

## ARKA KALPANA & ITS IMPORTANCE IN AYURVEDA

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### ABSTRACT

*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. It is more palatable form of Ayurvedic dosage forms in comparison to *Swarasa* (Juice), *kalka* (paste), *kwath* (decoction) etc. *Arka Prakash* is the first Ayurvedic classical text in which various kinds of distillation Procedures and heating methods are mentioned for preparing *Arka* from different type of *Dravya* for different diseases. *Arka Kalpana* is correlated with Distillation in modern pharmaceuticals practices. The five basic *kalpanas* comprise of *Swarasa* (Juice), *kalka* (Paste), *kwath* (Decoction) *hima* (Cold infusion) and *Phanta* (Hot Infusion). But some Acharyas has variable opinions in the respective formulary classifications. According to *Arka prakasha*, the *panchavidha kalpanas* include *Kalka*, *choorna*, *Rasa*, *Taila* and *Arka*. In this context, *Arka kalpana* is given specific importance and it opines that it has more potency in comparison to the other *kalpanas*. Due to its increased potency, reduced dose, better shelf life, easy absorption, fast action and patient compliance *Arka kalpana* is first choice in growing demand among current population. 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. The pharmaceutical aspects regarding this formulation have been explained in detail with specific importance to the *yantras*, *patras*, *agni* and different method of preparation based on the consistency of *dravyas*.

**Keyword:** *Ayurveda*, *Bhaisajya Kalpana*, *Arka*, Distillation.

### 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 absorption and assimila-

tion. *Bhaisajya kalpana* is a branch of Ayurveda which deals with the various pharmaceutical, neutraceutical formulations specified by the Acharyas<sup>1</sup>. In Ayurveda Kalpana means various dosage forms<sup>2</sup>. 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. To achieve this, many processes were invented in a sense of manufacturing process, these are termed as *Kalpanas*. *Arka Kalpana* is now days famous *Kalpana* among the Ayurvedic Formulations. It is introduced in pharmacy of Ayurveda in later part of development, which is very specific in its mode of preparation and due to virtue of this particularity; it may have all volatile active substances in effective form in its final product. It is more palatable form of Ayurvedic dosage forms in comparison to other dosage forms. *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

#### Historical Review:-

References of *Arka kalpana* are not found in neither vedic period nor in Samhita period. First of all in 12<sup>th</sup> century Acharya Shodhala mentioned about the *Arka Kalpana*. In modern period the text like *Gadanigraha*, *Asava-Arista Vigyana and Sahasrayoga* described about *Arka yantra and Arka* preparation. Though different books are written on *Arka Kalpana* in Modern period, *Arka prakash* written by Ravan is considered as a compressive referral book as far *Arka Kalpana* is concerned<sup>3</sup>.

#### Importance of the Arkas:

*dravya kalpah panchdhasyat kalka churna rasastatha tailamarka kramatgneyam yathottargunam priye {a. p\ 1/46}*

According to the above reference 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 importances 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.

#### 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 vapors 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.<sup>4</sup> *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<sup>5</sup>.

#### **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 vapors 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<sup>6</sup>.

Distillation consists of two steps (A) Evaporation (B) Condensation

A) Evaporation:- Evaporation may be defined as the free escape of vapors 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 are escaping from the liquid. Latent heat of Vaporization:- It will be seen, therefore, that if it is desired to change a liquid into a vapor without fall in temperature, heat must be supplied. This heat is called latent heat of vaporization and when the vapor returns to the liquid state the latent heat is evolved as sensible heat. 1 gm. of water at 100°C may be converted in to water vapor (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 vapor (at normal atmospheric pressure) of the same temperature, the expenditure of 537 cal. of heat energy is required, accordingly when water vapor is condensed by cooling.

#### **Precautions during preparation:**

1. Both ends of *vabaka yantra* are sealed tightly by mud and clay. Cool water is placed in the Upper portion of the *vabaka yantra* and water is changed from time to time when it gets heat (it is convenient to convert the vapour in to aqua). Pipe of yantra should be sprinkled with cold water. The fuel should be under control according to the Drugs. The Extracted *Arka* should be 60% of total amount of Water. If the extraction of *Arka* is done from the flower and leaves then chances of obstruction of path of *vabaka yantra* may occur. It should be taken in cloth and put in the water of *vabaka yantra*. If the drugs are strong at first it should be soaked in hot water and then *Arka* is extracted. If the drug is mild in action then 4 times of water is added to it and kept in sunlight, when the water becomes hot then *Arka* is extracted by *vabaka yantra*. If the *Arka* is extracted from ripe fruits then it should be done by adding 4 times of water. In case of flower 6 time of water is to be added and extraction is done<sup>7</sup>.

2. On distillation process the condensation of water vapor requires a more rapid heat exchange that required for any of the other vapors produced from the common solvents. According to Cook and Lawall - "Remington"s practice of pharmacy", it has been calculated that steam at 100° C requires about twenty-five times its weight of water at 20°C. to condense it. In most of cases, water is used as the cooling media and is most effective when supplied as a stream from a constant source, rather than when used by simply surrounding the condensing tube with a relatively large volume of water that is not in motion. The constant motion provides for the continuous replacement of the water as it becomes heated. The condenser should be designed so as to have a relatively large cooling surface, since the rate of condensation is proportional to the area of surface exposed. The condensing surface should be made of substance, which is a

reasonably good conductor of heat, for the rapidity of condensation is proportioned to the speed with which the heat is carried away. For this reason, metallic condensers are more efficient than those made of glass.

**Distribution of Agni in Arka preparation:-** In *Arka Prakasa* for the preparation of *Arka* six type of *agni* (heat) are described which is used for different type of ingredients. Like *Dhumagni* (Without any flame only huge amount of fumes) heated up to 1½ *prahara* (4½

hrs.). *Dipagni* (flame of *Dhumagni* is increased to four times) heated upto 1 *Prahara* (3 hrs). *Mandagni* (flame of *Dipagni* is increased to four times) heated upto ½ *Prahara* (1½hrs.). *Madhyamagni* (The Agni in which the flame is in between *Dipagni* & *Mandagani*) heated upto 1 *Muhuruta* (45 minutes). *Kharagni* (complete Agni) heated upto 1 *Muhuruta* (45 minutes). *Bhattagni* (The Agni in which the flame spreads all over the bottom of the vessel).

### Different Arka Formulations<sup>8,9,10</sup>:

Sl.No	Formulation	Reference	Dose	Disease
1.	<i>Ajamoda Arka</i>	<i>Arkaprakasha, Sataka</i> 3	12-24 ml	<i>Agnimandya</i> (digestive impairment), <i>Ajeerna</i> (dyspepsia), <i>Vastiroga</i> (disease of urinary system)etc
2.	<i>Karpuradyarka</i>	<i>Arkaprakasha, Sataka</i> 4,	6-12 ml	<i>Agnimandya</i> (digestive impairment), <i>Hrudroga</i> (heart disease), <i>Medoroga</i> (obesity) etc
3.	<i>Jatamansyarka</i>	<i>Arkaprakasha, Sataka</i> 4	12-24 ml	<i>Agnimandya</i> (digestive impairment), <i>Unmada</i> (mania/psychosis), <i>Apasmara</i> (epilepsy) etc
4.	<i>Satapusparka</i>	<i>Arkaprakasha, Sataka</i> 3	12-24 ml	<i>Agnimandya</i> (digestive impairment), <i>Adhmana</i> (flatulence with gurgling sound), <i>Sula</i> (abdominal pain) etc
5.	<i>Pudinarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-25 ml	<i>Chhardi, Ajeerna</i> (dyspepsia), <i>Udarasula</i> (abdominalpain) etc
6.	<i>Yavanayarka</i>	<i>Arkaprakasha, Sataka</i> 3	10-25 ml	<i>Trikasula</i> (pain in sacroiliac region), <i>Agnimandya</i> (digestive impairment), etc
7.	<i>Kakamachyarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Hridroga</i> (heart disease), (Yakritroga liver disease), <i>Udara roga</i> (disorders of abdomen), <i>Kamala</i> (jaundice) etc
8.	<i>Kiratatiktarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	25-50 ml	<i>Jwara</i> (fever), <i>Pandu</i> (anaemia), <i>Raktapitta</i> (bleeding disorder) etc
9.	<i>Guduchyarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	20-50 ml	<i>Amavata</i> (rheumatoid arthritis), <i>Vatarakta</i> (gout), <i>Jwara</i> (fever), <i>Raktapitta</i> (bleeding disorder) etc
10.	<i>Chandanadyarka</i>	AFI, Part-III, 2:5	30-60 ml	<i>Paitikadaha</i> (burning sensation due to pitta dosa), <i>Jwara</i> (fever), <i>Daha</i> (burning sensation) etc
11.	<i>Gulabarka</i>	API, Part-II, Vol-3	10-20 ml	<i>Daha</i> (burning ensation), <i>Trisna</i> (thirst), <i>Hrullasa</i> (nausea) etc
12.	<i>Triphalarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	20-50 ml	<i>Prameha</i> (increased frequency and turbidity of urine), <i>Medobrudhi</i> (obesity), <i>Pandu</i> (anaemia), <i>Vibandha</i> (constipation)etc
13.	<i>Dasamularka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	20-50 ml	<i>Vatavikara</i> (disease due to vata dosa), <i>Sutika roga</i> (puerperal disease) <i>Shotha</i> (inflammation), <i>Gulma</i> (abdominal lump) etc
14.	<i>Nilodupusparka</i>	AFI, Part-III, 2:8	10-20 ml	<i>Kasa</i> (cough), <i>Swasa</i> (asthma) etc

15	<i>Parpatarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Jwara</i> (fever), <i>Atisara</i> (diarrhoea), <i>Daha</i> (burning sensation), <i>Vicharchika</i> (eczema),
16	<i>Punarnavarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Sotha</i> (inflammation), <i>andu</i> (anaemia), <i>Udara roga</i> (disorders of abdomen), <i>Yakrut Sotha</i> (hepatomegaly) etc
17	<i>Bramhyarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Budhimandata</i> (low intelligence), <i>Smruti bhrama</i> (disturbed memory), <i>Pralapa</i> (delirium) etc
18	<i>Munditiktarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Pliharoga</i> (splenic disorders), <i>Prameha</i> (increased frequency and turbidity of urine), <i>Vatavyadhi</i> (disease due to vata dosa), <i>Twakroga</i> (skin diseases) etc
19	<i>Vanyajamodarka</i>	AFI, Part-III, 2:13	10-20 ml	<i>Agnimandya</i> (digestive impairment), <i>Ajeerna</i> (dyspepsia), etc
20	<i>Satahyarka</i>	<i>Ayurveda Sara Samgraha, (Arkaprakarana)</i>	10-20 ml	<i>Jwara</i> (fever), <i>Agnimandya</i> (digestive impairment), <i>Atisara</i> (diarrhea) etc

**Removing durgandha from Arka:** After preparation of *arka* if it has bad smell then it has to be fumigated by *Hingu*, *Methika*, *Rajika*, powder and ghee for several times<sup>11</sup>.

**Storage of Arka:** *Arka* should be stored in air tight bottle. Expose to air will lose its volatile constituents. Don't remove the oil drop from *Arka* because these are the desirable medicaments of the Root drugs and are medicinally important. Before using the *Arka*, bottle should be well shake<sup>12</sup>

**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<sup>8</sup>

**Shelf life:** 1 year<sup>13</sup>.

## 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 and particularity in therapeutic effect, and it may have all volatile active substances in effective form in its final product. Pharmaceutical aspect of this formulation has not been described in Classical text of Ayurveda. The factors like *Arka Yantra*, *Arka Patra*, *Agni* etc having a sig-

nificant 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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**Source of Support: Nil**

**Conflict Of Interest: None Declared**

How to cite this URL: Purnendu Panda et al: Arka Kalpana & Its Importance In Ayurveda. International Ayurvedic Medical Journal {online} 2019 {cited March, 2019} Available from: [http://www.iamj.in/posts/images/upload/413\\_418.pdf](http://www.iamj.in/posts/images/upload/413_418.pdf)