**Recent Updates in *ArkaKalpana***

Anjali .D1*, Govinda Sharma.K2, Vinay R Kadibagil3 and Sreelakshmi K4

1-4Dept of Rasashastra and Bhaishajyakalpana, Sri Dharmasthala Manjunatheswara College of Ayurveda and Hospital Hassan, India

**ABSTRACT**

**INTRODUCTION:** *Arkakalpana* is considered as one among the panchavidhakashayakalpana as per *arkaprakasha*. It is colourless, effective in low dosage when compared to other dosage forms like *vati, swarasa and kalka*. Owing to the properties of *arka* like reduced dosage, tastelessness, colorless, clarity and stability they have better patient compliance, which paves way for vast opportunities in Pharmaceutical and Clinical researches in *arkakalpana*.

**METHODOLOGY:** The extensive literature search was carried out for researches on *arkakalpana* both in electronic and print media. Published research articles from indexed peer reviewed journals and researches from Post graduation dissertation works were included in the present study. The standard operative procedures of preparation of *arka* followed by the researchers were compared with references available in *arkaprakasha* and Ayurvedic formulary of India.

**DISCUSSION AND CONCLUSION:** Nineteen research works on arkakalpana were reviewed including eight clinical studies, seven pharmaceutico-analytical, four experimental studies. So the study gives an insight towards recent updates in *arkakalpana*

**KEYWORDS**

*Arkakalpana, Arkaprakasha, Ayurvedic formulary of India*
INTRODUCTION

Arkakalpana is one of the elegant and established dosage forms of Ayurvedic pharmaceutics. Kalka, curna, swarasa, taila and arka are the panchavidha kashaya kalpana mentioned in arka prakasha which narrates more than 500 of arka formulations. Few of them include metals and minerals also. Nowadays, the method of extracting essential oil from medicinal plants and flowers were extensively adopted in Ayurvedic system of medicine. However, only few arka are used in present day Ayurvedic clinical practice.

In arka preparation, distillation is carried out for certain liquids or drugs soaked in water. Arkayantra or any other convenient modern distillation apparatus can be effectively used for distillation. Few drugs may contain volatile active principles, which evaporate quickly on heating. If kwatha is prepared by using drugs having volatile principles, during the preparation the active ingredient may get vaporized. Therefore to prevent the loss of active principles, the vapours are to be condensed and collected which is main principle behind arka. It possesses good palatability and attractive color. Due to these reasons the acceptance of arka is more in comparison to other dosage forms. For the method of preparation of arka freshly collected drugs are to be used. The drugs should be cut into small pieces (if it is wet) or made into coarse powder (if it is dry). It is soaked for 2 – 4 hrs with sufficient quantity of water. The well-soaked drug should be transferred to a distillation apparatus. Ten parts of water is to be added to it. The mixture should be continuously heated till 60% of distillate is collected. After cooling the collected arka should be filtered and stored in airtight bottle. The distillate should be mixed well to get the uniform concentration in the preparation. Arka should be clear, transparent liquid. Durgandhayuktha arka will be unfit for the therapeutic use. It may cause giddiness.

Five types of drugs have been mentioned in the preparation of arka, athyanta Katina, Katina, ardra sarasa, neerasam, and pallava. The classification of drugs given in arkaprakasha is based on the nature of raw materials used. The ratio of preparation of water and drug varies accordingly for extracting active principles.

Arka in modern pharmaceutics may be compared with distillation. The process of separating the constituents of a liquid by vaporizing and condensing them, to convert again into liquid is termed as distillation. Simple distillation, fractional distillation, steam distillation, destructive distillation and vacuum distillation under
reduced pressure are the five types of distillation.\textsuperscript{10}

**MATERIALS AND METHODS**

An attempt was made in this work to collect researches done on \textit{arkakalpana}. Published articles of journals, unpublished thesis works and general articles were surfed through for collection of data. The search was done on digital media also.

**OBSERVATION AND RESULTS**

In total 19 works were found on \textit{arkakalpana} which are detailed below.

1. **Jatamansi Arka**: A clinical study of \textit{jatamansi arka} in management of essential hypertension was conducted. Here 1 part of \textit{jatamansimoola} and \textit{kanda} were soaked overnight in 25 times the quantity of water (1:25) and 60% of \textit{arka} was extracted. At a dose of 10ml twice daily, it proved highly significant in both reducing and normalizing systolic and diastolic blood pressure including the subjective symptoms like headache, giddiness, palpitations.

2. **Bharangi Arka**: A clinical study on the efficacy of \textit{bharangimoola arka} nebulisation in the management of \textit{tamakashvasa}. In this study, \textit{bharangimoola arka} was prepared with a drug and water in the ratio 1:3. In a dosage of 5ml per 8\textsuperscript{th} hourly as a nebulisation in \textit{vegavastha} of \textit{Tamakashwasa} (with respect to Acute Exacerbation of Bronchial Asthma) it showed statistically significant relief in the symptoms.

3. **Vacha Arka**: Pharmaceutico-Analytical study of \textit{Vachaarka} prepared by two different methods and Evaluation of its \textit{medhya} effect. In this study, \textit{Vachaarka} was prepared with 1:2 (A) and 1:3 (B) drug water ratios. Analytical study could generate quality standards for study drug. The experimental study showed both the \textit{Arka} have \textit{Medhya} effect with \textit{Vachaarka} A shows better in Anti anxiety, Anti convulsant property and \textit{Vachaarka} B shows better in CNS Stimulation activity, anti stress, effect on learning and memory, problem solving ability, anti amnesia.

4. **Dronapushpi Arka**: An experimental study to compare the anti-inflammatory action of \textit{dronapushpi (Leucasaspera)} swarasa and \textit{arka}. In this study, \textit{Dronapushpi Arka} was prepared with the proportion of 1:1/100\textsuperscript{th} drug and water ratio. Analytical parameters of both \textit{arka} & swarasa were documented as reference standards. The prepared \textit{dronapushpi arka} and \textit{dronapushpi swarasa} were tested on albino rats for assessing its anti-inflammatory effect by Plythesmograph test in which both showed remarkable decrease in paw edema. \textit{Swarasa} has shown more result compared
to arka. But the observed effect was found to be statistically insignificant.

5. Chaturjataka Arka: Evaluation of chaturjataka arka as a preservative for guduchikwatha.

It was an in vitro study, chaturjataka arka was prepared with the proportion of 1:10 w/v, 1:10 v/v and 1:5 w/v, drug & water proportions. The prepared chaturjataka arka was added in different concentrations in guduchi kwatha prepared in different ratio of drug and water. Guduchi kwatha was subjected to microbiological study with chaturjataka arka as a preservative in different concentrations. The study showed that guduchi kwatha without preservatives, Guduchi kwatha with 1% chaturjataka arka & Guduchi kwatha with 2% chaturjataka arka - showed indefinite growth of colonies of microbes on the day of preparation itself. Guduchi kwatha with 5% chaturjataka arka and guduchi kwatha with 0.2% sodium benzoate - Did not show any microbial contamination on the day of preparation. On the 7th day, when it was given for microbial load analysis, both the samples showed indefinite colonies.

6. Amrutottara Arka: Pharmaceutico-analytical study of amritothara arka and its experimental evaluation of antipyretic effect in albino rats with different doses. In this study the arka was prepared from amrutottara kwatha churna in two different methods i.e 1:16 & 1:2 ratio of drug and water. Both samples were tested experimentally for its antipyretic action (Yeast induced fever) on albino rats in different doses (48ml, 96 ml). Amrutottara arka 1:16 ratios were showing more significant reduction in temperature for experimental animals.

7. Shadrasa Arka: Pharmaceutico-analytical study of shadrasa arka & its deepaniya and pachaniya effect in albino rats

The Arka was prepared by using 6 drugs (sita, chinja, maricha, vibhitaki, punarnava, saindhavalavana) and water ratio of 1:6. Analysis to generate preliminary standards and experimental study in wistar strain albino rats to establish deepana & pachana effect are undertaken. Overall analysis of results, it indicates that the drug did not produce remarkable effect indicative of deepana but produced some marginal pachana effect.

8. Parnayavani Arka: A clinical study to evaluate the swasahara karma of parnayavani Arka as a nebulization in the management of tamakaswasa with specific reference of acute exacerbation of Bronchial Asthma. In this study Arka was prepared from leaves of parnayavani by 1:2 ratio of drug and water. This parnayavani arka when used as nebulization, showed equivalent effect to theophylline (standard
drug) immediately after nebulization. Further, significant decrease in chest tightness, breathlessness, wheezing, speech difficulty, cough, sputum production, pulse rate and respiratory rate were observed.

9. Daruharidra Arka

In this research work, Pharmaceutico analytical comparison of daruharidraarka and kwatha as aschothana drug were carried out. Daruharidraarka was prepared by powder of daruhardidra and water in a rati of 1:20. Daruharidrakwatha was prepared by powder of daruharidra and water in a ratio of 1:8 and reducing to ¼ on mild fire.

Analytical study like pH, refractive index, specific gravity, organoleptic parameters were done for prepared arka and kwatha. When compared with kwatha, arka was colourless and clear. pH for arka was 6.76 and for kwatha it was 5.95. In comparison to pH of tear film which is 7.3-7.6, pH of arka is near to it. So it was opined that the arka is better choice than kwatha when used as aschothana in case of eye drops.

10. Triphala Arka

A critical evaluation on preparation of triphalaarka by following the standard operating procedure (S.O.P) was done. In this work triphalachurna was prepared and analysed. From same triphalachurna arka was also prepared and analysed. After comparing pharmaceutical and analytical parameters it was opined that the arka have better properties than the churna.

11. Shigrupallava arka

Role of Shigrupallava arka as a aschyotana in the management of Kaphaja Abhishyanda w.s.r. to muco purulent conjunctivitis. In this work, Arkawas prepared from tender leaves of shigru in the ratio of 1:10 drug and water. Aschyotana using this arka was done twice daily on diagnosed cases Kaphaja Abhishyanda of for 1 week. It was concluded that arka has statistically significant results in signs and symptoms of Kaphaja Abhishyanda w.s.r. to muco purulent conjunctivitis.

12. Mamsa arka

Pilot study on pharmaceutical process of mamsa arka - A forgotten Ambros. Mamsaarka had prepared by using one part mamsa, 1/40th part lavana, 1/6th part astagandha powder and 1/8th part of milk. Maximum yield of33% yield was observed in 1.5 hrs. Mamsa arka is an aromatic and palatable preparation best among all arka kalpana with fast acting, laghu (light in digestion), balya (strengthpromoting) properties.

13. Medohara arka

A comparative clinical study of medohara arka and medohara arka along with lekhana vasti on medovriddhi w.s.r. to hyperlipidaemia. In this study authors have taken as 2 groups and group 1 was given
gomutra arka 30ml along with honey 10ml and group 2 Same along with lekhanavasti. BMI, Cholesterol, HDL, and LDL were assessed before treatment & after treatment of this study. Group 2 had shown Good, moderate, mild and unsatisfactory result. Group – I had shown only 50% patients got mild improvement.

14. Shigrupallava arka
It’s a clinical study on primary open-angle glaucoma with ashchyotana, tarpana and oral medication. The study conducted under two groups. In group A nasya, tarpana and ashchyotana with shigrupallava arka along with punarnavashtaka kwatha and gokshuradi guggulu were given for 52 days. In group B only antiglaucoma eye drop were given. Patients of group A showed better results in blurred vision, frequent changes of presbyopia glasses, delayed dark adaptation, visual field defect, headache and intraocular pressure.

15. Bilwadi yoga arka
A comparative study of bilvadi yoga aschyotana and eye drops in vataja abhishyanda (simple allergic conjunctivitis. Arka was prepared from equal quantity of bilva, agnimantha, aralu, patala, gambhari, eranda, brihati&madhushigru in the ratio of 1:10 . In group A, ten drops of bilvadi yoga aschyotanawas instilled thrice a day for three months, and in group B, one drop of bilvadi eye drops was instilled thrice a day for three months. The assessment of bilvadiashchyotana and eye drops on vatajaabhisnya, was done by using subjective and objective parameters. It was assessed based on subjective parameter and objective parameter. Both had given results. On comparision of results of the study, patients of group A had shown more significant results patients treated under Group B.

16. Amrutaabheervadi arka
This research work was entitled preparation of amrutaabheervadi drops: An ayurvedic formulation for neonatal jaundice. In this work, Arka was prepared from guduchi, abheeru, sariva, patola, nimba, rakthachandana in the ratio of 1:10 . It was aimed for neonatal jaundice. Amrutaabheerwadi drops were colorless and liquid in consistency and easy to administer in the patients of navajata (neonates) and one who hesitate to take medicines like churna, kwatha etc due its palatability.

17. Haritakyadi arka
Preparation of haritakyadi eye drops: An ayurvedic formulation for ophthalmia neonatorum
Arka was prepared from amalaki, hareetaki, daru, yashti in the ratio of 1:10 and mainly intended for ophthalmia neonatorum. Haritakyadi eye drops was
colourless and liquid in consistency which establishes the optimum presentation of arka preparation

18. **Gomutra Arka**

Immunomodulatory and antioxidant effect of gomutra arka in rats. *Gomutra arka* was procured from govigyananusandhansanthan, Deolapur.

Two groups of rats, containing 6 animals each weighing between 150 to 250 grams were taken. The group I (control) was given normal food ad libitum for 21 days, where group II (GoA) was given *gomutraarka* at dose of 0.2 ml BD for 21 days along with food and libitum. This study shows that the *gomutraarka* has immunomodulatory and antioxidant effect.

19. **Medohara arka**

A comparative study of *kapalabhati* and *medohara arka* in the management of *shtauyla* (obesity). It is a prospective, open randomized study in *shtoulya* done on 90 subjects. This study was conducted on three groups namely *kapalabhati* group, *medohara arka* group, and combined *kapalabhati* with *medoharaarka* group for 45 days. In *kapalabhati* and *medoharaarka* group, percentage was more when compared to other groups in all signs and symptoms.

**SUMMARY**

Among the nineteen works reviewed, eight are clinical studies, seven are pharmaceutico analytical, and four are experimental studies. Table 1-3.

### Table 1 Details of Clinical studies undertaken in Arkakalpana

<table>
<thead>
<tr>
<th>Name of the arka</th>
<th>References</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parnayavani</td>
<td>Priyanighantu</td>
<td>Tamakashwasa</td>
</tr>
<tr>
<td>Medoharaarka</td>
<td>Text book of medicine-surendra k Sharma</td>
<td>Sihaula</td>
</tr>
<tr>
<td>Bilwadi yoga</td>
<td>Bhaishyaratnavali</td>
<td>Vaijajabhishtyanda</td>
</tr>
<tr>
<td>Jatamansiarka</td>
<td>Arkaprakasha</td>
<td>Uchhavayana/hypertension</td>
</tr>
<tr>
<td>Bharangimoolarka</td>
<td>Arkaprakasha</td>
<td>Tamakashwasa</td>
</tr>
<tr>
<td>Medoharaarka</td>
<td>Rasa tantra sarasidhaprayagosangraha/ayurvedasarasangraha</td>
<td>Hyperlipidaemia</td>
</tr>
<tr>
<td>Shigrupallaarka</td>
<td>Arkaprakasha</td>
<td>Kaphajaabhishtyanda</td>
</tr>
<tr>
<td>Shigrupallaarka</td>
<td>Arkaprakasha</td>
<td>Open angle glaucoma</td>
</tr>
</tbody>
</table>

### Table 2 Details of Pharmaceutical & Analytical studies undertaken in Arkakalpana

<table>
<thead>
<tr>
<th>Name of the arka</th>
<th>References</th>
<th>Ratio</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amruthaabheervadi</td>
<td>Ashtangahrudaya</td>
<td>1:10</td>
<td>Easy to administer</td>
</tr>
<tr>
<td>Haritakyadi</td>
<td>Kashypasamhita</td>
<td>1:10</td>
<td>More shelf life, easy to administer</td>
</tr>
<tr>
<td>Daruharidra</td>
<td>Arkaprakasha</td>
<td>1:20</td>
<td>Arka is better than kwatha</td>
</tr>
<tr>
<td>Vachaarka</td>
<td>Arkaprakasha</td>
<td>1:2</td>
<td>Maximum yield</td>
</tr>
<tr>
<td>Triphalaarka</td>
<td>Arkaprakasha</td>
<td>1:10</td>
<td>More properties than choorna</td>
</tr>
<tr>
<td>Chathurjathakaarka</td>
<td>Arkaprakasha</td>
<td>1:10 &amp; 1.5</td>
<td>Can be used as preservative</td>
</tr>
<tr>
<td>Mamsaarka</td>
<td>Arkaprakasha</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 3 Details of Experimental studies undertaken in Arkakalpana

<table>
<thead>
<tr>
<th>Name of the arka</th>
<th>Ratio</th>
<th>References</th>
<th>Experimental model</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dronapushpiarka</td>
<td>1:1/100</td>
<td>Arkaprapaksha</td>
<td>Anti inflammatory</td>
<td>Yield and therapeutic efficacy was less</td>
</tr>
<tr>
<td>Gomutraarka</td>
<td>Procured</td>
<td>Arkaprapaksha</td>
<td>Immune modulatory &amp; anti oxidant</td>
<td>Significant result got</td>
</tr>
<tr>
<td>Amritottaraarka</td>
<td>1:16 &amp; 1&amp;1:2</td>
<td>Arkaprapaksha</td>
<td>Antipyretic effect</td>
<td>Significant reduction in temperature</td>
</tr>
<tr>
<td>Shad rasa Arka</td>
<td>1:6</td>
<td>Arkaprapaksha</td>
<td>Deepaniya&amp;pachaniya effect</td>
<td>Marginal pachaniyaeffect, nodepachiyaffect</td>
</tr>
</tbody>
</table>

DISCUSSION

As many as 500 arkakalpanas are detailed in arkaprakashaan authoritative reference book for arkakalpana. On the other hand this study envisaged only 19 research works on arkakalpana. This observation portrays the need of many more researches in this field.

In ancient time arkayantra, varuniyantra, or tiryakpatanayantra which were usually made up of clay were being used for the preparation of arka. In recent times however modern distillation apparatus or other equivalence made up of stain less steel or glass are being used. The ratio of drug and water in the preparation of arka is a much discussed topic in arkakalpana. The ratio varies from one drug to the other depending up on properties and parts used in the preparation. In Ayurvedic formulary of India the ratio is found to be 1:25 or 1:35 where as text books of bhaishyakalpana have advocated 1:10 ratio of drug and water in the preparation of arka. It is observed in the present study that when the ratio of the drug and water is followed according to arkaprakasha the yield was less, the better yield was observed by following the other two references. Atyanta Katina, Katina, pallava etc are the classifications that are given in arkaprakasha. But applications of these classifications are not clearly stated.

The pharmaceutico analytical studies that have been included in this work can be considered as preliminary pharmaceutical and phyto chemical characterization of seven arka kalpana namely amrutha abheervadi arka, haritakyadi arka, daruhridra arka, vacha arka, triphala arka, chathur jathaka arka and mamsa arka. Standardization of these arka however is required which can be taken up by future researches.

Experimental evaluation of arka was done on 4 models namely antipyretic, anti inflammatory, anti oxidant activity, deepana pachana activity. It can be noted that the dose fixation, dilution and feeding of the medicine is considerably easier in case of arka kalpana in in-vivo studies.
also opens up new avenues for future researches. Among the clinical studies anti asthmatic effect, anti obesity effect, anti hypertensive effect, and effect on conjunctivitis and glaucoma have been studied. It is observed that most of the clinical studies have been taken up on single drug arka. It is pertinent to note that the therapeutic efficacy of the arka is directly proportional to the pharmacological properties of drug used in the preparation. Further a new approach of using arka as nebulization and as eye drops is an appreciable step taken by the researchers. May be that the requirement of sterile medicine for nebulization and for eye drops is fulfilled by general preparation of arkakalpana.

CONCLUSION

In arkaprakasha there are 500 arka mentioned, out of these only few research works are available. However only 19 research works on arkakalpana were available for review in the present work. Among 19 works seven researches were pharmaceutico analytical study, eight clinical study, and four were experimental study. It was found in this study that the trend of research in arkakalpana is seen more in departments like kayachikitsa, shalkya, koumarabhrithya and Rasa shastra and bhaishjya kalpana. The study reveals that many more researches have to be done in this field.
REFERENCES

12. Sandrima k s. (2017). Comparative clinical study on the effect of bharangimoolaa rka as nebulization and oral intake in the management of tamakaswasa [acute bronchial asthma]. Sri Dharmasthala Manjunatheswara college of Ayurveda and Hospital, Hassan, RGUHS, Bengaluru
18. Gouthama A Pushya.(2018).A clinical study to evaluate the swasahara karma of parnayavaniArka as a nebulization in the management of tamakaswasa with specific reference of acute exacerbation of Bronchial Asthma.SriDharmasthalaManjunatheswara college of Ayurveda and Hospital,Hassan,RGUHS,Bengaluru
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