



## Research Article

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**PREPARATION AND PRELIMINARY QUALITY CONTROL STANDARD OF  
RASONA-RASNADI GHANA VATI: A NEW DRUG FOR AMAVATA (RHEUMATOID ARTHRITIS)**

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**ABSTRACT**

Rasona-Rasnadi Ghana Vati (aqueous extract pills of Rasona-Rasnadi decoction) is an important Ayurvedic formulation containing Rasonadi Kwatha (decoction) and Rasna Saptak Kwatha (decoction) as the main ingredient. The combination of Rasnasaptaka Kwatha with Rasonadi Kwatha are very much effective in the disease Amavata (Rheumatoid Arthritis). The development of new doses form without diluting the basic principles of Ayurveda is the need in current scenario for their global acceptance. Kwatha form has few difficulties such as the need of everyday fresh preparation, short shelf life, the chance of microbial growth, transportation, fixing of unit dose etc. Considering these inconveniences and to convert it into a doses form with additional advantages; an attempt has been made to convert Ghanvati (semisolid extracted pills) and develop Physico-chemical profile of the new drug Rasona Rasnadi Ghana Vati. Raw material has been collected from Pharmacy, Gujarat Ayurveda University, Jamnagar and utilized after proper authentication. Preparation of Rasona Rasnadi Kwatha, Rasona Rasnadi Ghana and Rasona Rasnadi Ghana Vati has been done in the Pharmacy of I.P.G.T. & R.A. The samples were subjected to relevant physico-chemical parameters. Rasona Rasnadi Ghanavati contains a variety of alkaloids because out of three two alkaloid test were positive. Microscopically all drugs show different-different cells and structures like- crystals, vessels, trachieds, trichomes, fibers, starch grains, oil globules, oleoresins and endosperms. The odors of most of the drugs were pungent and the smell was not specific. All these characters were as such like described in Ayurvedic Pharmacopoeia of India (API).

**Key words:** Rasnona-Rasnadi Ghanavati, Amavata, Pharmacognosy, Pharmaceutical, Alkaloid, Rheumatoid Arthritis.

**INTRODUCTION**

Inappropriate identification of plant species, their geographical source, drying method, storage conditions and microbial contamination etc., gives extensive and unpredictable variation in the quality of the raw material. Apart from this, a method of preparation also reflects eventually in the efficacy of formulations as well. Hence, to ensure uniform quality and efficacy, there is a need to develop methods for standardization of raw materials and preparation process. In the present study, we had tried to establish the authentication of raw drug and preparation process of pills of Rasona-Rasnadi Ghana vati, which is very much effective in the remedy of Amavata. Rasonadi Kwatha<sup>1</sup> & Rasnasaptaka Kwatha<sup>2</sup> has been selected for making Rason-Rasnadi Ghana Vati. In this combination of Rasnasaptaka Kwatha with Rasonadi Kwatha most of the drugs are Katu (Pungent), Tikta (Bitter) Rasa, Ushana Virya (Hot in

Potency), Rasayana prabhava (Rejuvenation effect), Amapachaka (Digestive) and Vatashamaka properties, it helps to disrupt the pathogenesis of Amavata<sup>3</sup>.

**Objectives of the study**

1. To identify the herbal ingredients in the preparation with the help of pharmacognostic study.
2. To develop parameters for routine analysis of Rasona Rasnadi Ghana Vati to ensure uniformity in quality.
3. To develop the analytical data of Rasona Rasnadi Ghana Vati

**MATERIAL AND METHODS**

**Raw drug collection:** All the raw drugs for the purpose of research work were collected from Pharmacy of Gujarat Ayurved University, Jamnagar.

**Table 1: Formulation of Drug (Rasona Rasnadi Ghanavati)**

| Sanskrit Name | English Name                      | Botanical name                              | Part used | Quantity |
|---------------|-----------------------------------|---|-----------|----------|
| Rasona        | Garlic                            | <i>Allium sativum</i> Linn.                 | Kanda     | 1Part.   |
| Shunthi       | Ginger root                       | <i>Zingiber officinale</i> Roxb.            | Rhizome   | 1Part.   |
| Nirgundi      | Indian privet/ Five leaved chaste | <i>Vitex negundo</i> Linn.                  | Leaf      | 1Part.   |
| Rasna         | Pluchea root                      | <i>Pluchea lanceolata</i> Oliver & Hiern.   | Roots     | 1Part.   |
| Guduchi       | -                                 | <i>Tinospora cordifolia</i> (Willd.) Miers. | Stem      | 1Part.   |
| Gokshura      | Calotrops fruits                  | <i>Tribulus terrestris</i> Linn.            | Fruit     | 1Part.   |
| Punarnava     | Hog wood / Horse purslane         | <i>Boerhavia diffusa</i> Linn.              | Stem      | 1Part.   |
| Devadaru      | Himalayan cedar                   | <i>Cedrus deodara</i> (Roxb.) Loud.         | Wood      | 1Part.   |
| Amaltas       | Purging cassia / Indian laburnum  | <i>Cassia fistula</i> Linn.                 | Fruit     | 1Part.   |
| Erandmula     | Castor oil plant                  | <i>Ricinus communis</i> Linn.               | Root      | 1Part.   |

Out of 3456 formulations of Bhaishajyaranavali (ancient book), 62 formulations are mentioned by Govinda Das Sen for Amavata<sup>4</sup>. These two kwatha are among them. For making Rason-Rasnadi Ghana Vati, ingredients of Rasonadi Kwatha (Rasona, Shunthi and Nirgundi) & Rasnasaptaka decoction (Rasna, Gokshura, Guduchi, Amaltas, Punarnava, Devdaru & Erandamula) has been taken in the following composition.

### Pharmacognostical Study

Pharmacognosy is the scientific study of the structural, physical, chemical and sensory characters of crude drugs. The quality of finished product entirely depends on the quality of the raw materials. Here Rasona, Shunthi, Nirgundi, Rasna, Gokshura, Guduchi, Amalatas, Punarnava, Devdaru & Erandamula were authenticated morphologically and microscopically.

### Raw drug identification

The correct identity and authenticity of Raw materials were confirmed by studying its organoleptic and powder microscopy, later subject experts of Pharmacognosy Department, I.P.G.T. & R.A, Gujarat Ayurved University further confirmed identification then comparing them with the characters mentioned in Ayurvedic Pharmacopoeia of India (A.P.I.).

### Morphological and Organoleptic study

Morphological and organoleptic characters were studied by observing the part used as such with the help of the dissecting microscope.

Table 2: Latin name, parts used & organoleptic character of the raw drugs

| Sanskrit Name | Botanical name                              | Part used | Colour          | Odour        | Taste            |
|---------------|---|-----------|-----------------|--------------|------------------|
| Rasona        | <i>Allium sativum</i> Linn.                 | Kanda     | White           | Pungent      | Bitter           |
| Shunthi       | <i>Zingiber officinale</i> Roxb.            | Rhizome   | Yellowish white | Pungent      | Irritating spicy |
| Nirgundi      | <i>Vitex negundo</i> Linn.                  | Leaf      | Green           | Pungent      | Bitter           |
| Rasna         | <i>Pluchea lanceolata</i> Oliver & Hiern.   | Roots     | Brown           | Pungent      | Non specific     |
| Guduchi       | <i>Tinospora Cordifolia</i> (Willd.) Miers. | Stem      | Brown           | Non specific | Bitter           |
| Gokshura      | <i>Tribulus terrestris</i> Linn.            | Fruit     | Yellow          | Pungent      | Non specific     |
| Punarnava     | <i>Boerhavia diffusa</i> Linn.              | Stem      | Brown           | Non specific | Non specific     |
| Devadaru      | <i>Cedrus deodara</i> (Roxb.) Loud.         | Wood      | Yellowish brown | Non specific | Non specific     |
| Amalatas      | <i>Cassia fistula</i> Linn.                 | Fruit     | Blackish brown  | Fragrant     | Sweet            |
| Erandmula     | <i>Ricinus communis</i> Linn.               | Root      | Brown           | Non specific | Non specific     |

### Microscopical study

Free hand sections of raw drug cleared with chloral hydrate to observe the various ergastic cell contents like crystals of calcium oxalate then the section stained with phloroglucinol and HCL for detecting lignified elements like fibers, vessels, tracheids etc., and the same method was adopted for powder microscopical study.

### Powder microscopy of the raw drugs

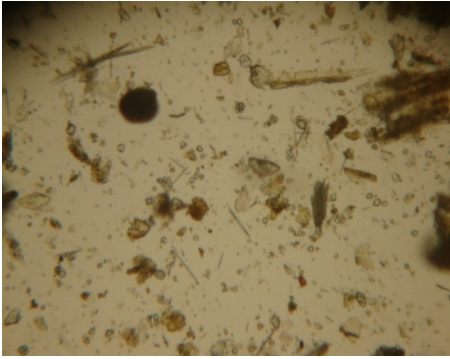
The drugs mentioned in the Rasona-Rasnadi yoga are cleaned and dried. They are powdered separately by pounding in with mortar and pestle and sieved through a thin layer of cloth (Vastragalita). The separate powders of different drugs are taken separately for powder microscopy.

Table 3: Powder microscopy of the raw drugs

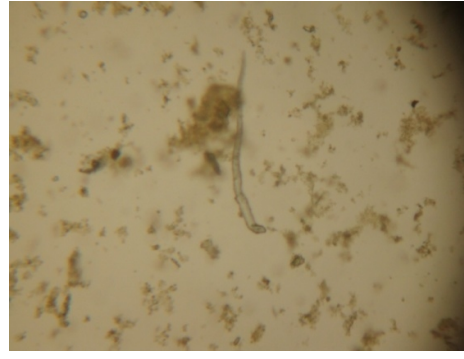
| Drug                    | Crystal                  | Cells                   | Vessels              | Trichome               | Tracheids |
|-------------------------|--------------------------|-------------------------|----------------------|------------------------|-----------|
| Rasna <sup>5</sup>      | Calcium-Oxalate, Rosette | Parenchyma              | Pitted & Scalariform | -                      | Tracheids |
| Guduchi <sup>6</sup>    | Prismatic                | Cork Cells Chlorenchyma | Pitted               | -                      | -         |
| Gokshura <sup>7</sup>   | Rosate                   | Stone Cells Parenchyma  | -                    | -                      | -         |
| Punarnava <sup>8</sup>  | Prismatic                | -                       | Pitted               | Warty                  | Raphids   |
| Devadaru <sup>9</sup>   | Prismatic                | -                       | Pitted               | -                      | Tracheids |
| Amaltas <sup>10</sup>   | Prismatic                | Stone Cells Mesocarp    | Annular              | Simple                 | -         |
| Erandmula <sup>11</sup> | Calcium-Oxalate          | Cork Cells              | -                    | Simple                 | -         |
| Rasona <sup>12</sup>    | Prismatic                | Parenchyma              | Annular              | -                      | -         |
| Shunthi <sup>13</sup>   | -                        | Parenchyma              | Spiral               | -                      | -         |
| Nirgundi <sup>14</sup>  | -                        | Pallisade Parenchyma    | -                    | Simple & Multicellular | -         |

Table 4: Powder microscopy of the raw drugs

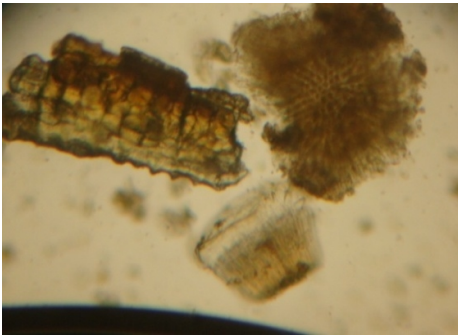
| Drug      | Fibre            | Starch        | Oil Globule | Oleoresin           | Endosperm       |
|-----------|------------------|---------------|-------------|---------------------|-----------------|
| Rasna     | Simple           | -             | -           | -                   | -               |
| Guduchi   | Group of Fiber   | Starch Grains | -           | -                   | -               |
| Gokshura  | Lignified        | Starch Grains | -           | -                   | Endosperm       |
| Punarnava | Simple           | Starch Grains | -           | -                   | -               |
| Devadaru  | Simple           | -             | Oil Globule | -                   | -               |
| Amaltas   | Simple           | -             | -           | -                   | Endosperm cells |
| Erandmula | Septet Lignified | Starch Grains | -           | -                   | -               |
| Rasona    | Simple           | -             | -           | Yellowish Oleoresin | -               |
| Shunthi   | Simple           | Starch Grains | -           | Yellowish Oleoresin | -               |
| Nirgundi  | Simple           | -             | -           | -                   | Stomata         |



**Rasona (*Allium sativum*)**



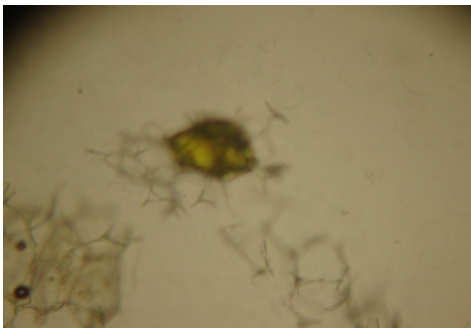
**Punarnava (*Borhavia diffusa*)**



**Amaltas (*Cassia fistula*)**



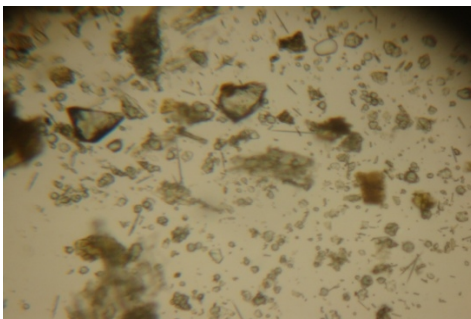
**Devdaru (*Cedrus deodara*)**



**Sunthi (*Zingiber officinale*)**



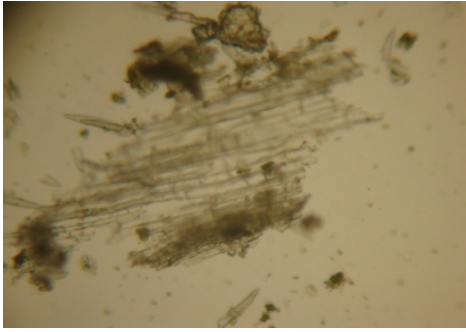
**Rasna (*Pluchea lanceolata*)**



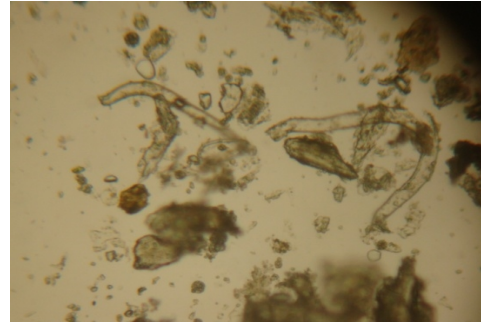
**Erand mul (*Ricinus communis*)**



**Guduchi (*Tinospora cordifolia*)**



Gokhru (*Tribulus terrestris*)



Nirgundi (*Vitex nigundo*)

Figure 1: Microscopic pictures of Rasona rasnadi ghana vati

Fig.2



Fig. 2.1



Fig. 2.2



Fig. 2.3



Fig. 2.4



Fig. 2.5



Fig. 2.6

Figure 2: Raw material of Rasona Rasnadi Ghanavati

Figure 2.1 : Root of Rasna, Figure 2.2 : Stem of Punarnava, Figure 2.3 : Dry leaf of Nirgundi, Figure 2.4 : Rhizome of Shunthi, Figure 2.5 : Yavakuta of Erandamula, Figure 2.6 : Fruit pulp of Aragvadha.



Fig. 3



Fig. 3.1



Fig. 3.2



Fig. 3.3



Fig. 3.4

Figure 3: Raw material of Rasona Rasnadi Ghanavati

Figure 3.1 : Stem of Guduchi, Figure 3.2 : Rhizome of Rasona, Figure 3.3 : Wood of Devadaru, Figure 3.4 : Fruit of Gokshura.

#### Preparation of Rasona rasnadi ghana vati

After proper identification by morphologically and microscopically Rasona-Rasnadi yoga are taken for decoction preparation. Preparation of Rasona Rasnadi Kwatha, Rasona Rasnadi Ghana and Rasona Rasnadi Ghana Vati were elaborated. Ghana preparation was intermediate preparation for manufacturing of Vati from Kwatha. The present research work has been done in the Pharmacy of I.P.G.T.& R.A., Gujarat Ayurved University, Jamnagar.

Coarse powder particles were prepared from ingredients of Rasonadi and Rasnadi Kwath then soaked it with water overnight. Next day prepare the decoction by applying the moderate heat. The pH, temperature range and various information related to the decoction preparation was noted at regular intervals to elicit the pharmaceutical behavior of the Rasona Rasnadi decoction. The pH range 4-5 was noted throughout the process and temperature 80-90°C range was also noted in between manufacturing process.

Out of 5kg of Rasonadi and Rasnadi powder taken for decoction preparation with the help of 40L of water and reduced it up to near 1/4<sup>th</sup> part and filtered it through cotton cloth for 3-4 times and 12.8L of the decoction prepared. The filtered decoction was

brown colour in appearance and astringent bitter in taste. In the preparation of Rasona Rasnadi Ghana, Rasona Rasnadi decoction was taken and reheated on the direct heat till liquid converted into semi-liquid then this semi-liquid was subjected to water bath heating till semisolid condition, in this whole process noted the pH, temperature and observation at different time intervals. The pH was observed in decreasing order up to 2.5 on the pH paper, this low pH levels of the aqueous extract of the Rasona Rasnadi was helpful to the negation of contaminants in Ghana (aqueous extract). The water bath was used to avoid the burning of the material on water bath the sticky nature of semisolid Ghana was observed, it may be due to mucilage, sugar etc. present in ingredients of Rasona Rasnadi. The colour of semisolid Ghana brownish red like coffee colour with shining was observed. Tray dryer was used to evaporate the water portion from semisolid Ghana at 50-55°C. Very high sticky nature was showed from semisolid Rasona Rasnadi Ghana during evaporation of remaining water in tray drying system. Out of 12.5L, Rasona Rasnadi decoction yielded 546g of Ghana was observed after complete drying of Ghana. The percentage of Ghana was calculated as 10.92% this percentage of Ghana was calculated from the weight of raw material. About 450g of dried Rasona Rasnadi Ghana was taken from each batch of Ghana for manufacturing of Vati (tablets/pills). Granules were made with the help of water (approximately 20%, 100ml) use as a binding

agent, when water was added in the Ghana powder, it showed highly sticky nature during granulation process (No use of any other binding agent due to adhesive nature of Ghana). Lubricants (Talc & magnesium stearate) were used in the manufacturing process of Vati. Out of 450g of Ghana yielded 367.8g Vati (pills) and total Vati was counted as 712 numbers.

#### Analytical Study

As the therapeutic efficacy of the medicinal plants depends upon its quality. So to evaluate the quality of Rasona Rasnadi Ghanavati analytical study was carried out by using suitable parameters. The present research work has been done in the Pharmaceutical laboratory of I.P.G.T.& R.A., Gujarat Ayurved University, Jamnagar.

#### Analysis of Physico - chemical parameters of formulation

The formulation was analyzed by following physico-chemical parameters:

**Table 5: Results of physico- chemical analysis of Rasona Rasnadi Ghanavati**

| S.N. | Parameters                           | Rasona Rasnadi Ghanavati |
|------|--------------------------------------|--------------------------|
| 1    | Uniformity of Pills (Average weight) | 250mg                    |
| 2    | Tablet hardness                      | 3.kg/cm <sup>2</sup>     |
| 3    | Tablet disintegration time           | >1h                      |
| 4    | Loss on drying                       | 5.1% W/W                 |
| 5    | Ash value                            | 27.95% W/W               |
| 6    | Acid insoluble ash                   | 3.65% W/V                |
| 7    | Water soluble extract.               | 22.80% W/W               |
| 8    | Methanol soluble extract.            | 15.9% W/W                |
| 9    | pH Value                             | 5.59                     |

In physico-chemical study average weight of pills, the hardness of pills, and disintegration time of the pills were observed. The pills had hardness more than 3 kg/cm<sup>2</sup> and disintegration time was more than 1hour.

#### Phytochemical study (Qualitative test for Alkaloid)

Each chemical constituent gives specific test when treated with the specific chemical. Some of the qualitative tests for

functional groups, which play very important role in the expression of biological activity by the plant materials, were performed. The tests to identify the alkaloid of drug samples macerate the plant material with 2% acetic acid in water, filter and concentrate to one-third of the original volume. Dissolve it again in a solution of Alkaloid. Pass this complex finally through Amberlite IRA 400 anion exchange resin (500g) to give an aqueous solution of alkaloid chlorides.

**Table 6: Results of qualitative analysis of Alkaloids**

| Sr. No. | Test                | Rasona Rasnadi Ghanavati |
|---------|---------------------|--------------------------|
| 1       | Wagner's test       | + ve                     |
| 2       | Dragon drift's test | + ve                     |
| 3       | Mayer's test        | -ve                      |

+ve = Alkaloid present, -ve = Alkaloid absent.

In phyto-chemical study alkaloid test (Wagner's reagent, Dragon drift's & Mayer's reagent) was done and found that in Rasona Rasnadi Ghanavati two alkaloid test was positive.

#### DISCUSSION

All crude drugs should be subjected to a pharmacognostical examination involving authentication, freedom from impurities, simple extractive tests and general quality control before they are used. To further ensure the quality & efficacy of herbal drugs phytochemical standardization using sophisticated analytical techniques is very essential. Therefore the first step of standardization is the quality control aspects of the raw material. It can be achieved by macroscopic and microscopic examination of the crude drugs.

Though, all drugs are collected from Pharmacy of Gujarat Ayurved University, Jamnagar. The correct identity and authenticity of Raw materials were confirmed by studying its morphological, organoleptic and powder microscopy then comparing them with the characters mentioned in A.P.I. Morphologically most of the raw drugs were of dry and looking according to its colour yellowish grey. The odors of most of the drugs were pungent and the smell was not specific. All these

characters were as such like described in Ayurvedic Pharmacopoeia of India (API).

In the analysis of churna (powder) Pharmacognostic study may be of great help in identifying the presence or absence of different type of cells and other ingredients with the help of Microscopic study. Microscopically all drugs show the different-different cells and structures like- crystals, vessels, tracheids, trichomes, fibers, starch grains, oil globules, oleoresins and endosperms.

Qualitative and quantitative analysis of drugs by using the modern techniques and instruments of the science is also the need of the time. Physico-chemical analysis provides the objective parameters to fix up the standards for quality of raw drugs as well as finished products. Analytical study of a drug also helps to interpret the pharmacokinetics and pharmacodynamics of the same. In physico-chemical study average weight of pills, the hardness of pills, and disintegration time of the pills were observed. The pills had hardness more than 3 kg/cm<sup>2</sup> and disintegration time was more than 1 hour. So, the patient had advised taking the pills after crushing. Due to more Moisture holding capacity, the shelf life and the storage capacity were more in the Rasona Rasnadi Ghanavati. Inorganic constituents were present because of more ash-value in the

sample of Rasona Rasnadi Ghanavati. Water-soluble constituents like sugar, Glycosides etc. & alcohol soluble constituents like sterol etc. were present because water & alcohol soluble extractive value of its sample was more.

Biomedical science has undergone the revolution in the past few years. Many of today's biological advances have their roots in chemistry and physics related techniques. Each chemical constituent gives the specific test when treated with the specific chemical. Some of the qualitative tests for functional groups, which play very important role in the expression of biological activity by the plant materials, were performed. In phytochemical study alkaloid test (Wagner's reagent, Dragon drift's & Mayer's reagent) was done and found that in Rasona Rasnadi Ghanavati contains variety of alkaloids because out of three two alkaloid test were positive.

### CONCLUSION

Ghana (aqueous extract) yielded in the range of 10-12% confirms that similarity of this Ghana percentage to the ideal range of aqueous extract of most of the drugs. On the basis of the quantity of Ghana (10-12%) 8 times of water is sufficient to get the maximum extraction of the active principle in the preparation of decoction of medium consistency drug. High degree of sticky nature observed till complete drying during the preparation of Ghana (aqueous extract). On the basis of stability study of Rasona Rasnadi Ghana Vati (aqueous extract pills) confirms that the Ghana Vati is stable for approximately two years while Rasona Rasnadi decoction is stable for one day. Ghana Vati (aqueous extract pills) is more convenient for the patient than decoction on the basis of dose, taste, smell and stability. Ghana Vati was rapidly dissolved in warm water as compare to normal water but not up to the limit which is needed for dispersible Ghana Vati it suggests that Ghana Vati takes as such by swallowing with warm water to get the similar effects as of decoction.

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