GREENTREE GROUP PUBLISHERS

IJAPC

Volume 10 Issue 3

10 May 2019

WWW.IJAPC.COM
E ISSN 2350 0204

Int J Ayu Pharm Chem

REVIEW ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Recent Updates in *ArkaKalpana*

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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

Greentree Group Publishers

Received 22/03/19 Accepted 20/04/19 Published 10/05/19

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*[1] 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[2].

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[3]. 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*[4]. 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[5].*Arka* should be clear, transparent liquid[6]. *Durgandhayukthaarka* will be unfit for the therapeutic use.It may cause giddiness.[7]

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[8]

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[9]. Simple distillation, fractional distillation, steam distillation, destructive distillationand vacuum distillation under

reduced pressure are the five types of distillation.[10]

MATERIALS AND METHODS

An attempt was made in this work to collect researches done on *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 *arkakalpana* which are detailed below.

1. *Jatamamsi Arka*[11]: A clinical study of *jatamamsi arka* in management of essential hypertension was conducted. Here 1part of *jatamamsimoola* and *kanda* were soaked overnight in 25 times the quantity of water (1:25) and 60% of *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*[12]: A clinical study on the efficacy of *bharangimoola arka* nebulisation in the management of *tamakashvasa*.In this study, *bharangimoola arka* was prepared with a drug and water in the ratio1:3. In a dosage of 5ml per 8th hourly as a nebulisation in *vegavastha* of *Tamakashwasa* (with respect to Acute Exacerbation of Bronchial Asthma) it showed statistically significant relief in the symptoms.

3. *Vacha Arka*:[13]Pharmaceutico-Analytical study of *Vachaarka* prepared by two different methods and Evaluation of its *medhya* effect. In this study, 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 *Arka* have *Medhya*effect with *Vachaarka* A shows better in Anti anxiety, Anti convulsant property and *Vachaarka* B shows better in CNS Stimulation activity, anti stress, effect on learning and memory, problem solving ability , anti amnesia.

4. *Dronapushpi Arka*:[14] An experimental study to compare the anti–inflammatory action of dronapushpi*(Leucasaspera)*swarasa and arka.In this study, *DronapushpiArka* was prepared with the proportion of 1:1/100th drug and water ratio. Analytical parameters of both *arka&swarasa* were documented as reference standards. The prepared *dronapushpi arka* and *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. *Swarasa* has shown more result compared

to *arka*. But the observed effect was found to be statistically insignificant.

5. *ChaturjatakaArka*:[15] 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*:[16]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*:[17]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.***Parnayavaniarka*** :[18] 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***[19]

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 P^H, refractive index, specific gravity, organoleptic parameters were done for prepared *arka* and *kwatha*. When compared with *kwatha, arka*was colourless and clear. P^H for *arka* was 6.76 and for *kwatha* it was 5.95. In comparision to p^H of tear film which is 7.3-7.6, p^H of *arka*is near to it. So it was opined thatthe *arka* is better choice than *kwatha* when used as *aschothana* in case of eye drops.

10. ***Triphala Arka***[20]

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***[21]

Role of *Shigrupallava arka* as a *aschyotana* in the management of *Kaphaja Abhishyanda* w.s.r. to muco purulent conjunctivitis. In this work, *Arka*was prapared 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***[22]

Pilot study on pharmaceutical process of *mamsa arka* - A forgotten Ambros. *Mamsaarka* had prepared by using one part *mamsa*,1/40thpart *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***[23]

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***[24]

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***[25]

A comparative study of *bilvadi yoga ashchyotana* 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 ashchyotana*was 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 *vatajaabhishyanda,* 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***[26]

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***[27]

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 opthalmia neonatorum. *Haritakyadi* eye drops was

colourless and liquid in consistency which establishes the optimum presentation of *arka* preparation

18. ***Gomutra Arka***[28]

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***[29]

A comparative study of *kapalabhati* and *medohara arka* in the management of *sthaulya*(obesity).It is a prospective, open randomized study in *sthoulya* 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 nineteenworks reviewed, eight are clinical studies, seven are pharmaceutico analytical, and four are experimental studies. Table 1-3.

Table1 Details of Clinical studies undertaken in *Arkakalpana*

Name of the arka	References	Diseases
Parnayavani	*Priyanighantu*	*Tamakashwasa*
Medoharaarka	*Text book of medicine-surendra k Sharma*	*Sthaulya*
Bilwadi yoga	*Bhaishjyaratnavali*	*Vatajaabhishyanda*
Jatamamsiarka	*Arkaprakasha*	*Ucchavyana/hypertension*
Bharangimoolaarka	*Arkaprakasha*	*Tamakashwasa*
Medoharaarka	*Rasa tantra sarasidhaprayogasangraha/ayurvedasarasangraha*	*Hyperlipidaemia*
Shigrupallavaarka	*Arkaprakasha*	*Kaphajaabhishyanda*
Shigrupallavaarka	*Arkaprakasha*	Open angle glaucoma

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

Name of the arka	References	Ratio	Result
Amruthaabheervadi	*Ashtangahrudaya*	1:10	Easy to administer
Haritakyadi	*Kashypasamhita*	1:10	More shelf life,easy to administer
Daruharidra	*Arkaprakasha*	1:20	Arka is better than *kwatha*
Vachaarka	*Arkaprakasha*	1:2	Maximum yield
Triphalaarka	*Arkaprakasha*	1:10	More properties than *choorna*
Chathurjathakaarka	*Arkaprakasha*	1:10 &1:5	Can be used as preservative
Mamsaarka	*Arkaprakasha*	-	-

Table 3 Details of Experimental studies undertaken in *Arkakalpana*

Name of the *arka*	Ratio	References	Experimental model	Result
Dronapushpiarka	1: 1/100	*Arkaprakasha*	Anti inflammatory	Yield and therapeutic efficacy was less
Gomutraarka	Procured	*Arkaprakasha*	Immune modulatory &anti oxidant	Significant result got
Amritottaraarka	1:16 & 1&1:2	*Arkapraksha*	Antipyretic effect	Significant reduction in temperature
Shad rasa Arka	1:6	*Arkaprakasha*	*Deepaniya&pachaniya effect*	Marginal *pachana*effect,no*deepaniya*effect

DISCUSSION

As many as 500 *arkakalpanas* are detailed in*arkaprakasha*an 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 *bhaishjyakalpana* 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, daruharidra 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.It

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.

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