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Research Article

PHARMACEUTICO ANALYTICAL STUDY OF VACHA ARKA

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*Correspondence	Abstract
<p>K. Priya Post graduate Scholar, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India</p> <p>DOI: 10.7897/2321-6328.01406</p> <p>Article Received on: 18/10/13 Accepted on: 08/11/13</p>	<p>To assess the differences between preparation of Vacha Arka (Vacha distillate) namely on weight-weight, weight- volume and volume- volume method, it was subjected to pharmaceutical and analytical studies through organoleptic and physico-chemical methods. The hardness of Vacha is not mentioned in the five fold classification explained by Ravana, and hence two ratios are taken for the study as atyanta Kathina and Kathina. Further the Pharmaceutical study was also done by weight-weight method, weight-volume and weight- volume method. The results were significant which revealed pharmaceutical study with maximum output in volume-volume method and minimum output in weight-weight method. The different samples were analyzed by analytical parameters like pH, Specific gravity and Refractive index. Analytical study revealed more acidic pH in weight- weight and less in volume- volume method. All the samples were acidic in nature. The acidic nature of Vacha Arka may be regulating the gastric secretion which thereby acts on Agnimandya, Shula. Specific gravity of samples is always equal to 1 and refractive index is zero. Based on yield, pH, Specific gravity, Refractive index and absence of charring volume- volume method will be ideal for preparation of Vacha Arka. In that sample 1:3 will be less irritant to gastric mucosa considering the pH value. In the experiment the results of 1:3 ratio in volume- volume method was having more yield in almost similar duration of time.</p> <p>Keywords: Vacha Arka, Agnimandya, pH, Specific gravity, Refractive index</p>

INTRODUCTION

Arka is a liquid preparation obtained by distillation of certain liquids or of drugs soaked in water using the Arkayantra or any convenient modern distillation apparatus¹. Arka kalpana is one among the panchavidha Kalpanas told in Arkaprakasa². The first historical reference is available in Arka Prakasha written by Ravana³. Vacha Arka is one such Arka having digestive properties and cures constipation, flatulence and pain⁴. In Sanskrit, Vacha literally means speaking. Vacha is named so as it improves the Vachan Shakti – ability to speak. The Vacha (*Acorus calamus*) is Katu, Tikta rasa, laghu, tikshna, sara guna, ushna virya and katu vipaka. It is analgesic, digestive, quenches thirst, kills worms, ear pain, increase vocal power, etc⁵. Ravana described five-fold classification of drugs as Katina, atyanta Katina, Palvala, Kashta and Drava⁶. All the Arkas in Arka Prakasha are included under these headings. For preparing Arka from different types of these drugs, different quantity of water is mentioned. There is no reference about whether Vacha is Katina or atyanta Katina. In this pharmaceutical study the

focus is on the ratio of water used for the preparation of Vacha arka.

Aims and Objectives

- Pharmaceutical study of Vacha arka prepared by different ratio
- To evaluate the organoleptic characters of the test drugs
- To assess the physicochemical parameters of the test drugs

MATERIALS AND METHODS

The test drugs were procured and authenticated from Pharmacy of Sreedhareeyam Ayurvedic Research Centre, Koothatukulam, Kerala, India. Six samples of the drugs were prepared in the Department of Bhaishajya Kalpana and Rasa Shastra, SDMCA, Hassan, Karnataka, India. The phytochemical study was done at Sreedhareeyam Ayurvedic Research Centre, Koothatukulam, Kerala, India.

Preparation of Vachaarka

Simple distillation apparatus was used for the preparation of Vacha Arka. Six samples of Vacha Arka were prepared for the study. In all the samples the Vacha was taken in the yavakuta form (coarse powder). To it prescribed quantities of water was added and kept for soaking for a day. Next day it is transferred to simple distillation apparatus and kept for heating. 60 % mantle heat was given till the water started boiling. When vapors appeared in the sides of the still, the heat was reduced to 20 % to prevent charring. The heating was continued till the water level in the distillation apparatus was not visible. The weight of Vacha was measured by weighing machine and volume by measuring cylinder. It was observed that the weight of 100 ml water is 96 g and 100 g water is equivalent to 105 ml water.

Sample 1

Weight/weight (w/w) was taken as the standard for measurement. 50 g of Vacha was measured in weighing machine and 100 g (105 ml) of water was taken together for soaking distilling.

Sample 2

Weight/weight (w/w) was taken as the standard of measurement. Drugs were measured in weighing machine. 50 g of Vacha and 150 g [100 g for soaking and 50 g before distilling] was taken. For soaking 2 parts of water is added and on next day 1 part of water (50 g) is added before transferring to Distillation apparatus.

Sample 3

Volume/volume (v/v) was taken as the standard of measurement. Drugs were measured in measuring jar. 50 ml

Vacha and 100 ml water was taken together for soaking and distillation.

Sample 4

Volume/volume (v/v) was taken as the standard of measurement. Drugs were measured in measuring jar. 50 ml Vacha along with 150 ml water [100 ml for soaking and 50 ml before distilling] was taken. For soaking 2 parts of water is added and on next day 1 part of water (50 ml) is added before transferring to distillation apparatus.

Sample 5

Weight/Volume (w/v) was taken as the standard of measurement. Vacha is measured in weighing machine and water was measured in measuring jar. 50 g Vacha along with 100 ml water was taken together for soaking and distilling.

Sample 6

Weight/volume (w/v) was taken as the standard of measurement. Vacha is measured in weighing machine and water was measured in measuring jar. 50 g Vacha along with 150 ml water [100 ml for soaking and 50 ml before distilling]. Vacha is made into yavakuta form. For soaking 2 parts of water is added and on next day 1 part of water (50 ml) is added before transferring to distillation apparatus.

Precautions

- There must be continuous water and electricity supply.
- Temperature regulation has to be maintained.

Physico-chemical parameters

The samples were analyzed for the physical parameters like pH, Specific gravity, Refractive index by following the method prescribed in Ayurvedic Pharmacopeia of India (API).

RESULTS**Table 1: Pharmaceutical Ratio aspect of Different Experiments**

S. No.	Quantity of Vacha used (g or ml)	Quantity of water used (g or ml)	Total Weight (g)	Quantity of final product (ml)	Yield (%)
1	50.0	100.0	150.0	20	.133
2	50.0	150.0	200.0	50	.242
3	50.0	100.0	157.5	40	.4
4	50.0	150.0	210.0	60	.5
5	50.0	100.0	170.0	96	.2
6	50.0	150.0	220.0	120	.2

G -gram, ml- milliliter, % -percentage

Table 2: Distillation pattern of Different Experiments

S. No.	Commencement time (am)	Boiling time (am)	First drop time (am)	Finished time (am)	Duration (hours)
1	11:05	11:30	11:40	12:35	1:30
2	11:30	11:40	11:45	12:20	1:00
3	12:30	12:35	12:45	1:05	1:45
4	11:30	11:40	11:45	12:45	1:45
5	10:30	10:40	10:45	11:00	0:30
6	11:30	11:43	11:45	12:30	1:00

Table 3: Results of Physical Parameters of Different Experiments

S. No.	Specifications	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
1	pH	3.9	4.1	4.5	4.1	3	4
2	Specific gravity	0.9898	1.002	1.002	1.002	0.9	0.935
3	Refractive index	1.33	1.335	1.332	1.333	1.333	1.335

In the pharmaceutical aspect (Table 1) the different ingredients along with their quantity of ingredients are discussed under the heading pharmaceutical ratio aspect of different experiments. Maximum yield was observed in volume – volume method of 1:3 ratio and minimum yield was observed in weight-weight method of 1:2 ratios. In the temperature pattern (Table 2) the starting time, first drop time, duration of preparation, etc. are discussed under the heading distillation pattern of different experiments. The physical parameters are discussed in Table 3 under the heading results of physical parameters of different experiments. The affirmation of organoleptic characters generates confidence in patients as well as in the physicians. The physical parameters indicate the nature of the formulation and it adds to patient compliance.

DISCUSSION

The following observations are observed in the Pharmaceutical study: In the distillation four steps are involved i.e. churana (powdering), plavana (soaking), kwathana (boiling in still) and Parisruta (liquefaction). Hence it is sterile and potent. All the steps have its own scientific importance. The crushing of drugs facilitates in dissociation of active principles to water. The soaking increases the duration of contact of drugs with water. Boiling helps to easier penetration of water soluble principles to water and converts the liquid to vapors. Liquefaction converts the vapors to distillate. Arka kalpana thus comprises of water soluble and thermo labile principles dissolved in liquid media. Except color and form, all the physical properties of Vacha are retained in the arka. The Vacha arka was katu in rasa and tikshna. The reason behind it may be that water is inert in nature and Vacha is the only ingredient. The organoleptic characters of all samples were almost same. Charring occurs when the heat given is more or there is insufficient amount of water. Charring may affect the quality of the distillate collected. Except sample 3 and 4 all the samples were charred showing sufficient amount of water. The attracting feature of volume -volume method is the yield was more. But according to Ravana after soaking the drug must turn shithila and dry, it was observed in weight-weight and weight – volume method and not in volume-volume method. It is due to the increased amount of water added. In the Analytical study the parameters can be discussed are specific gravity, refractive index and pH value. Specific gravity is an important parameter for analyzing Arka. The specific gravity indicates the presence of solutes in a solvent. The presence of dissolved substances in the samples changes the value of specific gravity⁷. Here the solvent is water and the solutes refer to the extracted active principles of Vacha. Samples 3 and 4 are having more specific gravity may be due to the increased time of contact. The specific gravity of the solutions is almost equal to 1. This indicates the solution is

viscous like water. The consistency of the media and solutes present in the media brings the difference in the refractive index⁸. Since the Arka is water like and there is no difference between the solutes and solvent the refractive index of all samples is around 1.3333. For determination of pH value the test is carried out with the help of pH meter. Absorption, efficacy, irritability, etc will depend on the pH value of the medicine. If the medicine is very acidic or very alkaline it will cause irritation to the tissues⁹. The pH of the solutions was between 3-5 indicating the acidic nature of Arka. May be this acidic nature increases the gastrin secretion and thereby reduces agnimandya (indigestion), it makes the jatragni (digestive fire) into samaavastha (normal) and thus relieves constipation and flatulence. Since there is proper vata karma, pain is removed. If it is very acidic, it will cause gastric irritation and hence sample 3 and 4 is better.

CONCLUSION

In the study the maximum yield and appreciable physical parameters was observed in sample 5. Thus it indicates Vacha may be a Katina dravya which can be prepared by volume – volume method. From these parameters only the physical constituents is assessed. Further studies need to be undertaken to evaluate the therapeutic efficacy.

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