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MACROSCOPIC AND PHYSIO-CHEMICAL DESCRIPTION OF *GHṚITKUMARYĀDI AŚCHYOTANA*

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ABSTRACT

Ghṛitkumaryadi Aschyotana is an Ayurvedic ophthalmic preparation containing *Ghritkumari* (Aloe vera), *Daruharidra* (Berberis aristata), *Madhu* (Honey), and Glycerine, formulated to support ocular health in conditions involving inflammation and infection. The present study evaluates its macroscopic and physio-chemical parameters in accordance with ASU Pharmacopeial standards. Macroscopic analysis revealed a transparent liquid with a pleasant odour. Physio-chemical analysis demonstrated pH 6.08, loss on drying 96.37%, refractive index (R.I.) 1.336, specific gravity 1.020, and refractometer reading 2.95%. Thin Layer Chromatography confirmed the presence of *Ghritkumari* and *Daruharidra* with characteristic Rf values 0.29 and 0.53. These findings validate the quality, purity, and authenticity of *Ghṛitkumaryādi Aśchyotana* and support its traditional therapeutic utility in ophthalmic disorders.

KEYWORDS: *Ghṛitkumaryadi Aschyotana*, Physio-chemical evaluation, *Ghritkumari*, *Daruharidra*, *Madhu*, TLC.

I. INTRODUCTION

Aśchyotana is the foremost *Kriya-Kalpa* in Ayurveda, widely used for ocular administration due to its rapid absorption and ease of application. *Ghṛitkumaryadi Aschyotana* is formulated for conditions such as *Netra-Daha*, *Abhishyanda*, *Raktasrava*, and superficial ocular infections. The formulation comprises: *Ghritkumari* (Aloe vera) – *Sheeta*, *Ropana*, *Drava-Guna*, indicated in burning and inflammatory conditions is mentioned in *Bhavprakash Nighantu Guduchyadi Varga* 229.[1] *Daruharidra* (Berberis aristata) – *Krimighna*, *Chakshushya*, *Shophahara*, containing berberine is mentioned in *Bhavprakash Nighantu Haritkyadi Varga* 70.[2] *Madhu* (Honey) – *Lekhana*, *Yogavahi*, antimicrobial and soothing mentioned in *Bhavprakash Nighantu Madhu Varga Shloka* 2.[3] Glycerine – modern humectant improving viscosity and retention time.

Standardization of ocular formulations is essential for safety, efficacy, and reproducibility. Therefore, macroscopic and physio-chemical evaluation is performed based on ASU and modern pharmaceutical standards.

II. METHODOLOGY

Collection of Raw Materials

All ingredients were procured from authenticated sources and processed at Sricure Herbs India Pvt. Ltd. under GMP guidelines.

Table 1: Composition of *Ghritkumaryadi Aschyotana*.[4]

Sr. No	Ingredient	Botanical Name	Family	Part Used	Proportion
1	*Ghritkumari*	*Aloe vera (Linn.) Burm f.*	Liliaceae	*Patra Majja*	10% w/v A.E
2	*Daruharidra*	*Berberis lycium*	Berberidaceae	Root	0.5% w/v A.E.
3	*Madhu*	*Honey*			3% w/v
4	Glycerine				1% w/v
5	Distilled water				Q.S.

Preparation of *Ghritkumaryadi Aschyotan*

Eye drops formulation is the most common form of local drug used in ophthalmic practice because the standard dose of the eye drops is maintained and patients can easily carry it with them and instil it whenever required. By keeping this point in mind Eye drops formulation has been selected in the present study which can be considered as an alternative for *Aschyotana Kriya Kalpa*.

Method of preparation: Drug preparation was taken according to Ayurvedic Formulary of India (AFI) and modern Pharmacopeia parameters.

Procedure in brief

1. *Ghritkumari* pulp and *Daruharidra* coarse powder were soaked overnight (8 parts water).
2. Distilled through *Ark Yantra* using *Madhyama Agni*.
3. Filtration through 0.2-micron sterile membrane.
4. Honey and glycerine added under aseptic conditions.
5. Final filling into sterile ophthalmic vials.

Analytical study

1. Macroscopic (Organoleptic) Parameters
- Appearance
- Colour
- Odour

2. Physio-chemical Parameters
- Loss on drying
- pH value
- Water soluble extract
- Refractive Index
- Specific Gravity
- Refractometer reading

3. Identification Test
- Thin Layer Chromatography

Physio-chemical analysis

1. Loss on drying and determination of Moisture Content

The Procedure here determines the amount of volatile matter (i.e., water drying off from the drug). Place about 10 g of the drug (without preliminary drying) after accurately weighing (accurately weighed to within 0.01 g) it in a tared evaporating dish. After placing the above-said amount of the drug in the tared evaporating dish, dry at 1050C for 5 hours, and weigh. Continue the drying and weighing at one-hour intervals until the difference between two successive weighing corresponds to not more than 0.25 percent. Constant weight is reached when two consecutive weighs after drying for 30 minutes and cooling for 30 minutes in a desiccator, show not more than 0.01 g difference.[5]

2. pH value

The pH value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the hydrogen ion concentration expressed in g per liter.

Procedure: 10 gm of test drug sample was weighed and taken in a conical flask. Then add 50 ml of accurately measured water and stir well for a few minutes. Keep this solution for some time and then filter it through filter paper. Take the filtered solution in a beaker. Standardize the pH meter and electrodes with a buffer solution of known pH i.e. 7. Rinse the electrodes with distilled water and introduce them into the test solution contained in a small beaker. Read the pH Value of the solution. This test is carried out to determine the pH of the test drug with the help of a pH meter.[6]

3. Water soluble extractive

Macerate 5 g of the air-dried drug, coarsely powdered, with 100 ml of chloroform water the specified strength in a closed flask for twenty-four hours, shaking frequently for six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat-bottomed shallow dish, and dry at 1050C, to constant weight and weight. Calculate the percentage of water-soluble extractives concerning the air-dried drug. From the weight of the extract the percentage of water-soluble extractive and expressed as %v/v.[7]

4. RI

The refractive index (η) of a substance about 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. It is measured with an Abbemat refractometer.[8]

5. Specific Gravity

The specific gravity of a liquid is the weight of a given volume of the liquid at 250(unless otherwise specified) compared with the weight of an equal volume of water at the same temperature, all weighing being taken in air.[9]

Procedure

Using a Digital Density Meter

o Calibrate the digital density meter according to the manufacturer's instructions. This often involves using a reference liquid with a known density.

o Ensure the solution is at the recommended temperature for accurate measurement.

o Using a syringe or pipette, introduce the 10 ml solution into the sample chamber of the density meter. Avoid introducing air bubbles.

o Follow the instructions to start the measurement process. The device will automatically measure the density and calculate the specific gravity.

o The specific gravity will be displayed on the screen. Ensure the reading is within the expected range and repeat the measurement if necessary to confirm accuracy.

Identification tests

1. Thin layer chromatography

Thin-layer chromatography is a technique in which a solute undergoes distribution between two phases, a stationary phase acting through adsorption and a mobile phase in the form of a liquid. The adsorbent is a relatively thin, uniform layer of dry finely powdered material applied to a glass, plastic, or metal sheet or plate. Precoated plates are most commonly used. Separation may also be achieved based on partition or a combination of partition and adsorption, depending on the particular type of support, its preparation, and its use with different solvents. A visual comparison of the size and intensity of the spots usually serves for semi-quantitative estimation.[10]

III. OBSERVATIONS & RESULTS

Table 2: Results of *Ghritkumaryadi Aschyotana.*

Sr. No	Test	Result
MACROSCOPIC PARAMETERS		
1	Appearance	Liquid
2	Colour	Transparent
3	Odour	Pleasant
PHYSICO-CHEMICAL PARAMETERS		
4	Ph	6.08
5	Loss on drying	96.37%
6	Refractive Index (R.I.)	1.336
7	Specific Gravity	1.020
8	Refractometer Reading	2.95%
IDENTIFICATION TEST		
9	Thin Layer Chromatography Rf values	0.29, 0.53

IV. DISCUSSION

The macroscopic properties—transparent appearance and pleasant odour—indicate correct preparation and absence of visible impurities. The pH of 6.08 lies within the optimal ophthalmic range, ensuring minimal ocular irritation. The loss on drying (96.37%) suggests high volatile or water-based content, appropriate for eye drop formulations. The refractive index (1.336) and specific gravity (1.020) align with the expected values for herbal aqueous distillates with honey–glycerine base. TLC analysis revealed Rf values 0.29 and 0.53, confirming the presence of key phytoconstituents including Aloe polysaccharides and Berberine alkaloids from *Daruharidra.* These outcomes confirm both the authenticity and quality of the formulation.

V. CONCLUSION

The macroscopic and physio-chemical evaluation of *Ghritkumaryadi Ashcyotana* indicates the preparation meets ASU standards. Physio-chemical parameters fall within acceptable ranges. TLC confirms the presence of major bioactive components. The formulation is safe, stable, and suitable for ophthalmic application. This study scientifically validates the preparation and supports its use in Ayurvedic ophthalmic therapy. Further work including sterility tests and clinical evaluation is recommended.

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