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Research Article

PHARMACEUTICAL AND PRELIMINARY ANALYTICAL STUDY OF SANGRAHANINASHAKA ARKA

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ABSTRACT

Introduction: Arka is a liquid preparation obtained by distillation of certain liquids or drugs soaked in water using Arkayantra or any convenient modern distillation apparatus. It is first described in the Arka Prakasha, which details various formulations, including Sangrahaninashaka Arka, made primarily from Mudga (Greengram) and Takra(Buttermilk). Methodology: Takra was prepared using a 1:1/4 ratio of Dadhi (Curd) to Jala (Water). Mudga was soaked in twice the amount of Takra for 48 hours before the Arka was prepared. The resulting Arka was then tested for pH, refractive index, specific gravity, and viscosity. Results and discussion: The Arka yield was 42% of the Takra, attributed to the mixture's consistency after soaking. The pH was found to be 3.42, indicating acidity. The specific gravity and viscosity were similar to those of water, while the refractive index was slightly higher. Conclusion: Sangrahaninashaka arka is indicated in Grahani. It is the disease caused due to Apathya and Agnimandhya. The properties of Takra (Buttermilk) and Mudga (Greengram) being Grahi (binding), Laghu (light), and Agnideepaka (digestive stimulant), may assist in alleviating the symptoms of Grahani.

Keywords: Sangrahaninashaka arka, Mudga, Takra, Samskara, Katina dravya arka.

INTRODUCTION:

Arka is a liquid preparation obtained by distillation of certain liquids or drugs soaked in water using Arkayantra or any convenient modern distillation apparatus[1]. The earliest discussion of Arka appears in the Arka Prakasha[2], which introduces it as one of the Panchvidha kashaya kalpana and highlights its added potency compared to other preparations.

Grahani roga is one of the conditions listed among the Ashtamahagada[3]. It primarily affects the Grahani due to weakened digestion (Mandagni) resulting from improper dietary habits (Ahitaakara sevana). This leads to an imbalance in one or more doshas, resulting in symptoms of Grahani roga, such as irregular bowel movements accompanied by pain and odor.

Sangrahaninashaka arka[4] is a formulation designed to address this condition. It is made from Mudga (Greengram) and Takra (buttermilk), and is administered with Dhanyaka (coriander), Jeeraka (cumin), and Saindhava lavana (rock salt). Takra is considered beneficial for treating Grahani due to its properties of Agnideepana (enhancing digestion), Hridya (being heart-friendly), and Kaphavatahara (reducing excess Kapha and Vata), while also having Grahi (binding), and Laghu (light) qualities[5]. Mudga is easily digestible and has Laghu, Grahi, and Ruksha (dry) properties[6]. This combination may be effective in treating Grahani roga.

Objectives: To prepare and analyze Sangrahaninashaka arka.

MATERIALS AND METHODS

The materials and methods of this work can be classified into following section.

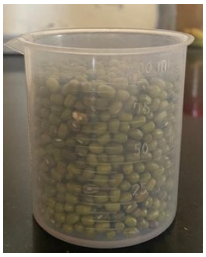
- Pharmaceutical study
- Analytical study

Pharmaceutical study

Collection of raw materials: Raw materials were collected from local market, Tanniruhalla, Hassan, Karnataka, India.

Preparation of Takra[7]: 450 ml of Dadhi (curd) was taken in a clean container and Manthana (churning) was done using a mechanical churner for five minutes. Afterward, one-fourth (i.e. 112.5ml) of the amount of water was added, and the churning process continued for one Prahara (equivalent to 3 hours). The Navaneeta (butter) separated out, and the Takra (buttermilk) was taken for further processing.

Preparation of Arka: 250ml of Mudga (green gram) was soaked in double the amount of Takra (i.e. 500ml), left under sunlight and moonlight for eight Prahara (24hr) each[8]. Subsequently, the soaked mixture was grinded, transferred into a still, and subjected to distillation. Throughout the process, a constant flow of water was maintained through the condenser, while heating was kept below a 10 gradient.


Mudga


Takra


Soaking

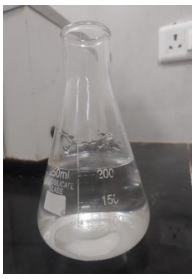

Arka

Figure 1: Preparation of Arka

Analytical study

The analytical study was done to assess the standard parameters mentioned for the formulation as per guidelines of CCRAS [9].

A) Organoleptic characters - Color, Odor, Taste and Appearance.
B) Physical and chemical parameters– pH, specific gravity, viscosity and refractive index.

Determination of pH: The pH of an aqueous liquid may be defined as, the common logarithm of the reciprocal of the hydrogen ion concentration expressed in grams per liter. The pH meter was used which consists of a voltmeter connected with two electrodes i.e., standard electrode and special electrode. The pH meter was calibrated using 7 and 4 buffer solution. The Sangrahaninashaka arka was taken, and the electrodes of the pH meter were immersed into the sample to record the reading.

Specific gravity: The specific gravity of a liquid is the weight of a given volume of that substance at the stated temperature as compared with the weight of an equal volume of water at the same temperature, all weighing being taken in air. Pycnometer was cleaned and dried carefully in dry air. Empty weight (W_1) of the same was noted. Then, Distilled water (W_2) was added to pycnometer, knob was closed to allow the extra liquid to drain out, and weight was recorded. Same procedure was repeated for sample (W_3). Specific gravity was calculated by following formula:

$$\text{Specific gravity} = \frac{\text{Density of liquid sample}}{\text{Density of water}}$$

$$\text{Specific gravity} = \frac{W_3 - W_1}{W_2 - W_1}$$

Viscosity: Viscosity is a property of liquid, which is closely related to the resistance to flow. The apparatus commonly used for the determination of relative viscosity of a liquid is known as Ostwald viscometer. It has a left-hand limb which is pipette with two calibration marks A and B. A length of capillary tube joins the pipette to a bulb C in the right-hand limb.

A definite volume of distilled water was poured into the bulb C. the liquid is sucked up to mark A of the left-limb with help of a rubber bulb. Then it was released to flow back into the bulb C. The time (t_2) to flow from mark A to B was noted with the help of stopwatch. Same procedure was repeated and the time of flow of sample (t_1) was recorded. Density of both sample (d_1) and water (d_2) was measured with pycnometer. Viscosity of sample (η_1) calculated by following formula:

$$\text{Viscosity } (\eta_1) = \frac{d_1 t_1}{d_2 t_2} \times \eta_2$$

Refractive index: The refractive index of a substance is defined as the ratio of velocity of light in vacuum or air, to that in the substance.

The instrument used is Abbe's refractometer. A thin film of the liquid was placed between the two prisms. Light was made to fall on lower side of the lower prism with the help of a mirror. The hypotenuse surface of the lower prism was ground and therefore light enters the liquid at all angles of incidence. Thus, the view in the telescope appears to be divided into two bands, one bright and one dark. The prism assembly was rotated with the edge of the bright band. A pointer attached to the prism assembly indicates the refractive index on the scale calibrated to read refractive indices.

OBSERVATIONS AND RESULTS

Pharmaceutical study

Preparation of Takra

- Adding only a quarter of water resulted in a thicker consistency of Takra.
- Despite churning for 3hrs, the amount of butter obtained was too little. It was yellowish in color.

Results

Dadhi- 450ml
Water- 112.5ml
Yield- 550ml

Preparation of Arka

- After soaking for two days, Mudga swelled, and the liquid content decreased.
- Upon grinding, the mixture became semisolid and turned into a parrot green color.
- The first drop of Arka was collected after heating for 40-45 minutes.
- Due to the thicker consistency of the mixture, the temperature was maintained below 10 gradients.

Results

Mudga: 250ml
Takra: 500ml
Grinded mixture: 800ml
Yield: 210ml

Organoleptic characters

Color: Transparent
Odor: Characteristic (that of Mudga)
Taste: Characteristic taste
Appearance: Liquid

RESULTS

Table 1: Physicochemical analysis

Parameter	Results
pH	3.42
Specific gravity	1
Refractive index	1.346
Viscosity	0.001 kg $cm^{-1}s^{-1}$

DISCUSSION

The procedures like Manthana (churning), Sthapana (soaking), Agni sannikarsha (processing with fire/heat), Kala prakarsha (processing for specific duration) are the Samskara involved in this preparation. This Samskara will help in "Gunantaradhana" i.e. transformation in the properties.

The Manthana of Dadhi with water continuously for three hours ensures that the water is evenly distributed throughout, creating a homogeneous mixture. This process also causes the Snehamsha in the Dadhi to collide and aggregate, forming Navaneeta, which separates from the liquid portion of the Dadhi producing Takra.

Mudga was also measured volumetrically, Arka was prepared using Katina dravya method, with a ratio of two parts liquid which may help in proper interaction and release of active constituents. The stapana of Mudga in Takra led to swelling and softening, which may be due to the rehydration of the beans. The soaking for two days may result in the fermentation of the product. The exposure to Ushnata of the Suryarashmi (sunlight) and Sheetata of the Chandrarashmi (moonlight) for specific duration, causes the Kala prakarsha leading to changes in properties. Overall, these processes may facilitate better interaction between these two substances, potentially enhancing the release of nutrients. The mixture was grinded to facilitate the extraction of volatile components, while heating at a lower temperature was employed to prevent charring.

The pH of the Arka was 3.42, indicating an acidic nature. Therefore, both the dosage and the Anupana play a crucial role. The Arka is recommended to be taken with coriander, cumin, and rock salt, which have a pH ranging from 6 to 7. These ingredients may help in neutralizing or balancing the acidity of the Arka. The specific gravity and viscosity of the Arka is same as that of water which may help in faster dissolution, improved bioavailability and absorption. The refractive index is slightly higher than that of water showing the increased solute concentration.

CONCLUSION

Sangrahaninashaka arka is indicated for Grahani (Malabsorption syndrome), caused from Apathya and Agnimandhya. The Grahi, Laghu, and Agnideepaka properties of Takra and Mudga may aid symptom relief. Preparation methods like Manthana and nirvapana probably enhances nutrient bioavailability. With a pH of 3.42, careful dosing is essential for balancing acidity, while water-like specific gravity and higher refractive index suggest improved dissolution and solute concentration respectively.

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