pharmacy of ITRA, Jamnagar. The obtained drugs were shade dried, equal amount of had taken and made into a coarse powder with help of mechanical grinder. Ingredients of *Rasnapanchaka kwatha* are summarized at [Table 1].

**Table 1:** Ingredients of *Rasnapanchaka kwatha*

Sr. No.	Contents	Latin name	Part used
1.	<i>Rasna</i>	<i>Pluchea lanceolata DC.</i>	Dried Root
2.	<i>Guduchi</i>	<i>Tinospora cordifolia Willd</i>	Dried Stem
3.	<i>Erand</i>	<i>Ricinus communis Linn.</i>	Dried root
4.	<i>Devadaru</i>	<i>Cedrus deodara Roxb.</i>	Stem
5.	<i>Shunthi</i>	<i>Zingiber officinale Roxb.</i>	Rhizome

### Organoleptic evaluation

Various parameters of the material such as colour, odour, touch and taste of the *Kwatha* powder were observed and recorded [13]. [Table 2].

**Table 2:** Organoleptic characters of *Rasnapanchaka kwatha*

No.	Organoleptic Characters	Results
1.	Color	Light brown
2.	Touch	Course
3.	Odour	Irritation
4.	Taste	Bitter followed by astringent
5.	Appearance	Course Powder

### Microscopic Evaluation

Microscopic examination of material powder was carried out with and without staining, by powder microscopy to

determine the chemical nature and microphotographs were taken using Carl Zeiss binocular microscope [14].

### Physico-chemical Analysis

Physico-chemical analyses were carried out by following the parameters. Physico-chemical analysis like

- Loss on drying at 110°C [15],
- pH value [16],
- Ash value [17],
- Water soluble extractive [18],
- Alcohol soluble extractive [19] were recorded.

### Observations and Results

#### Pharmacognostic Study

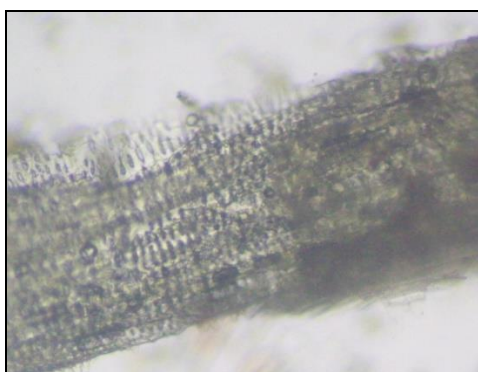
Microscopic powder characters of *Rasna* were found like Acicular cristal, pitted vessel, etc. Microscopic powder characters of *Guduchi* were found Starch grain, Fibers etc. Microscopic powder characters of *Erand* were found like Strait fiber, Cluster crystal etc. Microscopic powder characters of *Devadaru* were found like Brown contents, Fibers, etc. Microscopic powder characters of *shunthi* were found like Starch grain, Oleo- resin contents which are depicted in [Table 3].

**Table 3:** Microscopic characters of *Rasnapanchaka Kwatha*

Sr.no.	Name of Drug	Characters found
1.	<i>Rasna</i>	Acicular crystal, Pitted vessel
2.	<i>Guduchi</i>	Starch grain, Fibers
3.	<i>Erand</i>	Strait fiber, Cluster crystal
4.	<i>Devadaru</i>	Brown contents, Fibers
5.	<i>Shunthi</i>	Starch grain, Oleo- resin contents



I. Acicular crystal of *Rasna*



II. Pitted vessel of *Rasna*



III. Starch grain of *Guduchi*



IV. Fibers of *Guduchi*



Fig 1

### Analytical Study

Results of the analytical study of *Rasnapanchaka Kwatha* powder are as follows.

### Physico-chemical Constants

The results are depicted in [Table 4]

**Table 4:** Physico-chemical Constants of *Rasnapanchaka Kwatha*

Sr. no.	Parameter	Result
1.	Loss on drying	3.55 % w/w
2.	Ash value	8.32 % w/w
3.	Water Soluble Extract	8.29 % w/w
4.	Alcohol Soluble Extract	3.98 % w/w
5.	pH	7

### Discussion

Results obtained in physico-chemical parameters of *Rasnapanchaka Kwatha* are within limit mentioned by Ayurvedic Pharmacopoeia of India.

With increasing demand for safer drugs, attention has been drawn to the quality, safety, efficacy and standards of the Ayurvedic drugs [20]. Hence, there is a need for standardization and development of reliable quality

protocols for Ayurvedic drugs using modern techniques of analysis [21].

The problems associated with unregulated herbal products highlight the major public health issues that can arise when their herbal ingredients have not been authenticated correctly. Herbal ingredients must be accurately identified by macroscopic and microscopic comparison with authentic material or accurate descriptions of authentic herbs [22]. In present study, the ingredients of *Rasnapanchaka kwatha* was studied under Pharmacognosy and Pharmaceutical laboratory of ITRA, Jamnagar for their authentication. Specific characteristics of *Rasnapanchaka kwatha* was studied as Microscopic Evaluation and Physico-chemical Analysis.

### Conclusion

By analysing the results it can be concluded that the trial drug is authentic and devoid of any adulteration. All quality control parameters were found satisfactory and can be used safe for a human trial. Further studies may be carried out on it on the basis of observation made and results of experimental studies. As pharmacognostical and physico-chemical analysis of *Rasnapanchaka kwatha* are available

this study may be beneficial for future researchers and can be used as a reference standard in the further quality control researchers.

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