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PREPARATION AND PHYSICO-CHEMICAL EVALUATION OF KANKSHI DRAV ASCHYOTAN W.S.R TO NETRABHISHYANDA – AN AYURVEDIC EYE DROP FORMULATION

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ABSTRACT

Kankshi Drav Aschyotana is a formulation was selected for evaluating its efficacy in kaphaj abhishyanda (Mucopurulent Conjunctivitis). In this study aschyotana comes under arka Kalpana of bhaishjya Kalpana. This aschyotana eye drop is made up of gulab petals arka and kankshi churna i.e kankshi drav. The mineral kankshi and medicinal herb gulab has a great potential to reduce, cure symptoms of conjunctivitis. Abhishyanda is considered as sarvagata netraroga and posses symptoms of conjunctivitis like excessive discharge from eye, itching, redness etc. This study direct towards pharmaceutical preparation of gulab arka with kankshi drav. And its analytical parameters like Ph value, refractive index, specific gravity etc has been studied.

KEYWORDS: Kankshi Drav, Gulab Arka, Netrabhishyanda

INTRODUCTION

Aschyotana is a method of instilling liquid medicine drop by drop in opened eye at kaninika sandhi (inner canthus) from two angula of height.[1] Aschyotana is indicated in amavastha of netraroga (acute inflammatory condition) that is presented with pain, foreign body sensation, burning sensation, redness, itching, profuse watery discharge, lacrimation, swelling etc.conjunctivitis is a inflammation of conjunctiva due to infection of membrane, congestion of strotas leading to congestion of vessels of eye.[2] hence the formulation kankshi drav is

selected which is therapeutically effective in amavastha of netraroga i.e (raag, daha, paka, ushnata) in the disease of Netrabhishyanda.

In this study formulation kankshi drav is selected to evaluate its analytical parameters. The Kankshi Drav is made up of Gulab Arka and Kankshi Churna. The kankshi is one of the important drug in rasaushadhi. The Kankshi Churna is prepared from purified alum by undergoing a specific purification process mentioned in grantha's for the therapeutic use. Kankshi Churna is also known as Sphatika Bhasma/Alum Powder/Sphatika Churna. It is available in Saurashtra region so the name is saurashtri. and from gulab petals the arka is prepared by distillation process.

The method by which the volatile oil and active principles of the drug are collected is called as *Arka- kalpana* (process of distillation) and the compound prepared through this procedure is called as *Arka* (distillate). So the kankshi drav is prepared as per standard method mentioned in Rastaringini. This article highlights the different steps and stages of preparation of Kankshi Drav.

AIM AND OBJECTIVES

- To Prepare the Kankshi Churna/Bhasma by purifying the Kankshi
- To Prepare the Gulab Arka by Distillation Process.
- To Study about Analytical Parameters of Kankshi Drav.

Literature review[3]

तरुण्या रक्तपुष्पाया: सलिि े तु पररस्रुते|

पञ्चकोि ेन्मिते काङ्क्षी चतुर्ुुंजालिता क्षषपेत् ॥ १६५ ॥ तस्याम्भसस्तु नयने द्विन्त्रबिमदून विननक्षषपेत् । अलभष्यमद ननहम्याशु शोथपाकाददसंयुत् ॥ १६६ ॥

(Rasataringini 11/165)

The Arka of Gulab Petals 5 Tola i.e 60 ml is added with 4 ratti i.e 500mg of Shuddha Kankshi Churna and mixed well, Instillation of 2 -3 drops of this mixture in eyes will reduce symptoms of conjuctivitis i.e (Abhishyandi Netra condition inflammation, swelling of eyes in Conjunctivitis.)

MATERIALS AND METHODS

Collection of the Drug-: The Gulab Flowers and Kankshi is procured from authentic market sources and authenticated in the Dept of Rasashastra and Dravyaguna Dept.

Sr No	Drug	Quantity
1.	Kankshi	25gm
2.	Gulab Petals	125gm

Distillation Procedure of Gulab Petals was done at Quality Control Laboratory of the Institute. Analytical Tests has been performed at Quality Control Laboratory of the Institute.

Drug Review [4,5,6,7]

Kankshi[4,5]

The Kankshi comes under Uparasa Varga as per Rasaratnasamucchay, Rasatarinigini etc. As it is originate from sand of Saurashtra it is known as "Saurashtri"

Chemical Formula: K2SO4, Al2(SO4)3, 24H2O Properties-: Rasa – Kashay, Katu, Tikta Virya – Ushna

The bright white in colour, Snigdha (very smooth in physical form, amla (sour) in taste, It has water absorbent and scrapping (lekhan) properties.
Rogaghnata- Vranaropak, Kanduhar, Netrya, Visarpaghna, Grahi, Lekhana, Rudhirstravrodhani, Vishanashini, Tridoshshanti, Kanduatihara.

Gulab[6,7]

Synonyms – Taruni, Shatpatri, Charukeshara, Laksha
Properties– Rasa- Tikta, Kashay, Madhur Virya: Sheet Vipak– Madhur Doshaghnata – Vata, Pittashaman

Roghaghnata -: Varnya, Mukhrognashan, Vranaropak, Dahaprashaman.

Method of Preparation

Kankshi Shodhana[4,5]

Ashuddha kankshi was taken in an earthen vessel (sharav) and subjected to heat Madhyamagni. The heat was given till all the water from kankshi evapourates and it turns free of water content. At the final end of the procedure a dull white coloured kankshi was obtained. Later it is taken out from the fire and kept for cooling and weighed. This white

substance then made as fine powder like the character of churna by mortzal and pestle.

Initial weight of Impure Kankshi -: 25gm Final weight Shodhit Kankshi-: 15gm
This is how Kankshi Churna is made and stored in airtight container.

Gulab Arka Preparation[8]

Kalpana – Arka Kalpana

Method – Firstly raw gulab petals 125 gms was taken and soaked overnight in 1.25 litre distilled water, next day its arka is distilled with the help of distillation apparatus. Gulab Arka was prepared following the standard method described in the Ayurvedic Pharmacopoeia of India. Fresh rose petals were separated from the sepals, rinsed with clean water, and chopped by hand. These petals were then soaked overnight in 10 times their volume of water.

The next day, the soaked mixture was poured into a distillation setup. The temperature was initially raised to 100°C until the water began to boil. After boiling started, the heat was lowered and maintained at around 40°C for the rest of the distillation process. The distillate was collected until it reached half of the total volume of the water used.

Sr no.	Gulab petals	Quantity of distilled water	Quantity of distillate
1.	125 gms	1250 ml	780ml

Initial Weight-: 125 Gms Gulab Petals - **Final Weight** -: 780 ml of Gulab Arka

The procedure was performed in following steps.

1. **Soaking**: Raw Gulab Petals was soaked in distilled water for 12 hours.
2. **Distillation**: Distillation process was started with simple distillation process. Total 780 ml of distillation was obtained at the end of distillation process. from it 120ml distillate was separated for an analytical purpose in a sterile iodine flask.
3. **Addition of Kankshi Churna:** fine powder of kankshi were added to required quantity of distillate gulab arka, stirred well and kept for 12 hours.
4. **Filtration**: The mixture were filtered with the help of filter paper and glass funnel then stored in airtight container.

Kankshi Jal Preparation

The Arka of Gulab Petals 5 Tola i.e 60 ml is added with 4 ratti i.e 500mg of Shuddha Kankshi Churna was taken in a Beaker and stirred well with a Glass Rod.

Sr No	Kankshi Churna	Quantity taken of distillate for Preparation of Drav	Distillate after Adding Churna
1.	500 mg	60 ml	60 ml

Organoleptic tests

The organoleptic parameters of medicinal plants, herbs are important and give the basic idea of the quality of sample, besides analytical parameters, rupa (colour), rasa (taste), gandha (odour), Sparsha by panchadnyanendriya pariksha are noted.

Material	Varna	Sparsh	Gandha	Rasa
kankshi	Greyish white	Smooth	None	Astringent
Gulab	Pink	Smooth	Sugandhi	Kashay
Gulab arka	Transparent	Liquid	Characteristic	Astringent
Kankshi drav	Transparent	Liquid	Characteristic	Astringent

Analytical study[9]

The prepared arka was analyzed for the physicochemical parameters. i.e Ph, refractive index, specific gravity, viscosity.

a) Determination of PH value

This test is carried out to determine the ph of the test drug sample with the help of ph meter.

- The ph value of liquid can be determined potentiometrically by means of the glass electrode, a reference electrode and a ph meter either of the digital or analogue type.
- The ph value of aqueous liquid may be defined as the common logorithum of the reciprocal of the hydrogen ion concentration expressed in a g per litre.
- Detection of ph value is useful for quantitative indication of the acidity or alkalinity of a solution.

b) **Specific gravity-:** The specific gravity of the liquid is the weight of a given volume of the liquid at temperature compared with the weight of an equal volume of water at the same temperature.

Significance: The presence of dissolved substances in Arka is expected to change its specific gravity. So it is considered to be an important parameter for analyzing.

Method: A clean and dry 25 ml capacity Pycnometer was taken and its weight was noted. It was filled with the sample, cleaned properly from outside and the weight was taken at tempreture. Then it was cleaned, rinsed and filled with distilled water, dried from outside and

the weight was noted at tempreture. The weight of sample and distilled water was calculated. Then the Specific gravity was determined by dividing the weight of the sample by the weight of the water.

c) Refractive index

Definition: The refractive index of a substance with reference to air is the ratio of the sine of the angle of incidence to the sine of the angle of refraction of a beam of light passing from air into the substance. It varies with the wavelength of the light used in its measurement.

Significance: The consistency of the media and solutes present in the media makes the difference in the refractive index. So, it is an important parameter for differentiating the arka.

Method: Refractive index of a substance varies with temperature. Hence, temperature is to be noted while determining R.I. The R.I. of different samples was measured in Abbe's Refracto-meter at temperature.

d) Viscosity

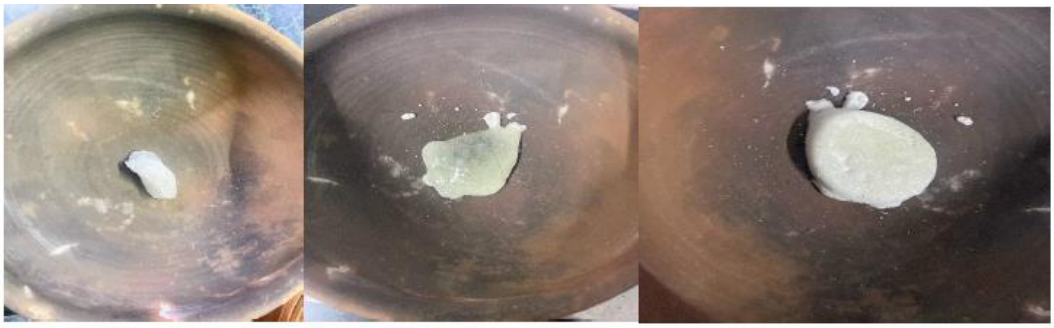
Definition: Viscosity is a property of a liquid which is closely related to the resistance to flow.

Method: The liquid under test is filled in a U tube viscometer in accordance With the expected viscosity of the liquid so that the fluid level stands within 0.2mm of the filling mark of the viscometer when the capillary is a vertical.

The liquid is sucked or blown to the specified weight of the viscometer and the Time taken for the meniscus to pass the two specified marks is measured.

Parameters tested are mentioned in index below.[10,11]

Sr no	Analytical Tests	Test Method	Results (Gulab jal)	Results (Kankshi drav)
1.	PH	As per API	4.2	3.26
2.	Specific Gravity	As per API	1.000 at Temp- 29.9 °C	1.007 at Temp- 29.9 °C
3.	Refractive index	As per API	-	1.3307 at 29.9 °C
4.	Viscosity	As per API	-	57.565 cps

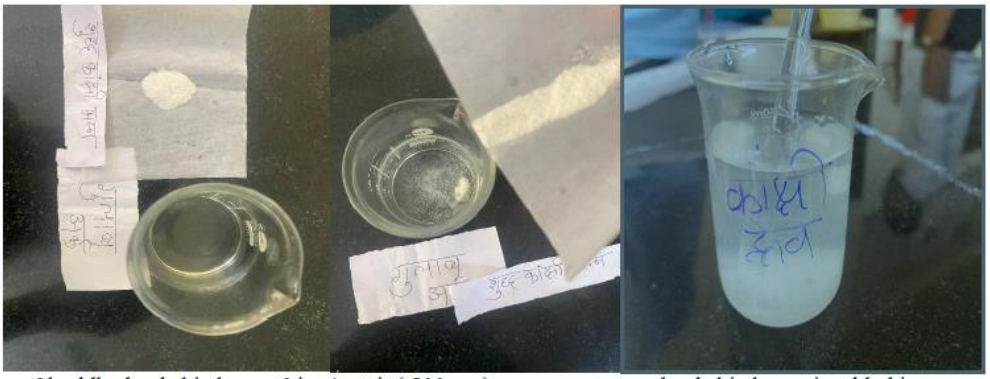


Ashuddha kankshi | Purification of kankshi On madhyamagni | Shuddha kankshi

Shuddha kankshi Churna | Gulab Petals | Soaked Gulab Petals in distilled water

Gulab petals placed in the round bottom flask | soaked petals water filled in round bottom flask | Extraction of Gulab Arka by Simple Distillation

The distillate i.e gulab arka | Filtration of distillate | Gulab arka



Shuddha kankshi churna &i.e 4 ratti (500 mg)
Gulab arka i.e 5 tola (60 ml)

kankshi churna is added into
gulab arka

After 12 hours kankshi is
Dissolved and some remaining
Particles settle down.and
later the Solution is filtered.

So the kankshi drav is ready
for further evaluation.

DISCUSSION

Netrabhishyanda is described in ayurvedic texts as a Sarvagata Netraroga presenting with symptoms similar to conjunctivitis—redness, itching, burning, discharge, and irritation. Kankshi Drav was selected based on the known therapeutic properties of Kankshi (alum): Lekhana, Netryahita, Kanduhara, Vranaropak, Gulab: Pittashamak, Dahaprashaman, Soothing for ocular tissues.

The study aligns with traditional claims that Arka Kalpana provides a potent, quickly acting medium for ophthalmic use due to its volatility, rapid absorption, and long shelf life.[13,14] *Arka kalpana* is explained in an Ayurvedic treatise named *Arka Prakasha*, where it has been said that *Arka* is the most potent among *Kalka*, *Churna*, *Swarasa*, *Kashaya*, *Phanta*, *Hima*. Its shelf life is longer than other *Kalpanas* like *Swarasa*, *Kwatha* etc. This *Kalpana* is easy to administer in the patients compared to *Anjana*, *prakshalana* etc.[13] *Arka* is *Laghupaki*, *Vyavayi*, *Vikasi* and thus acts quickly on the eye there by gives immediate results. *Arka Kalpana* acquires highest position in obtaining the potentially active volatile oils as the condensation takes place during the process of distillation.[7]

However, a major finding is the acidic nature of the final formulation (pH 3.26), which is far lower than physiological tear pH. The normal pH range of tear fluid was 6.5 to 7.6[14]; the mean value was 7.0. so the ph of eye drops should be according to ph of tear fluid and the formulation kankshi drav aschyotana ph was found to be acidic.[15] An aqueous solution of potash alum is mildly acidic. Eg. a 10% solution usually has a pH between 3.0 and 4.0. This acidity comes from the behavior of aluminum ions (Al^{3+}) when the compound dissolves in water. Potash alum (potassium aluminum sulfate, $KAl(SO_4)_2 \cdot 12H_2O$) is formed from a strong acid (sulfuric acid) and a weak base (aluminum hydroxide). When dissolved, the aluminum ions react with water in a process called hydrolysis, releasing hydrogen ions (H^+). These hydrogen ions increase the acidity of the solution, which is why the pH drops.[15]

This suggests that although the formulation qualifies pharmaceutically, its direct ocular use may cause irritation or discomfort unless pH adjustments or additional standardization procedures are performed. The study supports the relevance of traditional Ayurvedic eye therapies.

CONCLUSION

The study successfully prepared and analyzed Kankshi Drav Aschyotana using classical Ayurvedic methods. Physico-chemical evaluation established baseline standards for the formulation. The findings confirm:

- Feasibility of preparing Kankshi Drav through Gulab Arka and purified Kankshi.
- Analytical parameters were successfully recorded.
- The formulation's acidic pH (3.26) highlights a potential challenge for direct ocular use and indicates the need for further refinement and safety evaluation.
- Clinical studies are essential to validate therapeutic effects and tolerability in actual cases of Netrabhishyanda.

This study offers the pharmaceutical and analytical profile of Kankshi Drav. Inspite of modern medicine advances in the field of ophthalmic medicine, ayurvedic conservative plant based therapy still continues to be mainstay for treatment of diseases. In this study analytical tests was performed to find out effectiveness of the formulation. *Arka Kalpana* is having more dominance over the other *kalpanas*, which is having more shelf life, easy to prepare and administer. Arka preparation is also used as eye drops in various eye diseases according to Ayurvedic classics. Physico-chemical profile of kankshi drav aschyotana is an important

parameter for quality assurance. Ph of kankshi drav solution found to be acidic i.e 3.26 which may cause irritation to eyes. kankshi jal need to be diluted and adjustment of ph parameter. Then clinical application need to be done for the assessment of effects of kankshi drav aschyotana. or the first time pharmaceutical and analytical profile of kankshi drav aschyotana was established.

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