

DEVELOPMENT AND PRELIMINARY PHARMACOGNOSTIC EVALUATION OF NETRAROGA SHAMAKA ARKA

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Abstract

Arka Kalpana (process of distillation) is an Upakalpana (sub type) of Phanta Kalpana (hot infusion), which contain the volatile constituents of the drugs used in the preparation in a medium of water and they are equivalent to the 'aquae' or 'waters' of the western pharmacopeia which is prepared in the same way. Netra roga shamaka arka is indicated in eye diseases which is mentioned in Arka Prakash. The netra roga shamaka eye drops was prepared by using modern pharmaceuticals equipment. During the process of preparation, the method of preparation of Arka according to The Ayurvedic Formulary of India was followed.

Introduction

In present scenario due to lifestyle modification eye has become more susceptible to various ocular diseases. Hence prevention and promotion of ocular health plays a major role.

Many local curative and preventive application has been mentioned in ayurvedic classics for the treatment of *Netra roga* like *Seka*, *Aschoytana*, *Pindi*, *Vidalaka*, *Anjana* etc. This route of drug delivery is used for local effect. In modern pharmaceuticals the different categories of ophthalmic preparations includes drops, solutions, suspensions and ointments. Aschoyotana is a form of eyedrop in which drops are administered in the eye from the height of two fingers. Because this preparation is intended for application to the conjunctival sac, it should be sterile and non irritant, so to make it patient compatible and to check cross contamination the manufacturing processes should meet the requirements of Good Manufacturing Practices (GMP)¹. Ophthalmic drops should be clear and practically free from particles when examined under suitable conditions of visibility.

Taking this into account, an attempt was made in this work to preapare and analyse Netra Roga Shamaka Arka²

MATERIAL AND METHODS –

The study was conducted in two phases. First phase was to prepare The netra Arka and the second phase involved its analysis.

I. Pharmaceutical Study:

The Raw drugs namely *Punarnava*, *Tuvari*, *Triphala*, *Haridra*, *Daruharidra*, *Rasanjana*, *Ghritakumari*, *Yashtimadhu* and *Gairika* were collected (table1).

Method of Preparation: 2gms of each drugs were taken crushed in Khalva Yantra to get a coarse powder and mixed 200 ml of distilled water and kept two hours for soaking. Then it was transferred into Arka Yantra. Temperature was maintained around 90°C till boiling starts. Then it was decreased up to 70°C. The vapors were condensed and collected in a receiver. In the beginning, the vapour consists of only steam and may not contain therapeutically essential substance thus few first drops were discarded. The last portion also may not contain therapeutically essential substance which was also discarded. It took around 3 hours to collect 60% of total water contents.

Table1. List of the ingredients used

Name of the plant	Latin name	Quantity used
Punarnava	<i>Boerhavia diffusa</i>	2gm
Tuvari	<i>Phaseolous vulgaris</i>	2gm
Ghritakumari	<i>Aloe barbadensis Miller</i>	2gm
Haritaki	<i>Terminalia chebula</i>	2gm
Bibhitaki	<i>Terminalia bellerica</i>	2gm
Amalaki	<i>Embllica officinalis</i>	2gm
Haridra	<i>Curcuma longa</i>	2gm
Yashtimadhu	<i>Glycyrrhiza glabra</i>	2gm
Gairik(Red ochre)		2gm
Saindhav Lavana (Rock salt)		2gm
Daruharidra	<i>Berberis aristata</i>	2gm
Rasanjana		2gm

II. Analytical study

A. Organoleptic Properties: The Arka was colorless, scented odor dominated of haridra it was palatable product with slightly Kashaya (astringent) taste.

B. Physico-chemical parameters

a) **Determination of pH:** The pH is a measure of the hydrogen-ion activity which is important from the standpoint of stability or physiological suitability. The pH was measured by using pH meter as per instruction given in instrument.

b) **Determination of Specific Gravity:** The specific gravity of the Arka was measured by using pycnometer as per standard method

c) **Determination of Refractive index:** The refractive index of the Arka was measured by using Abbes refractometer.

d) **Determination of Total Solid Substance:** Total solids were measured by using refractometer.

e) **Viscosity-** Viscosity was measured by using viscometer.

RESULT

The final distillate obtained was 120 ml which was 1/3rd of the total liquid content. Organoleptic and Physicochemical characters of Karnasravahara Arka are presented in Table-2 and Table-3.

Table 2. Organoleptic Findings

Organoleptic character	Netradoshahara arka
Colour	Transparent,clear
Odour	Characteristic to Haridra
Consistency	Liquid
Taste	Kashaya, amla

Table 3. Physicochemical Parameters

pH	5.2
Specific gravity	1
Refractive index	1.34
Viscosity	1.01
Total solid substances	0.1

DISCUSSION

The final product was clear transparent liquid with characteristic odour and taste of the ingredients These observations meet the requirement of Prashasta Arka Lakshana.³

Specific gravity is an important parameter for analyzing Arka which indicates the presence of solutes in a solvent. The presence of dissolved substances in the samples changes the value of specific gravity.⁴The specific gravity of the solution is viscous like water.

Total solid is a measure of the suspended and dissolved solids in water. Here the TSS of obtained Arka was 0.1 indicating that the Arka has less solids substances.

Ph of the obtained arka was found to be 5.2 which is near to the pH of the eye i.e 7, as eye can tolerate the pH ranging between 3 to 9⁵, Netra roga shamaka arka can be used as an eye drop without causing any irritation.

Root extracts of punarnava were found to have a broad spectrum and very high antiviral activity.⁶ Different uses of Punarnava has also been mentioned in Bhavprakasha in various netra rogas.⁷

Tuvari (*Phaseolous vulgaris*) is having Laghu, Tikshna, Ushna, Kaphahara, Dipana, Grahi, Krimighna and Kusthaghna property.⁸

Aloe vera contains multiple pharmacologically active substances which are capable of modulating cellular metabolism, activation of some enzymes and express antibacterial, antifungal and anti-inflammatory activities⁹

Triphala has a high contains of phenolics, phenolics are known to be toxic to microorganism because of which triphala possess broad spectrum actibacterial property without any sideeffect.¹⁰

Haridra has been proved to have anti-inflammatory and analgesic activities. Rhizomes of it contain curumin (diferuloylmethane), turmeric oil or turmerol and 1,7-bis, 6-hepta-diene-3, 5-dione, proteins, fat, Vitamin A, B, and C. Curcumin present in has a potent anti-inflammatory and antibacterial property.¹¹

Yastimadhu has also been proved to have antimicrobial action. Glabridin, which is an active component of Yastimadhu is found to exhibit antimicrobial activity against both Gram-positive and Gram- negative bacteria¹²

Gairika is madhura, kashaya, snigdha , hima , rakta pitta hara and Vrana ropaka Daruharidra is having anti-inflammatory, antibacterial and anti allergic properties and it was found to be effective when given as an Aschyotana in allergic conjunctival inflammation.¹³

Saindhava lavana is having Laghu, Tikshna Guna its spreads through channels and clears the accumulated Doshas.

Rasanjana is a concentrated extract prepared with roots and stem bark of Daruharidra (*B.aristata*).In a study, it is found to be effective in the condition of Netra Abhishyanda (Mucopurulent Conjunctivitis)¹⁴

Due to all the above mentioned properties of the ingredients of Netra roga shamaka arka , and being one the most sterile dosage form in Ayurveda , arka kalpana is having dominance over the other dosage form specially when used in eye ailments so Netra roga shamaka arka may be useful in various common bacterial infections of the eye.

CONCLUSION

Netra roga shamaka arka can be easily prepared as all the ingredients used are easily available. Pharmacological properties and phytoconstituents of these drugs are supportive in their suggestive action on various eye ailments.

60% of yield can be obtained in this formulation which is in line with the description of authoritative books.

The organoleptic and physicochemical properties of netra roga shamaka arka generated in this work can be considered as preliminary standards for the formulation.

Considering the sterile nature of the dosage form the Netra roga shamaka arka is preferable over other dosage forms for the purpose of aschyotana. However an efficacy study may be essential in a clinical study.

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