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Review Article

A CRITICAL DRUG REVIEW ON ARKA KALPANA

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ABSTRACT

Background: *Arka Kalpana* is one of the important drug dosage form. *Arka Kalpana* is correlated with Distillation in modern pharmaceuticals practices. *Arka* is a liquid preparation obtained by distillation of certain liquids or of drugs soaked in water using the *Arka yantra* or any convenient modern distillation apparatus. In this study, preparation and standardization of *Vachadi Arka* and *Supachya Arka* two drugs was done as per API standards. **Material and method:** The drugs were collected and authenticated from the experts. The *Arka* was prepared as per classical methods. Standardization was done on the basis of organoleptic characters, physicochemical parameters like volatile matter (%), specific gravity, refractive index, pH, total acidity, viscosity and boiling point. **Result:** The result of the standardization revealed that *Vachadi Arka* is colourless with aromatic odour and *Kashaya Madhura Rasa*, Volatile matter is 19.49%, specific gravity is 1.0029, Refractive index is 1.33, pH is 6, total acidity is 0.13, viscosity is 0.96, and boiling point is 100°C. *Supachya Arka* is colourless with characteristic odour and *Tikta Rasa*, Volatile matter is 14.33%, specific gravity is 0.9842, Refractive index is 1.33, pH is 6, total acidity is 0.010, viscosity is 0.96, and boiling point is 100°C. **Conclusion:** *Arka Kalpana* acquires highest position in obtaining the potentially active volatile oils as the condensation takes place during the process of distillation. It has the

significant role in traditional medicine. This article is a contribution for reviewing the *Arka Kalpana* as well as standardizing of two *Arkas*, i.e., *Vachadi Arka* and *Supachya Arka*.

Keywords: *Vachadi Arka*, *Supachya Arka*, *Arka Kalpana*, Distillation

1.1 Introduction

Ayurveda is an archaic and experiential science of life, explains the principles for the maintenance of health and eradication of disease. Therefore, different dosage forms are evolved from time to time according to need. The idea behind the preparation of different dosage form is to make more suitable to the body for better absorption and assimilation. *Bhaisajya Kalpana* is a branch of Ayurveda which deals with the various pharmaceutical, nutraceutical formulations specified by the Acharyas¹. *Arka Kalpana* is one of the important drug dosage forms. *Arka Kalpana* is correlated with Distillation in modern pharmaceutics practices. *Arka* is a liquid preparation obtained by distillation of certain liquids or of drugs soaked in water using the *Arka yantra* or any convenient modern distillation apparatus. *Arka Kalpana* is more potent in comparison to the other *Kalpanas* due to having increased potency, reduced dose, more shelf life, fast action etc. There is no reference of *Arka Kalpana* in Bruhatrayi. *Arka Kalpana* is first mentioned by Acharya Shodhal in Gadanigraha in 12th century. It is widely described by Ravan[1] in his book *Arkaprakasha*. Ayurveda is the science which has its own principles and that are different from modern pharmacological aspects. In Ayurveda the pharmacological actions of a drug are attributed to *Rasa Panchakas* (i.e. *Rasa*, *Guna*, *Veerya*, *Vipaka*, *Prabhava*) and these are considered as foundation of Dravyaguna shastra or Ayurvedic pharmacology.

Vachadi Arka and *Supachaya Arka* is been mentioned in Ravanakruta *Arkaprakasha* .² In this study, *Vachadi Arka* and *Supachaya Arka* is reviewed and standardized according to API parameters.

1.2. *Vachadi Arka*:

Table.1: Ingredients and properties of *Vachadi Arka*

Drug	Botanical Name	Part used	Proportion	Rasa	Virya	Gana	Virya
VACHA	<i>Acorus calamus</i>	Rhizome	1	<i>Katu</i> , <i>Tikta</i>	<i>Ushna</i>	<i>Virechaniya</i> , <i>Lekhaniya</i> , <i>Arshoghana</i> , <i>Triptighana</i> ,	<i>Katu</i>

						<i>Asthapanopaga, Sheetaprashamana, Sanjasthapana, Shirovirechana</i>	
<i>AJAMODA</i>	<i>Trachyspermum roxburghianum(DC)</i>	Fruit	2	<i>Katu, Tikta</i>	<i>Ushna</i>	<i>Shoolaprashamana, Deepaniya, Pippalyadi</i>	<i>Katu</i>
<i>HINGU</i>	<i>Ferula foetida</i>	Root latex	1	<i>Katu</i>	<i>Ushna</i>	<i>Katukaskandha, Pippalayadi, Ushkadi</i>	<i>Katu</i>
<i>PUDINA</i>	<i>Mentha piperata</i>	Leaves	1	<i>Katu</i>	<i>Ushna</i>	-	<i>Katu</i>
<i>JALA</i>			16 parts				

1.3. SUPACHYA ARKA:

Table 2: Ingredients and properties of Supachya Arka

Drug	Botanical Name	Part used	Proportion	Rasa	Virya	Gana	Vipaka
<i>AJAMODA</i>	<i>Trachyspermum roxburghianum(DC)</i>	Fruit	1 part	<i>Katu, Tikta</i>	<i>Ushna</i>	<i>Shoolaprashamana, Deepaniya, Pippalyadi</i>	<i>Katu</i>
<i>PUNARNAV</i>	<i>Boerhavia diffusa L.</i>	Stem	1 part	<i>Tikta, Kashaya, Madhura</i>	<i>Ushna</i>	<i>Vayasthapana, Kasahara, Vidarigandhadi, Anuvasanupaga, Swedopaga</i>	<i>Katu</i>
<i>VIBHITAKI</i>	<i>Terminalia bellirica (Gaertn.) Roxb.</i>	Fruits	1 part	<i>Kashaya</i>	<i>Ushna</i>	<i>Jwara Hara, Kasa Hara, Virechanopaga, Mustadi Gana</i>	<i>Madhura</i>

MARICHA	<i>Piper nigrum</i> L.	Fruits	1 part	<i>Katu</i>	<i>Ushna</i>	<i>Deepaniya,</i> <i>Shoolanut,</i> <i>Krimighna, Shiro-</i> <i>Virechanopaga,</i> <i>Pippalyaadi,</i> <i>Trayoshna</i>	<i>Katu</i>
CHINCHA	<i>Tamarindus indica</i> Linn	Root	1 part	<i>Madhura,</i> <i>amla</i>	<i>Ushna</i>	<i>Phalvarga</i>	<i>Amla</i>
SITA	Sugar		1 part	<i>Madhura</i>	<i>Sheeta</i>	-	<i>Madhura</i>
SAINDHAVA	rock salt		1 part	<i>Lavana,</i> <i>Madhura</i>	<i>Sheeta</i>		<i>Madhura</i>
JALA	Water		16 Part				

Arka

The word “*Arka*” is found in *Arkaprakasha* is derived from the word “*agama*” which means “that which came”. It implies “the essence of drug (distillate)” which came after process of distillation.

Definition:

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 apparatus. *Arka* is the essence of the drug. The drug must be soaked in water for a night and it must be kept on fire. It turns to steam and later cools to obtain liquid form. This is called *Arka*.

2. Material and method: All the draw drugs were collected from authenticated sources followed by identification and authentication done by the expertise as per API standards.

2.1. Method of preparation of Arka

- One part of the drug was cleaned with water and crushed,
- It was then transferred into a distillation apparatus with attached condenser. Required quantity of water (3 parts) was added and the apparatus was closed securely.
- The water was brought to boil by heating.
- The vapours formed were condensed by the condenser and the initial drops were discarded and

collected in a receiver.

- The *Arka* was collected until the water reduced to half the quantity of water taken.
- The *Arka* collected was packed and stored in the small plastic bottles. Each bottle contains 12 ml of *Arka* i.e *Vachadi Arka* and *Supachaya Arka*.

2.2. Method of Standardization of drugs:

Organoleptic characteristics as well as physicochemical parameters were assessed according to API standards for standardization of drugs.

Organoleptic characteristics: Organoleptic characters of sample are noted down using sensory characteristics like color, odour and taste. They are as follows:

Volatile matter: 10 ml of sample was extracted 2 times with 20 ml n-hexane. Hexane soluble portion was taken in a pre-weighed china dish and evaporated to room temperature. Noted the weight difference calculated the volatile matter.

Specific gravity: Cleaned a specific gravity bottle by shaking with acetone and then with ether. Dried the bottle and noted the weight. Cooled the sample solution to room temperature. Carefully filled the specific gravity bottle with the test liquid, inserted the stopper and removed the surplus liquid. Noted the weight. Repeated the procedure using distilled water in place of sample solution.

Placed a drop of water on the prism and adjusted the drive knob in such a way that the boundary line intersects the separatrix exactly at the centre. Noted the reading. Distilled water has a refractive index of 1.33206 at 29°C. The difference between the reading and 1.3320 gives the error of the instrument. If the reading is less than 1.33206, the error is minus (-) then the correction is plus (+) if the reading is more, the error is plus (+) and the correction is minus (-). Refractive index of oil is determined using 1 drop of the sample. The correction if any should be applied to the measured reading to get the accurate refractive index. Refractive index of the test samples were measured at 29°C.

Determination of pH: Standard buffer solution: Dissolved one tablet of pH 4, 7 and 9.2 in 100 ml of distilled water.

Determination of pH: 1 ml of sample was taken and make up to 10 ml with distilled water, stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on. 30 minutes time was given for warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30°C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. Introduced the pH 9.2 solution and checked the pH reading without adjusting the knob. Then the

sample solution was introduced and reading was noted. Repeated the test four times and the average reading were taken as result.

Total Acidity: Take 1 gram of the sample in a suitable titration flask & dissolved in 75ml of CO₂ free water. Mix thoroughly, titrate against std NaOH solution using 4-6 drops of phenolphthalein indicator till the pink colour persists for 10 sec.

$$\% \text{ Acidity} = 0.23 \times V \times M,$$

V=Corrected volume of 0.05 N NaOH used

Viscosity: The given sample is filled in a U tube viscometer in accordance with the expected viscosity of the liquid so that the fluid level stands within 0.2 mm of the filling mark of the viscometer when the capillary is vertical and the specified temperature is attained by the test liquid. The liquid is sucked or blown to the specified height of the viscometer and the time taken for the sample to pass the two marks is measured. Viscosity is measured using the formula

$$\eta_1 = \frac{\rho_1 t_1 \times \eta_2}{\rho_2 t_2}$$

η_1 – Viscosity of sample

η_2 - Viscosity of water

t₁ and t₂- time taken for the sample and water to pass the meniscus

ρ_1 and ρ_2 – Density of sample and water

X= Specific gravity of sample x 0.9961/specific gravity of water

$\eta = X \times \text{Time for sample} \times 1.004 / \text{specific gravity of water} \times 70 \text{sec}$

3. Result:

Authenticate Certificate is shown below in Fig No.1

AUTHENTICATION CERTIFICATE

Certified that the drugs submitted for identification by Dr Kumari Nikita, 2nd year Post Graduate Scholar, Department of Kaumarabhritya, S D M College of Ayurveda & Hospital, Hassan are identified as:

S. N	Botanical name	Sanskrit Name	Part Identified
1.	<i>Acorus calamus</i> Linn.	Vacha	Rhizome
2.	<i>Apium graveolens</i> Linn.	Ajamoda	Fruit
3.	<i>Ferula narthex</i> Linn.	Hingu	Exudate
4.	<i>Mentha piperata</i> Linn.	Putiha	Leaf
5.	<i>Boerhavia diffusa</i> Linn.	Punarnava	Stem
6.	<i>Terminalia bellerica</i> Roxb.	Vibhitaki	Fruit
7.	<i>Piper nigrum</i> Linn	Maricha	Fruit
8.	<i>Tamarindus indica</i> Linn.	Chincha	Root
9.		Sita	Sugar candy
10.		Saindhava Lavana	Rock salt


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Fig No. 1: Authenticate Certificate of Drugs

Standardisation Certificate is shown below in Fig No.2

Part D: Results

The given sample of Vachadi arka and Supachaya arka has been standardized as per standard testing protocol. The results of standardization parameters are represented in respective Table I.

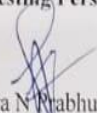

<p style="text-align: center;">Testing Personnel</p>  Suchitra N. Prabhu M.Pharm Research Officer – Pharmaceutical chemistry and Pharmacognosy	<p style="text-align: center;">Authorized Signatory</p>  Principal DIRECTOR SDM Centre for Research in Ayurveda & Allied Sciences Kuthyady, Udipi - 574 116.
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Fig No.2: Standardisation certificate of Vachadi Arka and Supachaya Arka

The result of the organoleptic characteristics and physicochemical properties of *Vachadi Arka* and *Supachaya Arka* is as follows:

Parameter	Results n = 3% w/w	
	<i>Vachadi Arka</i>	<i>Supachaya Arka</i>
Color	Colorless	Colorless
Odour	Aromatic	Characteristic
Taste	<i>Kashaya, Madhura</i>	<i>Tikta</i>
Volatile matter (%)	19.49	14.33
Specific gravity	1.0029	0.9842
Refractive index	1.33206	1.33206
Ph	6.0	6.0
Total acidity	0.13	0.010
Viscosity	0.9623	0.9628
Boiling point (0C)	100	100

4. Discussion:

Characteristics of *Arka*:

Arka is a suspension of the distillate in water having slight turbidity and colour according to the nature of the drug used and smell of the predominant drug.³

Shelf life: 1 year⁴

Importance of *Arkas*:

The efficacy of *Kalka*, *Churna*, *Swarasa*, *Taila* and *Arka* is gradually increasing in descending order. This efficacy of individual formulation is may be due to various degrees in the concentration of active principle. This implies that the author of *Arka-Prakash* has said this on the basis of concentration of drug in formulations. Other importance of this *Kalpana* are as follows:

1. It can be preserved for longer time than other *Kalpanas* like *Swarasa*, *Kwath* etc. This *Kalpana* is easy to administer in the patients of *Mridu Prakriti* and one who hesitate to take medicines like *Churna*, *Kwath* etc.

2. *Arka* is prepared by the combination of *Jala* and with the help of *Agni*; hence *Arkas* are *Laghupaki*, *Vyavayi* and *Vikasi* & thus assimilates quickly in the body.

3. *Arkas* have good palatability.

4. *Arka Kalpana* acquires highest position in obtaining the potentially active volatile oils as the condensation takes place during the process of distillation.

5. Conclusion:

The eternal science Ayurveda has its own ideology which is entirely different from modern pharmacological study. *Arka Kalpana* has the significant role in traditional medicine. In present scenario, many researches of *Arka Kalpana* have been carried out to explore the importance of *Arka Kalpana* and its activity. This article is a contribution for reviewing the *Arka Kalpana* as well as standardizing of two *Arkas*, i.e., *Vachadi Arka* and *Supachya Arka*.

6. References

¹ Reddy Rama Chandra. K. Bhaishajya, *Kalpana Vijnanam*.1st ed. Varanasi: Chawkambha Sanskrit Bhavan;1998. p. 356

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³ The Ayurvedic Formulary of India. First ed. New Delhi: Govt. Of India, Ministry of Health And Family Welfare; 1978 Part I. p. 21-22

⁴ Good Manufacturing Practices(GMP), Directorate of AYUSH, 2016, p 73