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Pharmacognostical and physicochemical analysis of *Elaneer kuzhambu* – An ayurvedic polyherbal formulation

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Abstract

In Ayurvedic classical texts administration of potent formulations are used in the form of *Anjana/* application of medicines to the eye in the form of ointment, fine powder or tablets rubbed in appropriate solutions. The Test drug *Elaneer Kuzhambu* which contains *Daarvi, Hareetaki, Vibheetaki, Amalaki, Madhuka Naalikerajala, Shashi, Saindhava* and *Maakshika.* Elaneer *Kuzhambu* is extensively used in Kerala to reverse cataract formation in the eyes but its efficacy does not have scientific and statistical backing. Hence this formulation is chosen for this study. For the first time compound formulation was subjected to organoleptic, pharmacognostical, phyto-chemical analysis and HPTLC studies. The study shows the presence of Prismatic crystals of Y*ashtimadhu*, Yellowish brown content and Prismatic crystals of *Daruharidra,* fragments of mesocarp cells, sclereids, tannin contents of *Haritaki*; Starch grains of *Naalikera,* Mesocarp, Starch grains & tannin of *Hareetaki,* Oleoresin of *Karpoora,* Fibres of *Darvi.* Phytochemical analysis shows that pH of 4.36, total ash 1.47, specific gravity 1.39.

Key-Words: *Elaneer Kuzhambu*, Pharmacognosy, Physicochemical, HPTLC

Introduction

According to WHO, 40% of the world's population (17 million) are blind due to cataract. People affected with cataract will reach to 40 million by year 2025. In India alone four million Indians become blind due to cataract per year (Minassian DC and Mehra V. 1990)

Cataract is the loss of transparency of the lens in the eye which develops as a result of altered physical and chemical properties inside it. The only available treatment of cataract is surgery. However due to its high cost, post operative complications necessitates researchers to find out other modalities of treatments for cataract, like use of antioxidants, vitamins etc to breakdown patho-phisiology of cataract.

In Ayurveda treatment of Timira / Cataract consists of systematic protocol comprising of Snehapaana, Raktamoksha, virechana, nasya, anjana, moordhni vasti,basti, Tarpana etc.

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Anjana has since long been used to expel ocular problems which acts longer than any other topical ocular administrations. To reduce the side effects of long-term drug therapy and to achieve a sufficient concentration of drug penetrating the lens, topical administration is more effective than systemic administration.[1] Since the progression of age-related cataract in humans is slow, the anti-cataract drug must be applied for a longer duration. Hence Anjana form of ocular application is selected for the study.

The majority of Anjana drugs are formulated in an aqueous medium. *Elaneer kuzhambu* is formulated in coconut water which is similar to blood plasma. Some physico-chemical factors affecting the drug absorption include: molecular weight, drug solubility, partition coefficient and pK_a. The various correlations between the above phenomena occurring in the eye such as wetting, spreading and retardation of evaporation of tears play an important role in ocular drug absorption. Further the drug uptake by cornea also depends on viscosity of the vehicle, pH, Oil-water partitioning and osmolality.

This study evaluates the physico chemical profile and analytical study of *Elaneer kuzhambu* which is used as *Anjana/* Eye ointment.

Material and Methods

Collection/Procurement of the drug

The test drug *Elaneer kuzhambu* was procured from Kottakkal Arya Vaidya Shala. The identities of samples of all drugs were confirmed by correlating their morphological and microscopical characters with those given in the literature.

Posology

One Vidanga matra (which was standardized after weighing 10 vidngas/ Seed of *Embelia ribes* which came to about 60-70 mg), as mentioned in the *Ayurvedic* classical text *Ashtanga Hridaya* was used as *Anjana* twice daily in the morning and evening followed by *Triphala* eye wash.[2]

Method of preparation

Powders of drugs of item Nos.1to 5 are added to Nalikera Jala before boiling. The Kwatha is then filtered and boiled again over a low fire to Rasakriya (Semisolid). This is then kept in khalva when drugs of item Nos. 7,8and 9 are added and ground with honey and packed in 10 ml plastic bottles.

Elaneer kuzhambu was analyzed by using qualitative and quantitative parameters at Pharmaceutical Chemistry Laboratory, Institute of Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar.

Method of Preparation the test drug *Elaneer Kuzhambu*

Darvi	Berberis aristata	Stem	96 gm
Haritaki	Terminalia chebula	Pericarp	96 gm
Amalaki	Phyllanthus emblica	Pericarp	96 gm
Vibhitaki	Terminalia bellerica	Pericarp	96 gm
Madhuka	Glycyrrhiza glabra	Root& stolons	144gm
Kerajala	Cocos nucifera	Tender/ unripe Drupe water	8.172 litres
Reduced to 1.022 litres			
Pitakarohini (Gambhari)	Coptis teeta	Rhizome	12 gm
Sasi	Dryobalanops aromatica	Sublimed extract	12 gm
Saindhava Lavana	Rock salt		6 gm
Makshika	Honey		170.25gm

Organoleptic Evaluation

Various parameters such as colour, odour, taste, touch and texture of the finished product (*Rasakriya*) were observed and recorded[3]

Microscopic Evaluation

Sample drug was dissolved in small amount of distilled water for a while and then mounted in glycerin. Microscopical examination was carried out with and without staining.[4] By powder microscopy, to observe the characters, determine the chemical nature of the cell wall along with the determination of the form and chemical nature of the cell contents. Microphotographs were taken by using Carl Zeiss binocular microscope attached with camera.

Physico-chemical Constants

In physical evaluation foreign matter, moisture content, ash values viz., total ash, acid insoluble ash and extractive values viz., alcohol soluble extractive value, water soluble extractive value as well as pH value etc. were determined.[5]

Phyto-chemical Analysis:

Preliminary tests were carried out on methanolic extract for the presence or absence of phytoconstituents like alkaloids, tannins & phenolic compounds, flavonoids, saponins and anthraquinon glycosides.[6,7]

High Performance Thin Layer Chromatography (HPTLC)

HPTLC was performed as per the guidelines provided by API [8]. Methanolic extract of drug sample was used for spotting. HPTLC was performed using Toluene + Ethyl acetate (7:3) solvent system and observed under visible light after derivation with vanillic sulphuric acid followed by heating the plate at 110°C. The colour and R_f values of the resolved spots were noted. (Table: 5)

Results and Discussion

Organoleptic Characters

Elaneer kuzhambu was characterized as fine homogenous thick liquid which was sticky and slow falling as drop, brownish black in colour, sweet smelling aromatic in odour, bitter and astringent in taste. (Table: 1). Fine liquid slowly miscible in water changing to golden yellow, after sometime thread formation is observed leaving clear fluid around.

Microscopical Characters

The diagnostic characters of microscopic analysis of *Elaneer kuzhambu* showed the presence of mesocarp cells, sclereids and tannin contents of *Haritaki*; pitted vessels, lignified fibres, and larger starch grains of *Yashtimadhu*; Starch grains of *Naalikera,* Mesocarp, Starch grains & tannin of *Vibheetaki,* Oleoresin of *Karpoora,* Fibres of *Darvi.* (Photo Plate: 1)

Physico-chemical Parameters

Physio-chemical parameters of *Elaneer kuzhambu* are tabulated in Table: 2. The extractive values of preparation were observed equal in both water as well as alcohol.

Phyto-chemical analysis

Preliminary qualitative analysis showed the presence of alkaloids, tannin & phenolic compounds, flavonoid, saponin glycosides, anthraquinone glycosides, indicating the active compounds were present in the preparation. (Table: 3)

High Performance Thin Layer Chromatography

The HPTLC profiles of methanolic extract of the formulation are super - imposable indicating the presence of all the constituents as per the ingredients.

Two spots at R_f 0.35, 0.73 were observed in 254nm UV light spectrum. Four spots at 0.32, 0.5, 0.6 and 0.73 were observed in 366 nm UV light spectrum and (Photo plate: 3) (Table: 4)

Conclusion

The study of microscopic characters of present formulation shows the presence of diagnostic identifying characters of ingredients which are used. So it can be concluded that these parameters can be used for the evaluation of *Elaneer kuzhambu*. Purity and potency of the materials and formulations following the procedures given could be performed in QC/QA laboratory of pharmaceutical house. The present study can serve as the reference for the future works on *Elaneer kuzhambu* which is a *Rasakriya Anjana.*

Acknowledgement

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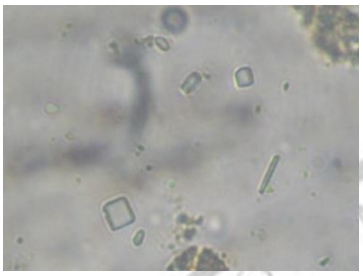
Table 1: Organoleptic characteristics of *Elaneer kuzhambu*

S/No.	Parameters	Results
1.	Colour	Brownish black
2.	Odour :	Sweet smelling, Aromatic
3.	Taste	Bitter, Astringent
4.	Touch	Sticky and slow falling drop
5.	Texture	Fine homogenous thick liquid

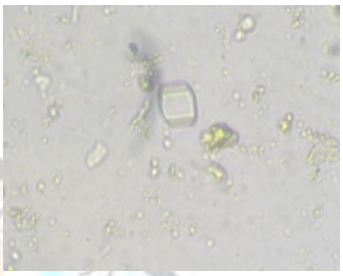
Fine liquid slowly miscible in water changing to golden yellow, after sometime thread formation is observed leaving clear fluid around

Table 2: Showing physicochemical constants

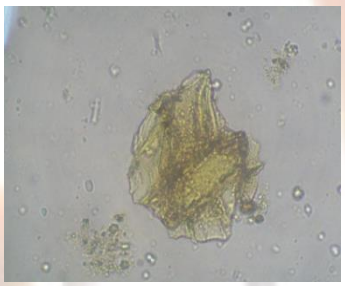
S/ No.	Analytical parameters	Results of *Elaneer Kuzhambu*
1.	pH	4.36
2.	Total Ash	1.47
3.	Specific gravity	1.39
4.	Total solid contents	72.99%
5.	Sugar Total sugar Reducing sugar Non-Reducing sugar	 68.67% 54.64% 14.03%

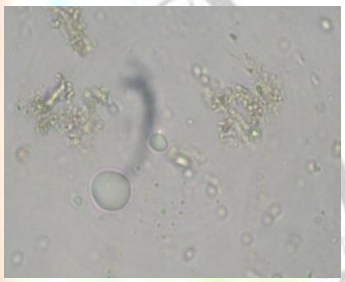

Prismatic crystals - *Yashtimadhu*


Yellowish brown content-*Daruharidra*

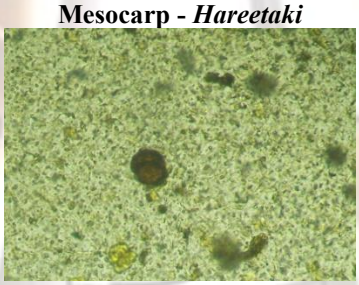

Prismatic crystals- *Daruharidra*


Starch grains - *Naalikera*


Mesocarp - *Hareetaki*


Starch grains & tannin


Tannin content – *Hareetaki*


Oleoresin – *Karpoora*

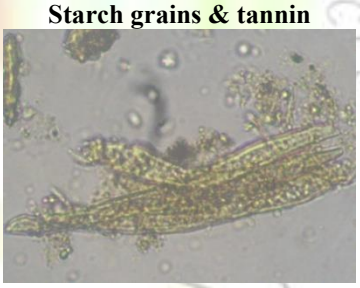

Fibres of *Darvi*

Fig. 1: Microscopy of *Elaneer kuzhambu*

Table 3: Showing results of phytochemical analysis

S/ No.	Components	Results
1.	Alkaloids	+
2.	Tannin & Phenolic compounds	+
3.	Flavonoid	+
4.	Saponin Glycosides	+
5.	Anthroquinon glycosides	+
6.	Sugars	+
7.	Reducing sugars	+
8.	Protein	+

+ Present

Table 4: *Elaneer Kuzhambu* Solvent system Toluene – Ethylacetate (7:3)

Under long UV(254 nm)	Under long UV(366 nm)	After spray
R_f Value	R_f Value	R_f Value
0.35 0.73	0.32 0.5 0.6 0.73	0.35 0.51 0,73

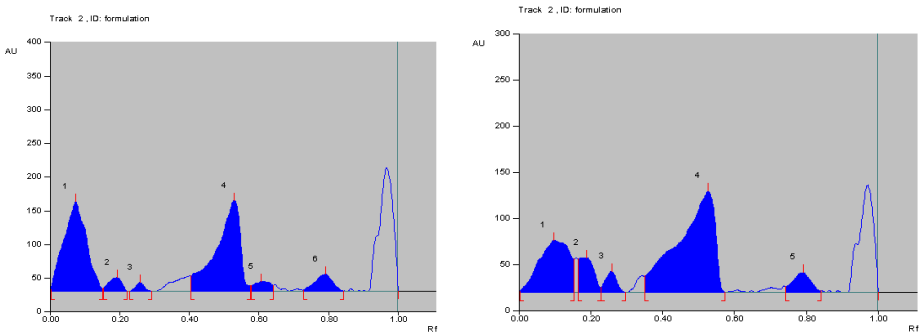


Fig. 2: Densitograms of Methanolic extract of *Elaneer kuzhambu*

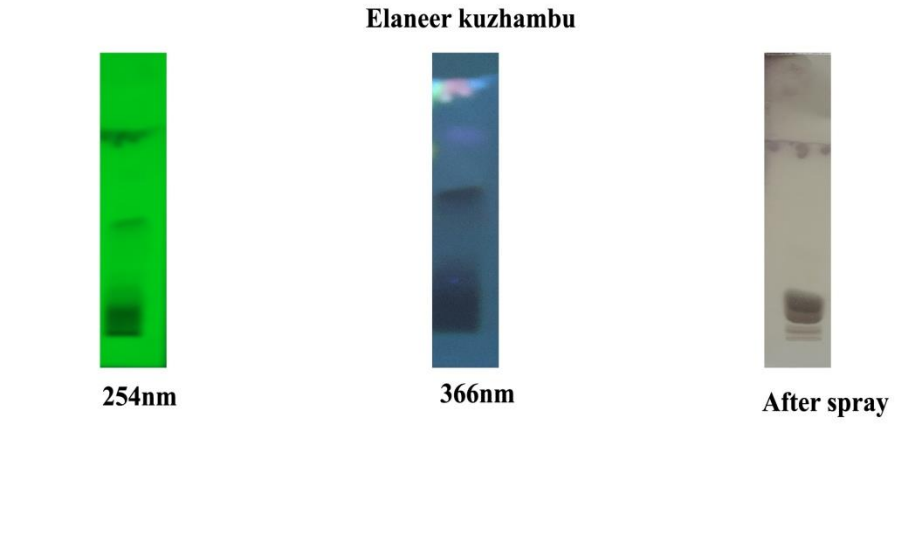


Fig. 3: HPTLC Finger prints