



A Pharmaceutical Analysis and Standardization of Haritakyadi eye drops (A Polyherbal Ayurvedic Formulation) in Myopia- through Phytochemical and HPTLC

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ABSTRACT

The prime objectives of this ancient science is prevention and management of diseases. Myopia is one among refractive error affecting many individuals in today's time. In Ayurveda classical texts it may be Co-related with (Pratham and Dwitiya Patalagata) Timir Roga. According to World Health Organisation prevalence of Myopia in India is found to be 6.9%. Overall reported prevalence is 20-40% of population. There are various therapeutic procedures known as kriya-kalpa mentioned in our classical literature for its prevention and cure. Anjana is one such simple, non-invasive procedure which can be easily done on the patients. In Modern system of Medicine, Eye glasses, Contact lenses, Surgeries (LASIK) are used to treat refractive error but its not good due to prolonged & unhygienic use. In this study mainly aims at deriving standard operating procedure of the Haritakyadi eye drops and respective analytical tests conducted. The present study mainly deals with the preparation and standardization of this herbal drug through Organoleptic, Physico-chemical parameters, Phyto-chemical analysis and (HPTLC) High Performance Thin Layer Chromatography fingerprinting.

KEYWORDS: Ayurveda, Haritakyadi eye drop, Herbaleyedrops, HPTLC, Myopia, Organoleptic analysis, Physico-chemical parameters, Phyto-chemical analysis

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INTRODUCTION

Ayurveda is the traditional Indian system of medicine being practiced for thousands of year. In Ayurveda natural products like plants, animals and minerals are used for the treatment of various diseases, mostly the plants are used to derive therapeutic materials [1]. Myopia or short-sightedness is a type of refractive error in which parallel rays of light coming from infinity are focused in front of the retina when accommodation is at rest [2]. According to the World Health Organisation (WHO)-prevalence of myopia in India is found to be 6.9%. in fact, vision 2020 which is foremost large scale program [3]. Overall reported prevalence is 20-40% of population [4]. There are various therapeutic procedures known as kriya-kalpa mentioned in our classical literature for its prevention and cure. Anjana is one such simple, non-invasive procedure which Eye disorders are most commonly seen now a days due to various etiological conditions. Being one of the prime sensory organs, the protection of eyes is given much importance in all phase of science. Timira or Myopia is the most common eye disease prevailing on a large scale. It is associated with blurred vision and asthenopic (eye fatigue) symptoms which are; headache, eye strain and watering in eyes. These adversely affect the overall quality of life of the individuals. For its management, classical therapies mentioned in our ancient literature need to be re-established today. In Modern system of Medicine, Eye glasses, Contact lenses, Surgeries (LASIK) are used to treat refractive error but its not good due to prolonged & unhygienic use.

Every drug can be a medicine but some pharmaceutical procedures are done to change or potentiate its original properties. The basic idea behind the administration of drug is to make it more suitable to the body elements. To achieve

this many processes were invented in a sense of manu facturing process, these are termed as *kalpanas*(pharmaceutical preparations) [5].*Arka kalpana*(process of distillation)is one among them, mentioned in a *Ayurvedic* text named *Ravanakrita Arka prakasha*. [6].The method by which the volatile oil and active princioles of the drug are collected is called as *Arka-kalpana* (process of distillation)and the compound prepared through this procedure is called as *Arka*[7]. For management of Myopia *Vangasen samhita* mentioned *Haritakyadi* formulation[8].Method of preparation of *Haritakyadi* Eye drops was performed and respective analytical tests conducted.

MATERIAL AND METHODS

Collection, Identification and Authentication of Raw Drugs:-

The raw materials used in this study were obtained from local drug dealer, Vadodara. The identification and certification of the drug substance was carried out at the Pharmacy in the Parul Institute of Ayurveda, Vadodara, Gujarat.

Ingredients of the formulations

- 1.Haritaki(*Terminalia Chebula*)
- 2.Haridra(*Curcuma Longa*)
- 3.Pippali(*Pipper Longum*)
- 4..Saindhav Lavana(*Rock Salt*)

Equipments

- 1.Boiler(Heating Mentle)-Which provides heat and maintain heat.
- 2.Vessel-in which vapours are produced by heating the liquid up to its boiling point.
- 3.Condenser-This function as a cooling device of vapours either by circulation of water or air at atmospheric temperature.
- 4.Reciever-It is used for the collection of the condensed liquid.

METHOD OF PREPARATION

It can be prepared in two steps.

- 1.Distillation of all the ingredients
- 2.Preparation of eye drops

Distillation of all the ingredients

All ingredients are taken in coarse powder form in equal quantity except Saindhav lavana.5 gm Saindhav Lavana added in to it. These are soaked in 10 parts of water for 12 hours. Next morning ,the soaked drugs were subjected for the distillation process . Through -out the procedure temperature is maintained. It was kept at 40⁰ C and gradually increases to 60⁰ C. The vapours are condensed and collected in a receiver and stored in an air tight container. In the beginning, the vapours consists of only steam and may not contain the essential principles of the drugs. It should therefore be discarded.The last portion also may not contain therapeutically essential substance and should be discarded.

Preparation of Haritakyadi eye drops

The pH of the drug is 6.5.First obtained pH was 7.2. But that was not suitable for eyes drops. So diluted it with distilled water. And again checked for pH Continued the dilution process till we got the desired pH.

Analytical study Organoleptic characters, physicochemical parameters were done at Pharmacy of Parul Institute of Ayurveda and HPTLC. Phyto-chemical study was done at Vasu Research Centre, GIDC, Makarpura, Vadodara. (Sample ID- AD/22/127 Dated: 31/05/2022). Haritakyadi Eye drops was analysed via way of means of using numerous analytical parameters. Organoleptic character like colour, odour, and consistency had been carried. Physio-chemical observe to analyses Total Ash Value, pH, specific gravity, Refractive index were done.

Preliminary phytochemical tests [9,10]

The preliminary phytochemical screening was performed according to the standard procedure.

High Performance Thin Layer Chromatography[11,12].

Preparation of Test Solution 0.5 g of sample is weighed in an Iodine Flask and to it 10 mL of Methanol is added. It is refluxed for 30 Minutes. Then the sample is filtered through Whatman Filter Paper and the filtrate of the sample is taken. The test solution thus obtained for HPTLC fingerprinting.

Preparation of Spray reagent [Anisaldehyde - sulphuric acid reagent]

0.5 mL Anisaldehyde is mixed with 10 mL Glacial acetic acid, followed by 85 mL Methanol and 5 mL Sulphuric acid (98 %). 8 µl of the above extract were applied on a pre_coated Silica gel 60 F254 on aluminum plates to a band width of 10 mm using Linomat 5 TLC applicator.

RESULTS

Haritakyadi Eye drops was analysed via way of means of using numerous analytical parameters. Organoleptic character like colour, odour, and consistency had been carried. Physio-chemical observe to analyses Total Ash Value, pH, specific gravity, Refractive index were done and resulted showed in table 1 and 2..

Preliminary Phytochemical Tests [Table 3]

The phytochemical screening results showed the presence of Flavonoids,Tannin,Steroids,Tritepenoids and Carbohydrate[13].

Flavonoids

Polyphenolic molecules with antioxidant activity and improve oxidative stress and neuro-inflammation.It is responsible for the development of different threatening ocular diseases and also bioavailable to eyes that can affect signal transduction mechanism. Flavonoid supplement increase neurotrophin activity to modulate inflammation in

retinal genetic diseases and also have favourable effect on condition associated with visual impairment [14]. Its content particularly anthocyanins, which have beneficial effect in the enhancement of vision.

Tannins

Effect on improving oxidative damage of ocular lens. So it helps to maintain flexibility of lens [15].

Steroids

Steroids are anti-inflammatory agent and thus may be helpful in asthenopic symptoms.

Triterpenoids

It also has antioxidant and anti-inflammatory property which has effects on stress resistance on eyes [16].

High Performance Thin Layer Chromatography:

Rf values and color of the spots in chromatogram evolved in Toluene: Ethyl acetate: Glacial acetic acid (7 : 2 : 1 v/v) changed into recorded. TLC picturegraph documentation discovered presence of many phyto constituents with exclusive Rf values and HPTLC densitometric scan of the plates confirmed numerous bands. Study discovered, at 254 nm were given 06 spots, densitometric scan at 254 nm discovered 06 peaks similar to 06 exclusive compounds with inside the *Haritakyadi* eye drops, compounds with Rf - 0.14, 0.25, 0.34, 0.38, 0.41, and 0.51 (Fig. 1). At 366 nm there are 7 spots, densitometric scan at 366 nm discovered 7 peaks similar to 7 exclusive compounds with inside the *Haritakyadi* eye drops, compounds with Rf - 0.29, 0.38, 0.48, 0.51, 0.56, 0.67, and 0.83 had been found (Fig. 2) and at 540 nm 6 spots had been found, densitometric scan at 540 nm discovered 6 peaks similar to 6 exclusive compounds with inside the *Haritakyadi* eye drops, compounds with Rf - 0.14, 0.20, 0.34, 0.38, 0.51 and 0.67 maximum Rf value changed into 0.67 in track 1 (fig-3).

Table no-1 (Organoleptic characters of *Haritakyadi* eye drops)

Parameters	Results
Colour	Colourless
Odour	Characteristic
Test	Specific taste
Consistency	Transparent

Table no-2 (Physio-chemical parameters of *Haritakyadi* eye drops)

Sl no	Parameter	Result
1	pH Value	6.5
2	Specific Gravity	0.998
3	Refractive index	1.3180
4	Viscosity	0.4520

Table no-3 (Phyto-chemical identification of compounds)

Sl no.	Parameters	Results
1	Alkaloid	-
2	Anthraquinone Glycoside	-
3	Flavonoids	+++
4	Tannin	+
5	Steroids	+
6	Triterpenoids	+
7	Saponin	-
8	Carbohydrate	+
9	Protein	-
10	Starch	-

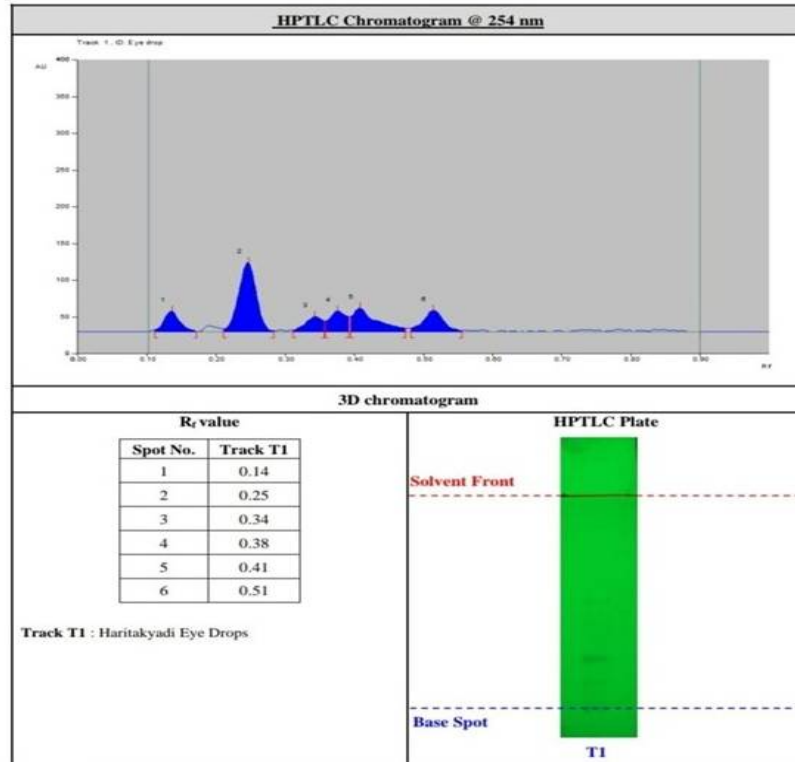


Fig .1: HPTLC plate showing banding pattern and R_f Values at 254nm

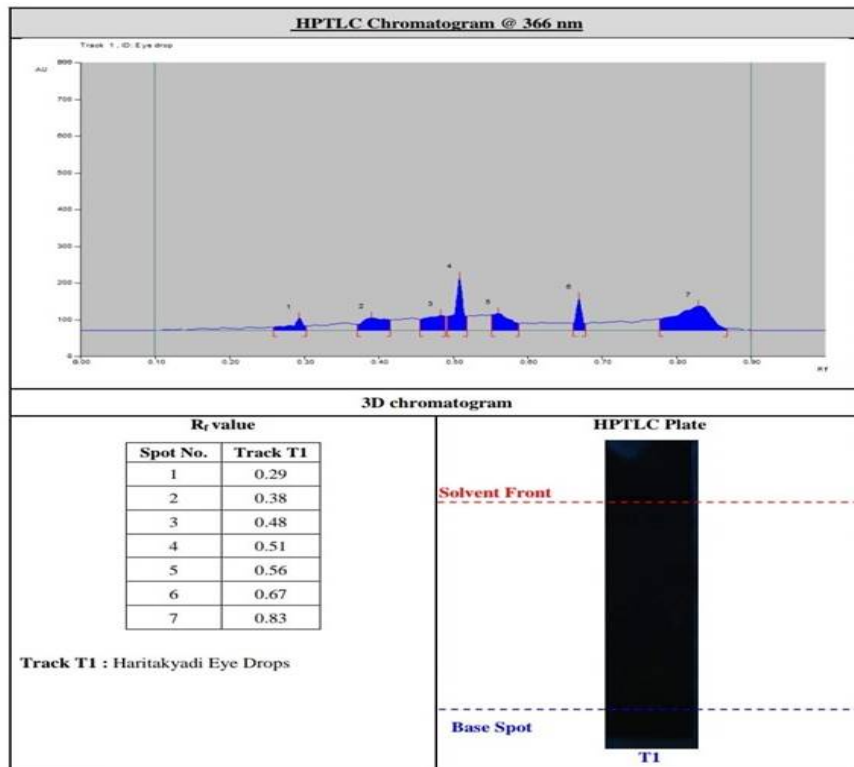


Fig .2: HPTLC plate showing banding pattern and R_f Values at 366nm

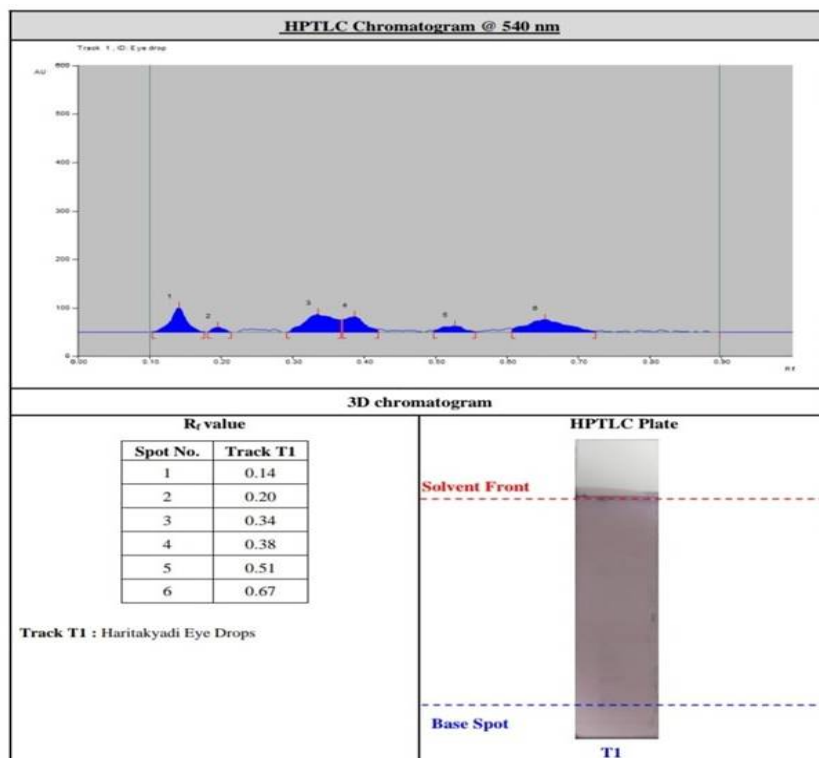


Fig .3: HPTLC plate showing banding pattern and R_f Values at 540nm

DISCUSSION AND CONCLUSIONS

Myopia is a most common ocular disorder worldwide, it is a leading cause of vision impairment in children and young age and its incidence is increasing rapidly, the landmark study published in scientific journal ,ophthalmology projected that if current trend continues almost 50% of the world population will be myopic by 2050[15]. There are very less internal medications are proved to be effective in myopia. Laser therapy, contact lenses, power glasses are the vision improving techniques used widely now a days. Though these techniques are not the permanent solution for improving vision, so we prepared *Haritakyadi* eye drops medicine in order to manage Myopia and we best analysed to validate the preparation and assessing the quality and authenticate the drug for its reproducibility. Preliminary phytochemical tests of *Haritakyadi* eye drops showed the presence of Flavonoids, Tannins, Steroids, Triterpenoids and carbohydrates which are reportedly bioactive in nature and add up to the therapeutic effect on HPTLC finger printing is commonly used technique in identifying volatile, compounds, determining their purity and following the progress of reaction [13, 14], The analytical data and HPTLC finger print profile obtained from the study for herbal eye drop will help to developed standard manufacturing process of herbal eye drop making, which will became a standard for future study and another remedies in future.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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