E ISSN 2350-0204

IJAPC

VOLUME 11 ISSUE 3 2019

www.ijapc.com
Greentree Group Publishers (GGP))

Int J Ayu Pharm Chem

RESEARCH ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Pharmaceutical and Analytical Study of *Shushka Kaasaghna Arka*

Rekha.J[1]*, Ravindra Angadi[2], Ashok Kumar B.N[3], Sushmitha.V.S[4] and Radhika Ranjan Geethesh P[5]

[1-5]Department of Rasasastra and BhaishajyaKalpana, SDMCA, Udupi, Karnataka, India

ABSTRACT

Arka Kalpana is one among the main dosage form explained in arka prakasha. Arkaprakash is believed to be a contribution of Ravana who was famous for his pharmaceutical preparation skills. Many arkas are explained according to diseases. For the use of this dosage form with full confidence each arka prepared is to be analysed pharmaceutically and analytically . Shuhska kaasaghna arka is an arka preparation explained in the context of shushka kaasa in Arka praksah.so IN the present study shushska kaasaghna arka was prepared and analytical profiling was done.

KEYWORDS

Shushka Kaasaghna Arka, Muhur Muhur Aushada Kala

Greentree Group Publishers

Received 31/07/19 Accepted 05/11/19 Published 10/11/19

INTRODUCTION

Arka Kalpana stays unique because of its preparation methods and other characteristics. Arka prakasha is a compendium of different Arka formulations. Shushka kasaghna Arka is one among the numerous Arkas explained in Arkaprakasha. The indication says that it is beneficial in shushka kaasa. Even though these many Arka are explained their clinical utility are less explored. Hence if it is proved efficacious Arka Kalpana can be utilised among other widely available Kalpana such as Kashaya, taila etc in the market. .shuhska kaasaghna arka is an arka preparation explained in te context of shushka kaasa in Arka praksah.so IN the present study shushska kaasaghna arka was prepared and analytical profiling was done.

MATERIALS AND METHODS

Present study for was conducted in two steps

- Pharmaceutical study
- Analaytical profiling

Pharmaceutical study

The pharmaceutical study is divided into following sections:

- Collection of drugs
- Authentication of the raw drugs
- Preparation of shushka kaasaghna arka

The pharmaceutical study was done step by step as mentioned above. The Shushka Kaasaghna Arka was prepared in Sri Dharmasthala Manjunatheshwara Ayurveda Pharmacy, Udupi.

Collection of drugs

The raw drugs required for the preparation was collected from Sri Dharmasthala Manjunatheshwara Ayurveda Pharmacy, Udupi.

Authentication of the drug

The authentication of drug was done at Sri Dharmasthala Manjunatheshwara Ayurveda Pharmacy, Udupi.

Preparation of shushka kaasaghna araka

Shushka Kaasaghna Arka was prepared with the drug and water ratio 1:10 parts

Equipment required

Powdering: weighing machine, Khalva yantra

Soaking: steel vessel, measuring jar

Distilling: Arka yantra

Collection: steel vessel

Storage :200ml plastic bottles

Ingredients [1]

- Kantakari
- Brihathi
- Draksha,
- Vasa
- Kachura
- Nagara
- Pippalli
- Kha khas

PROCEDURE

• Morphological examination of ingredients was done

• Ingredients were pounded separately using pulveriser.

• All ingredients were measured and mixed

• They were transferred in to a steel vessel for soaking

• Then 3 litres of water were added for soaking and covered with a lid

• The soaking was done overnight

• Next day it was transferred to distilling apparatus

• It was added with 7 litres of water

• Distillation was started and the observations are noted

• First 5o ml of the distillate was discarded

• When the 60% of the distillate was collected the distillation was stopped

• It was then packed in 200ml plastic bottles.

Precautions

• Ingredients should be coarsely powdered.

• First few ml of Arka should be discarded since it does not contain active principles

• Utensils should be clean enough to avoid the mixing of materials of previous products

• Constant temperature should be maintained

• Continuous cold-water supply and heat supply should be ensured

• The patra in which Arka is collected should proper without hole

Storage

After cooling the Arka was stored in air tight plastic bottles

ANALYTICAL STUDY

This part of the study was conducted in the following steps

• Organoleptic analysis

• Physico-chemical analysis

• Gas chromatography

A. ORGANOLEPTIC ANALYSIS

Organoleptic analysis was done by assessing the following parameters

• Colour

• Taste

• Odour

• Characteristics

B. PHYSICO-CHEMICAL ANALYSIS

Determination of pH [2]

The pH value conventionally represents the acidity or alkalinity of an aqueous solution. In the pharmacopoeia, standard and limits on pH were provided for these pharmacopoeial substances in which pH as a measure of the hydrogen activity is important from the stand point of stability or physiological suitability.

The measurements of pH is generally done with a suitable potentiometric meter known as the pH meter fitted with two electrodes, one constructed of glass and sensitive to hydrogenation activity and the other a

calomel reference electrode. The determination is carried out at a temperature of 2540c ±20c unless otherwise specified in the individual monograph.

Apparatus: The pH value of a solution is determined potentiometrically by means of a glass electrode, a reference electrode and a pH meter either of the potentiometric or of the deflection type

Operate the pH meter and electrode system according to the manufacturer's instruction. Calibrate the apparatus using buffer solution D as the primary standard, adjusting the meter to read the appropriate pH value corresponding to the temperature of the solution. Where provision is made for setting the scale, use a second reference buffer solution, either buffer solution A, buffer solution E or buffer solution G. In this case a check is carried out with a third reference buffer solution of intermediate pH, when the reading of the intermediate solution must not differ by more than 0.05 pH unit from the corresponding value indicated in the Table. Where there is no provision for setting the scale with a second reference buffer solution, checks should be made with two reference buffer solutions, the readings for which must not differ by more than 0.05 pH unit from the value corresponding to each solution

Determination of Specific gravity[3]

Weight per milliliter – The weight per millilitre of a liquid is the weight in g of 1 ml of a liquid when weighed in air at 25º, unless otherwise specified.

Method

Select a thoroughly clean and dry pycnometer. Calibrate the pycnometer by filling it with recently boiled and cooled Water at 25º and weighing the contents. Assuming that the weight of 1 ml of water at 25º when weighed in air of density 0.0012 g per ml, is 0.99602 g. Calculate the capacity of the pycnometer. (Ordinary deviations in the density of air from the value given do not affect the result of a determination significantly).

Adjust the temperature of the substance to be examined, to about 20º and fill the pycnometer with it. Adjust the temperature of the filled pycnometer to 25º, remove any excess of the substance and weigh. Subtract the tare weight of the pycnometer from the filled weight of the pycnometer. Determine the weight per millilitre dividing the weight in air, expressed in g, of the quantity of liquid which fills the pycnometer at the specified temperature, by the capacity expressed in ml, of the pycnometer at the same temperature.

Specific gravity

The specific gravity of a liquid is the weight of a given volume of the liquid at 25º (unless otherwise specified) compared with

the weight of an equal volume of water at the same temperature, all weighings being taken in air.

Method

Proceed as described under Wt. Per ml. Obtain the specific gravity of the liquid by dividing the weight of the liquid contained in the pycnometer by the weight of water contained, both determined at 25º unless otherwise directed in the individual monograph.

Refractive index[4]

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. Reading was noted.Distilled water has arefractive index of 1.3325 at 250c .The difference between the reading and 1.3325 gives the error of the instrument .I the reading is less than 1.3325 ,the error is minus ,then the correction is plus .Ithe reading is more ,the error is plus and the correction is minus .refractive index of the test samples were measured at 28oc.

Volatile oil[5]

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

Microbial load

A. Total bacterial count by plate count method

Clean the working space in laminar air flow using 70% ethanol and switch on the UV for 20 minutes. After cooling, casein soya bean digest agar medium was coloured int to 100 mm sterile Petri dishes. Add 1 ml of Shushka Kaasaghna Arka sample in to petri dish containing the media. Plates were gently rotated to achieve uniform distribution of the sample and allow the media to solidify. Incubate all the Petri dishes for 5 days at 30 oc in BOD incubator. All experiment was carried out in triplicate. Number of colonies was counted using digital colony counter.

B.Total fungal count by plate method

Clean the working space in laminar air flow using 70% ethanol and switch on the UV for 20 minutes. After cooling sabouraud dextrose agar medium, add antibiotic to check the growth of the bacteria. Then media was poured into 100mm sterile Petri dishes. Add one ml of shushka Kaasaghna Arka sample into Petri dishes containing media. Plates were gently rotated in a circular motion to achieve uniform distribution of the sample and allow the media to solidify. Incubate all the petri dishes for 5 days at 25oc in BOD incubator. Experiment was carried out in triplicate. Number of colonies was counted using digital colony counter.

C.CHROMATOGRAPHY

Gas chromatography

Gas chromatography mass spectrometry was performed using 7890 A,MS 5975.The capillary coloumn (HP -5ms ultra inert (lenth 30.0 :diameter :o.25mm)with afilm thickness of 0.25mm) and thecarrier gas at a flow of 1.0ml/min used.2µl sample with 36.445 cm/sec averge velocity was utilized .The inlet temperature was maintained at 280℃.The oven temperature was programmed at 50℃ for 1 min and then increase to 310 ℃ at a rate of 10℃.total run time was 42 min .The mass transfer line was maintained at a temperature of 240℃.Mass apectrum was recorded using 70ev electron energy.Fragmented compounds were evaluated using total ion count for compound identification and quantification.The spectra of the unknown componenets were identified and compared using spectral data base NIST -11 library.

RESULTS

PHARMACEUTICAL STUDY

The pharmaceutical preparation was conducted and the details of the events during the procedure was recorded (table 1)

Table 1 details o f pharmaceutical procedure

• **QUANTITY OF EACH DRUG**	• **130GMS**
• **QUANTITY AFTER PULVERIZATION**	• 1KG
• **QUANTITY OF WATER ADDED**	• 10 LITER (10 TIMES)
• **LOSS ON PULVERIZATION**	• 50GMS
• **DATE OF INITIATION**	• 9/7/18
• **DATE OF COMPLETION**	• 9/7/18
• **TIME OF COMMENCEMENT**	• 10:39 AM
• **VAPOURIZATION STARTED AT**	• 10.52 AM
• **CHARACTERISTIC SMELL OF INGREDIENTS STARTED AT**	• 10.57 AM
• **PREPARATION STOPPED AT**	• 11.51 AM
• **TOTAL DURATION**	• 1.12

ANALYTICAL STUDY

Analytical study of the product shushka kaasaghna Arka was carried and the details are given in table 2

Table 2 analytical study results

PARAMETER	**VALUE**
• **Ph**	4.58
• **VOLATILE OIL**	3.805
• **SPECIFIC GRAVITY**	0.9977
• **REFRACTIVE INDEX**	1.33
• **MICROBIAL LOAD**	• Fungal load - 8.0*101CFU/ml • Bacterial load- 4.0*101CFU/ml
• **GAS CHROMATOGRAPHY**	MAIN INGREDIENT WAS PIPERINE, STIGMA SITOSTEROL ETC

DISCUSSISON

PHARMACEUTICAL STUDY

Arka Kalpana is unique dosage form in Ayurveda. Arka Prakasha is the only text book which is available till date which have extensively narrated about Arka Kalpana. Arka is considered to be one among the pachavidha Kashaya kalpanas according to this textbook. Since the Kalpana is less explored in the clinical level the present study aimed at clinical evaluation along with its pharmaceutical evaluation and analytical profiling of shushka kaasaghna Arka in Vatika kaasa was carried out.

Pre-preparations:

• Particle size

There are ten ingredients in the formulation of the trial drug i.e. shushka kaasaghna Arka. All the ingredients were separately collected dried and powdered. The churna for Arka should be coarsely powdered. The fine powdering of the ingredients may lead to the loss of volatile oils available in the raw drugs due to the heat of pulverization. The ten drugs present in the trial drug are brihathi, kantakari, draksha, vasa, kachura, nagara, pippali, khasa khas. Most of them contain volatile oils as their phytoconstituent. the fine powder may settle as sediment during the boiling process and the drug particles may not come in proper contact with the water molecules.

• Soaking

After coarse powdering the ingredients were soaked in water. Total quantity of water used was ten times. Among the ten litres 3 litres were used for soaking. If soaking is proper the proper extraction of the active principles will be done. By proper soaking the water molecules will be entering properly in the molecules of the coarsely powdered drug. Thereafter while subjected to heating the volatile principles along with the water will be evaporated not properly soaked the proper active ingredients will not be available in the Arka.

Addition of water

The ratio of water selected here is ten parts. There are many references available regarding the quantity of water. The practical experiences of successful practioners says that ten parts was found suitable for good Arka.so the study was carried out adding ten parts of water. After soaking the remaining 7 parts were added. Arka preparation process will take few hours. This water added helps for the proper vaporization and avoid charring of drug until the completion of the Arka preparation.

Procedure

In Arka preparation the volatile principles are trapped in water medium and it is condensed and used. In the beginning the vapours may not contain the active

principles, so the first 100ml of Arka was discarded. First few minutes Arka was coming drop by drop later on continuous collection was there in the vessel. The Arka was measured using the scale in the vessel. Practical experiences prove that Arka proves to be good when 60% of the distillate is taken. Hence the Arka preparation was stopped when 60%/was collected. Arka since it is the condensed volatile principles of a drug is transparent without turbidity. Since trial drug is compound formulation characteristic smell and taste of mixed ingredients were observed. The Arka obtained was neither theekshna nor mrudu. It is madhyamarka.

ANALYTICAL STUDY

ORGANOLEPPTIC CHARACTERISTICS

Appearance

Arka is the dosage form in which the volatile principles are condensed and obtained. Hence the dosage forma was a clear liquid

Smell

Smell of the Arka is characteristic one. There was no prominent smell of particular drug among the drugs added. It was the mixture of all drug which was not identifiable particularly as the taste of one single ingredient

Taste

The Arka is having a particular taste. on trial over the people a mixture of Kashaya thiktha was opined. A soothing effect was felt afterwards by the people who consumed it. soothing effect may be due to the presence of drugs like shati, khas khas etc. There are no palatability issues in consuming the formulation.

pH estimation

It is the value which determines the alkaline or acidic nature of a dosage form. The pH value of shushka kaasaghna Arka was found to be 4.58. It indicated that the formulation is acidic in nature. According to Ayurveda kaasa in amashaya samudhbhava. As anupana to Arka tambula sevana is said. May be the controlled acidity needed for the proper secretion of the digestion is occurring in the amashaya level. Hence the acidic pH may be acting as a stimulation for the proper secretion of digestive juices.

Volatile oil

Volatile indicates the active principles available in the dosage form. Arka Kalpana contains the volatile principles in the condensed form. Hence the formulation will be more therapeutically effective if required amount of volatile oils are there. Here in shushka kaasaghna Arka the volatile oils were found to be 3. 805. This value says that there are enough active principles available in the form of volatile.

Specific gravity

Specific gravity indicated the total dissolved solids. Here the specific gravity of the shushka kaasaghna Arka is found on analysis as 0.9977.

Refractive index

Refractive index is the change of the direction of light when it moves from one media to another. here the refractive index of the shushka kaasaghna Arka is 1.33. Hence the formulation has refractive index similar to water (standard refereance).One of the characteristic features of Arka is clarity. Hence the parameter similar to prescribed standard protocols are found in the product.

Microbial load

Microbial load is a part of standard to assess the purity of sample

The fungal load and bacterial load are as follows

- Fungal load - 8.0*101CFU/ml
- Bacterial load- 4.0*101CFU/ml

These values indicate that there is only negligible contamination

Gas chromatography

Gas chromatography is a part of standardization of final product. It gives us the presence of different active present in the formulation in the form of peaks. Gas chromatography result identified 30 compounds in the formulation. The highest of which is piperene which is supposed to be the volatile principles from pippali which is one of the ingredients of the formulation. Other active principles identified are camphene, Gama sitosterol, methyl ester, ethyl-p-methoxycinnamate, ethanol pentamethyl,9-octadecenamide (Z)-, pentadecane, stigmasterol beta longipin.

CONCLUSION

The Arka will be of good quality when 60% of the distillate is collected .When 60% of the distillate is collected the distillation can be stopped. Analytical profiling such as Ph, volatile oil, specific gravity, refractive index all were within the limit of a standard Arka.Microbial load such as fungal and bacterial load test results revealed negligible contamination.Gas chromatography identified 30 compounds in the Arka..Piperiene is the compound that gave the maximum peak.Hence it is concluded that shushka kaasaghna arka mentioned in Arkaprakasha is pharmaceutically and analytically meeting the pharmacopeia standards and can be suggested for the clinical evaluation

REFERENCES

1. Lankapathi ravana, Arka Prakasha commentary by Indradev Tripathi,1st edition, Varanasi, Krishnadas Academy; 1995;p8-9; pp172.
2. Dr Devendra joshi,quality control and standardization of Ayurvedic medicines,1st edition, Choukhambha Orientalia,2017; pp284,p170.
3. Dr Devendra Joshi, quality control and standardization of Ayurvedic medicines,1st edition, Choukhambha Orientalia, 2017; pp284,p167.
4. Dr Devendra Joshi, Quality control and standardization of Ayurvedic medicines,1st edition, Choukhambha Orientalia, 2017;pp284,p138.
5. Dr Devendra Joshi, quality control and standardization of Ayurvedic medicines,1st, edition, Choukhambha Orientalia, 2017; pp284, p133.
6. .Dr Devendra joshi,quality control and standardization of Ayurvedic medicines,1st edition, Choukhambha Orientalia,2017; pp284, p148.

Conflict of interest-nill

Source of support-nill