



ARKA KALPANA - A DEVELOPING SCIENCE

Gite Shweta*¹, Kurkute B. R.², Suryawanshi Renuka³ and Tapre Sachin⁴

P.G.Scholar¹, HOD², Guide and Associate Professor³ and Professor⁴

Department of Rasashastra and Bhaishjya Kalpana PMT's Ayurveda College Shevgaon, Dist: Ahmednagar, Maharashtra.

***Corresponding Author: Gite Shweta**

P.G.Scholar Department of Rasashastra and Bhaishjya Kalpana PMT's Ayurveda College Shevgaon, Dist: Ahmednagar, Maharashtra.

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ABSTRACT

Bhaishajya kalpana is the branch of Ayurveda which primarily deals with the different kinds of dosage form and their therapeutic utility. Among the large number of formulations specified by Acharya, the panchvidha kasaya kalpanas have great importance as they form the primary or basic dosage forms from which other secondary dosage forms are prepared. Arka kalpana is a very unique formulation in ayurvedic pharamaceutics for its method of preparation and efficacy. According to Ravana's Arka Prakasha, the Panchvidha kalpanas include Kalka, Choorna, Rasa, Taila and Arka. Arka kalpana is given specific importance and it opines that it has more potency in comparison to the other kalpanas. It is most potent due to dosharahithatva and its specific gunas. Arka kalpana is now days famous kalpana among the ayurvedic procedures. It is introduced in Ayurvedic pharmacy in later part of samhita period, which is very specific in its mode of preparation and therapeutic effect. So there arises a need to know the simplified procedures and methodologies involved in the preparation of this formulation which can be easily understandable and applicable both in industrial level as well as testing scientific laboratories.

KEYWORDS: Arka Doshrahithatva Arka Prakash.

INTRODUCTION

Ayurveda is a science of life and serve to mankind since a long period. The object of Ayurveda is preventing as well as curing the disease. Therefore different formulations or 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 absoption and assimilation.

The word Arka is derived from 'Ru – gatau'.^[1] Every word contains meanings. Gati (motion), denotes three different meanings i.e.Gyan, Gaman and prapti. In Arka process all these three meaning are to be accepted, as the knowledge of the contents of the drug is first thing (i.e. Gyan) then the motion is given to the contents through water (i.e.Gaman) and lastly required amount of active content is obtained (i.e. prapti). Thus Arka contains the complete aspect of its manufacturing process by root word 'Ru-Gatau.'

In ayurveda kalpana means various dosage forms.^[2] Every dravya can be a medicine but some pharmaceutical procedures are done to change or potentiate its original properties. The basic idea behind the administration of drug is to make it more suitable to the body elements.

Arka kalpana can be defined as a liquid preparation obtained by distillation of certain liquids or of drugs soaked in water using the Arkayantra.^[3] or any convenient modern distillation apparatus. The concept of arka as a dosage form can be seen in different texts but the pharmaceutical aspect of Arka kalpana is mentioned in detail mainly in Ravana's Arka praksha.^[4]

LITERARY REVIEW

Samhita kala

References about Arka kalpana are not available in any samhita .Usage of arkas may not be popular during that period.

Adhunika kala

- It is first mentioned in Gad Nigraha by Acharya Shodhal in 12th century.^[5]
- It is widely described by Ravana in his book Arka prakasha. In this book, different ratios for distilling, reference for 196 single drugs and 192 aushada yogas for preparation of Arka with their indication is described with details about Varuni Yantra for preparation of arka.
- In Ayurved Sar Sangrah, there are 25 Arkas explained with their ingredients, method of

preparation, indication and dose.

- Examples of 21 Arkas with the method of preparation, anupana, aushada sevana kala and bhaishya margo of each Arka are mentioned in the first volume of Rasatantra sara and Siddha Prayoga Sangraha.

Material and method

The details of the method of preparation of Arka kalpana is taken from Ravana's Arka prakash.

Equipments required

Following equipments are required for preparation of Arka

1. Chulla – Angi or stove
2. Lakadi – coal along with kerosene oil
3. Dravya – oushadha dravya ,medicine
4. Patra – Glass bottles
5. Yantra – Bhakka yantra ,Varuni yantra ,Tiryak patina yantra, Karanambika Arka yantra and Nadika yantra
6. Arka sangrahara patra.^[6]

Method of preparation of Arka

Arka prakasha of Ravana clearly mentions the pharmaceutical aspects of arka kalpana with much detail. The text explains the general method of arka preparation which is as follows.

The required quantity of water is added to the drugs for soaking and kept overnight. Next day morning it is poured into the arka yantra and the remaining water was added and boiled. The vapours get condensed and collected in a receiver. The aliquots collected in between contain the active ingredients and may be mixed together to ensure uniformity of the Arka. In recent books it is mentioned as drugs are soaked and kept overnight. Eight

times of water must be added. Madhyagni (moderate fire) or Teevra agni (extreme fire) must be maintained during the procedure and only two third of the poured liquid must be collected.^[7]

Arka is extracted from two ways – 1. wet drugs 2. Dry drugs.

If the drugs are soft and wet then 6 times of water should be added to the quantity of wet drug and extraction of Arka should be done up to 60 % if the drugs are wet and mildly hard then 8 times of water should be added to it and extraction of Arka should be done up to 60 % - 70 %. If the drugs are dry and soft they need not to be crushed. At the time of extraction they should be mixed with 6 -8 times of water in the vabaka yantra and usage of mild fire for obtaining 60 % - 70 % of arka. If the drugs are dry and hard then these are crushed into coarse powder form and soaked in 10 times of water for overnight, in the morning it should be placed in the vabaka yantra and mild fire for obtaining 60 % - 70 % of arka. If the drugs are dry and moderately hard they need not to be crushed and 8 times of water is added to it and kept for overnight and in the morning it should be placed in vabaka yantra and mild fire for obtaining 60 % of Arka.^[8]

Shat agnis in preparation

During Arka patina (collection of arka) the agni (fire) must be proper. If the Angi is less, there will be no production of distilled vapours and arka will not be obtained. If the agni is more, the drugs will turn to khara paka and there will be vaivarnya and altered burnt smell for the arka. All the qualities of the Arka will be lost. For the preparation of arka six different types of agni are mentioned and are illustrated in the table no.1⁹

Table 1: Shat Agnis in preparation of Arka kalpana.

Sr.no	Types of Agni	Total Time taken	Quantity of fuel	Features
1.	Dhumagni (smoky no fire)	2 yama (6 hours)	Not mentioned	Without any flame if there is huge amount of fumes (smoky) such agni is known as Dhumagni.
2.	Deepagni (2/4 times dhumagni)	1.5 yama (4.5 hours)	2 part of the quarter of 1 mushti (fist)	If the flame of Dhumagni is increased to two or four times it is considered as Dipagni.
3.	Mandagni (4 times deepagni)	1 yama (3 hours)	Quarter of 1 musti	If the flame of Dipagni is again increased to four times, it is termed as Mandagni.
4.	Madyamagni (between deepagni & mandagni)	2 yama (6 hours)	½ mushti	The Agni in which the flame is in between Dipagni and Mandagni it is termed as Madyamagni.
5.	Kharagni (5 times madyagni)	1 muhurtha (45 minutes)	2 ½ Mushti	Fifth part of complete agni is known as kharagni, this Agni is used for all purpose.
6.	Bhatagni (high burning flame)	1 muhurtha (45 minutes)	Not mentioned	The Agni in which the flame spreads all over the bottom (high burning flame) of the vessel is considered as Bhatagni

Modern view

Process of Distillation

According to Modern Science it is known as process of distillation. In the process of distillation condenser is mounted in the neck of the flask containing the material being treated. As vaporization occurs, the vapours enters the condenser, the pressure of the vapors causes the distillate to spurt out from it. At the same time, a certain amount of back pressure is produced by the presence of the liquid retained in the condenser and this interrupts the smooth progress of the distillation process.

Distillation consists of two steps

- A. Evaporation
- B. Condensation.

A. Evaporation

Evaporation may be defined as the free escape of vapours from the surface of a liquid. It should be distinguished from boiling or ebullition, which takes place at one temperature only for a given pressure. The kinetic theory of matter assists us to understand how evaporation takes place at any temperature and from the surface of a liquid only. It is presumed that the molecules of a liquid are always in motion, moving hither and hither at enormous speeds, frequently colliding. The molecules of a liquid are believed to exert an attractive force upon each other. It will be seen that the kinetic

theory affords an explanation of the fact that when a liquid is allowed to evaporate without being heated it gradually becomes cooler. This is because the molecules with the highest velocity be seen therefore, that if it is desired to change a liquid into a vapour without fall of in temperature, heat must be supplied. This heat is called latent heat of vaporization and when the vapour returns to the liquid state the latent heat is evolved as sensible heat. 1 gm of water at 100 ° c may be converted into water vapour (at normal atmospheric pressure) of the same temperature, the expenditure of 537 cal. Of the heat energy is required.

B. Condensation

Condensation is the reverse process of evaporation or vaporization. It will be recalled that, in order that 1 gm of water at 100° c may be converted into water vapour (at normal atmospheric pressure) of the same temperature, the expenditure of 537 cal. of heat energy is required, accordingly when water vapour is condensed by cooling.

Specific method of preparation –The fivefold classification of drugs is Atyanta kathina(very hard), Kathina (hard), Ardra (wet), Pallava(tender leaves) and Drava(liquids). Different methods of preparation of arka are mentioned for different arkas. The types of drugs, quantity of water and example of each type are shown in table no.2.^[10]

Table 2: Different method of preparation of Arkas.

Sr.no	Types of drug	Quantity of Water	Examples
1.	Atyanta kathina	3 parts	Chandana
2.	Kathina (hard Drugs)	2 parts	Ajmoda
3.	Sarasa nala (stem with juice)	1/20 part	Nirgundi Eranda
4.	Patra (leaves)	1/100 th part	Vasa
5.	Nirasa (devoid of juice)	1/20 th part	Vata,Asvadhā
6.	Mridu dugdhika (mild latex)	4 part	Dugdhika
7.	Tikṣna dugdhika	10 part	Satala
8.	Phala (fruit)	0 part	Amra
9.	Kashta oushadhas (plant drugs)	Add 1/80 th part of water, 4 times sarjikshara and saidhava. 1/40 th part of water is added to it.	Udumbara
10.	Atipakwa phala (very Ripe fruit)	0 part	Kadali
11.	Puspa (flower)	1/16 th part	Gulab Arka
12.	Katu phala	1/40 th part	Pippali
13.	Drava dravya (liquids)	0 part	Gomutra

Precautions during preparation

1. While doing Arka preparation, distillation apparatus should be exposed with Mandagni, because boiling of the drugs with excessive heat will lead to water getting vaporized rapidly. There by spoiled kwatha like preparation will be produced.
2. Because of more heat very soon the water content will get vaporized and there is a chance of burning and spoilage of arka dravya, then little bit Arka is produced which contains improper taste, smell and which will not be up to mark.
3. The lid should be tightly placed and sealed around to prevent vapours from escaping.
4. Heat is applied to the drug mixture and the distillate is collected in large bottles and mixed well to ensure uniform concentration of the medicine because the compared to that collected at the end of the process when the drugs are depleted.
5. Continuous water current should be maintained in the condenser.
6. When a copular type of condenser is used water is replaced by cool water when it becomes warmed up.
7. The vessel or bottle in which the distillate is collected is placed in a container containing cool water.

DISCUSSION

Arka kalpana is one of the most sought after formulation in this modern era. Many number of dosage forms are being converted to Arka due to its reduced dose, patient compliance and increased potency. We find many references regarding the pharmaceutical aspects of Arka kalpana in different literatures like A.F.I Ayurveda sara sangraha, Gadanigraha, Rasatantrasara and Siddhaprayogasangraha etc. A detailed explanation regarding all the aspects in the manufacture of Arka is seen in Arka prakasha by Ravana.

Seven different types of classification of Arka are mentioned in different literatures. They are based on contents, part used, duration of preparation, action on doshas, manogunas, ruti and disease.

On close examination we see that the Arka yantra told in the classics and the modern day distillation apparatus are following same principles of science i.e. distillation which clearly states the significance of the detailed procedures explained.

CONCLUSION

Arka kalpana is a very unique formulation in Ayurvedic Pharmaceutics for its method of preparation and efficacy. It has been introduced in Pharmacy of Ayurveda in later part of samhita period. This is very specific in its mode of preparation in its final product. Pharmaceutical aspect of this formulation has not been described in classical text of Ayurveda. The factors like Arka yantra, Agni etc. having a significant role in preparation of Arka. So it needs more pharmaceutical study and research work to develop this dosage form without violating the basic principle of Arka kalpana.

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