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Research Article

OVERVIEW ON HARIDRĀDI ASCHYOTANA (EYE DROP) IN THE MANAGEMENT OF ABHISHYANDA W.S.R. TO BACTERIAL CONJUNCTIVITIS

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ABSTRACT

Abhishyanda in fact is an infective condition of the eyes with redness and other inflammatory features, where Topical Ophthalmologic preparations significantly improve the rate of early clinical and microbial remission. Haridrādi Aschyotana is a Topical Poly Herbal Ophthalmologic preparation widely used in Sri Lankan Traditional Ophthalmology. The present review was focussed to critically analyze the Pharmacodynamic properties, Phytochemistry and the Bio activities exerted by herbal ingredients of Haridrādi Aschyotana (Eye drop) as an effective remedy in Abhishyanda.

Data were collected from Authentic Ayurvedic, Modern & Traditional texts, Journals, Articles, Depth interviews with Traditional physicians and Web search. The ingredients of Haridrādi Aschyotana are responsible for pacifying vitiated Pitta dosha and Rakta which are predominant in manifestation of the disease, by Madhura, Tikta and Kasāya rasa, Sheeta & Snigdha guna, Sheeta veerya and Madhura vipāka. The provoked Kapha dosha in Abhishyanda is pacified by Katu, Tikta, Kasāya rasa, Rūksha and Laghu guna, Ushna veerya and Katu vipāka.

The herbal ingredients of Haridrādi Aschyotana have important Karma (Actions) as Chakshushya (Vision Promoting), Rasāyana (Rejuvenation), Rakta prasādana (Purifies blood), etc. The study revealed important secondary metabolites such as Glycosides which reduces oedema, **Tannins** with Immunomodulatory action and Phenol compounds exhibiting Anti septic and Anti inflammatory properties enhancing the healing process. Further the herbal ingredients possess with more than 20 bioactivities in eliminating the diseases, such as Anti bacterial, Anti microbial, Anti oxidant, etc. Thus Haridrādi Aschyotana is an effective and safe Topical ophthalmologic preparation, in the management of Abhishyanda especially in Bacterial Conjunctivitis considering the Pharmacological attributes.

Keywords: Anti microbial, Anti inflammatory, Phyto chemicals, Rejuvenation, Pathogens, Vision promoting.

INTRODUCTION

Abhishyanda is a disease categorized under sarvagata netraroga¹ or Sarvakshi netra roga² where there is involvement of the whole eye. The cardinal features of Abhishyanda are rāga (redness), dāha (burning sensation), srāva (licrimation & discharges), Shopa (oedema) and kandu (itching) due to vitiation of Dosas. Further Abhishyanda is subdivided into 4 types¹ due its particular features of doshic predominance as: Vataja Abhishyanda (Sub acute catarrhal Conjunctivitis), Pittaja Abhishyanda (Acute catarrhal Conjunctivitis), Kaphaja Abhishyanda (Purulent conjunctivitis), Raktaja Abhishyanda (Acute muco purulent Conjunctivitis). Abhishyanda can be correlated with Conjunctivitis by considering of the

aetiological factors, pathogenesis, signs & symptoms, line of treatment and the prognosis by exhibiting similarity. Conjunctivitis is mainly classified as Infective, Allergic, Cicatrical and Toxic types while Bacterial Conjunctivitis is a sub type of Infectious Conjunctivitis. The Health sector claims Bacterial Conjunctivitis as the commonest type of epidemic in developing countries, with growing attention towards preventive and curative measures.

Bacterial conjunctivitis can spread as sporadic and epidemics⁴ cases frequently during monsoon season where the controlling the disease is very difficult: Specially in schools and places with large gatherings. The common signs & symptoms are redness, grittiness, burning sensation, discharge: purulent or mucopurulent and matting of the eye lids specially in the

morning where there is interference with day to day life . According to Ayurveda vitiation of Pitta, Kapha and Rakta doshas are present, hence Pittaja, Kaphaja and Raktaja Abhishyanda types can be compared with Bacterial conjunctivitis. According to classics these three Abhishyanda types as well as Bacterial conjunctivitis may lead to serious complications due to improper and inadequate treatment . Thus prompt management of the disease is essential with a suitable treatment protocol.

The Sri Lankan Indigenous system of Medicine is a compilation of vast practical knowledge, gained through the experience of several centuries, preserved and handed over to the posterity for the welfare of Humanity. This system of medicine possess with vast amount of drug formulae of herbo-mineral compounds, for the treatment of various diseases. The Aschyotana or Netra bindu are herbal Topical eye drops which are prepared under aseptic conditions according to documented formulae. The acute eye diseases can be very effectively managed by Aschyotana when prepared and administered according to recommended method of preparation and dosage forms.

In all diseases of the eyes, Aschyotana is beneficial, in the beginning itself, before the manifestation of the diseases to prevent bleeding, excess of lacrimation, itching, friction, burning sensation during lacrimation and redness⁵.

The evidence has shown with clinical practices that herbal eye drop preparations shows minimal or no side effects when instilled to eyes which paves the way for more research on herbal drug formulae.

The Antibiotic resistance and potential increase of complications such as cataract, Glaucoma due to prolong antibiotic and steroidal use is a major health issue in modern drug era, thus increase the concerns on holistic approach with herbal eye drop preparations in eye ailments. Administering of Herbal eye drops significantly improves the rate of early clinical and microbial remission with shortening the duration of the infection. Haridrādi Aschyotana is being documented as a very important traditional plant origin eye drop preparation, effective in the management of Bacterial Conjunctivitis which does not possess with evidence based scientific proof.

Thus the review was undertaken to assimilate the Ayurvedic Pharmacodynamic properties, Phytochemistry and Pharmacological actions exerted by chemical compounds of herbal ingredients of Haridrādi Aschyotana.

MATERIALS AND METHODS

Data Collection

Literature & Data were collected from Authentic Ayurvedic & Modern texts, Traditional texts, Journals, Articles, depth interviews with Traditional physicians and web search on computerized data bases such as Google scholar, Pub Med, Medline for scientific and Clinical trials: vivo & vitro studies on Medicinal Plants. The retrieved data were tabulated and analysed accordingly.

Drug Preparation

The formula of Haridrādi Aschyotana is mentioned in Ayurveda Pharmacopoeia – Sri Lanka⁶, an authentic text which contain the Ayurvedic and Traditional medicinal formulae in Sri Lanka.

Method of preparation of the Haridrādi Aschyotana (eye drop)⁶

Equal amounts of ingredients (25.75 g each) are measured, made into small particle size and washed thoroughly with pure water. The ingredients are put into a clean sterile new clay pot prepared prior to the preparation. The required amount of water (4.5 L) is added and the decoction is prepared by simmering to 1/6 in mild temperature. The final decoction is filtered twenty one (21) times under sterile conditions, through a minute pore diameter cloth. Pure Bees honey is added to the filtrate, when the decoction is cooled in room temperature. The final preparation is re-filtered with a sterile fine cloth. Every 10ml of the filtrate should be introduced to sterile dropper bottles and labelled accordingly.

The Aschyotana (Eye drop) is prepared as per standard protocol of Ayurveda Pharmacopoeia- Sri Lanka, under aseptic conditions.

RESULTS

The formula of Haridrādi Aschyotana according to Ayurveda Pharmacopoeia – Sri Lanka. is tabulated below [Table No 01].

Table 1: Ingredients of Haridrādi Aschyotana^{6,9-13}

Botanical name	Family	Local name	Sanskrit name/s	Part/s used	Amount (g)
<i>Terminalia chebula</i> Retz.	Combretaceae	Aralu	Haritaki, Abhayā, Pathyā, Kayasthā, Putanā, Haimavati, Avyathā, Chetaki, Shivā, Vayasthā, Rohini	Fruits	25.75
<i>Terminalia bellerica</i> (Gaertn.) Roxb.	Combretaceae	Bulu	Bibhitaka, Aksha, Karshaphala, Kalidruma, Bhutavasa, Kaliyugalaya	Fruits	25.75
<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Nelli	Amalaki, Vayasya, Dhātriphalā, Amritaphala, Amalaka, Tishyaphala	Fruits	25.75
<i>Curcuma longa</i> L.	Zingiberaceae	Kaha	Rajani, Nisha, Gauri, Krimighna, Yoshitpriya, Kanchani, Varavarnini, Haldi, Hattavilāsini, Haridrā	Tender Leaves	25.75
<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Menispermaceae	Weniwel	Kāliyaka, Kāliya, Kāleyaka ²⁵	Stem-Bark	25.75
<i>Pterocarpus santalinus</i> L. f.	Fabaceae	Rat handun	Kshudrachandana, Pravālapphala, Raktānga, Raktasāra, Tilaparni ²⁸ , Raktacandana, Lohita, Haricandana ²⁴	Bark	25.75
<i>Glycyrrhiza glabra</i> L.	Fabaceae	Welmi	Yashtimadhu, Yashti Yashtimadhuka, Madhuyashtika, Madhuka, Kleetaka, Yashtyahva	Root	25.75

Indications of Haridrādi Aschyotana⁶:

Indications of Haridrādi Aschyotana according to Ayurveda Pharmacopoeia – Sri Lanka are documented as follows.

Rata (Pink eye- Inflammatory conditions of the eye), Suda (White eye- Non inflammatory conditions of the eye & Degenerative conditions of the eye), Bibili (Inflammatory conditions of the eye lids), Pola (Corneal scars), Arma (Pterygium)

Ayurvedic principles regarding drug action of Haridrādi Aschyotana^{7,8}

The drugs are administered in various forms according to the particular disease. In order to produce desired action of a particular drug formula it should be absorbed quickly at the cell level and enter the micro channels of the body as a

dynamic agent. For this purpose it should be in appropriate concentration and form, at the site of action. In Ophthalmic pathologies the drugs: topical application or systemic drugs, should act accordingly to the site of manifestation of the disease. The plant ingredients should possess with healing and rejuvenating properties for the healthiness of eyes. The drug action depends on the digestion/ metabolism, absorption, biotransformation and excretion of the drug. These actions are mainly identified in Ayurveda by Rasa Panchaka or Ayurvedic principles of drug action; Ayurveda Pharmacokinetic, Pharmacodynamic properties. Ayurveda Pharmacodynamic Properties of herbal Ingredients of Haridrādi Aschyotana are tabulated below: [Table No 02].

Table 2: Ayurveda Pharmacodynamic Properties of Ingredients of Haridrādi Aschyotana^{9-13,24}

Ingredient	Rasa (Taste)	Guna (Physical property)	Veerya (Potency)	Vipāka (Post digestion effect)
<i>Terminalia chebula</i> Retz.	Kashāya, Tikta, Madhura, Katu, Amla	Laghu, Rūksha	Ushna	Madhura
<i>Terminalia bellerica</i> (Gaertn.)Roxb.	Kashāya	Rūksha, Laghu	Ushna	Madhura
<i>Phyllanthus emblica</i> L.	Amla, Madhura, Kashāya, Tikta, Katu	Guru, Ruksha, Sheeta	Sheeta	Madhura
<i>Curcuma longa</i> L.	Tikta, Katu	Rūksha, Laghu	Ushna	Katu
<i>Coscinium fenestratum</i> (Gaertn.)Colebr.	Tikta, Kasāya ³¹ .	Rūksha, Laghu ³¹	Ushna ³¹	Katu
<i>Pterocarpus santalinus</i> L. f.	Madhura, Katu ²⁹ Tikta ²⁴	Guru, Rūksha	Sheeta ²⁴	Madhura
<i>Glycyrrhiza glabra</i> L.	Madhura	Guru, Snigdha	Sheeta	Madhura

Ayurveda Pharmacodynamic Properties of Bees Honey (Madhu):

The vehicle of Haridrādi Aschyotana are tabulated below: [Table No 03]

Table 3: Ayurveda Pharmacodynamic Properties of Bees Honey(Madhu)^{26,30}

Vehicle	Rasa (Taste)	Guna (Physical property)	Veerya (Potency)	Vipāka (Post digestion effect)	Effects on Tridosha
Bees Honey	Madhura, Kashāya	Laghu, Sūkshma, Vishada, Rūksha ²⁶	Sheeta ^{26, 30}	Madhura	Pacifies Pitta. Pacifies Tridosha ²⁶

The bioactivities of plant ingredients exhibits drug actions (Karma) as special affinity to specific tissue or organ (Doshaghnatā) and specific action on specific disease/s (Rogaghnatā).

Ayurveda Pharmacological attributes of Ingredients of Haridrādi Aschyotana are tabulated below [Table No 04].

Table 4: Pharmacological attributes (Ayurveda) of Ingredients of Haridrādi Aschyotana^{9-13,24,29}

Ingredient	Doshaghnatā (Effect on Biological humors)	Rogaghnatā (Therapeutics)	Karma(Action)
<i>Terminalia chebula</i> Retz.	Tridoshashāmaka, especially Vātashāmaka	Vātavyadhi, Shotha-vedanāyuktavikāra, Vrana, Mukharoga, Kantharoga, Nādidaurbalya, Mastishkaurbalya, Netrābhishyanda,	Shothahara, Vēdanā sthāpana, Vranashodhana, Vranaropana, Nādbalya, Medhya, Chakshushya, Deepana, Pāchana, Rasāyana, etc.

		Drishtimandya.	
<i>Terminalia belerica</i> (Gaertn.) Roxb.	Tridoshashāmaka, especially Kaphashāmaka	Shotha- vedanāyuktavikāra, Charmaroga, Granthi-visarpa, Agnimāndya, Shvitra, Pālitya, Pratisyāya, Kāsa, Shwāsa, Swarabhanga, Hridroga, Vrana, Nethrābhishyanda,	Shothahara, Vēdanā sthāpana, Raktastambhana, Krishnikarana, Madaka, Deepana, Anulomana, Krimighna, Rechana, Bhedana, Grāhi, Trishnānigrahana, Chhardinigrahana, Kaphaghna, Vājikarana, Jwaraghna, Dhātuvardhaka, Chakshushya.
<i>Phyllanthus emblica</i> L.	Tridoshashāmaka, especially Pittashāmaka	Paittikavikāra, Dāha, Paittikashirashoola, Mootrāvarodha, Netraroga, Khalitya, Palitya, Mastishkadaurbalya, Drishtimāndya.	Dāhaprashamana, Chakshushya, Keshya, Medhya, Nādibalya, Balya, Rochana, Deepana, Anulomana, Amlatānāshaka, Yakriduttejaka, Sthambhana, Sransana, Hridya, Rasāyana.
<i>Curcuma longa</i> L.	Tridoshashāmaka	Shotha, Vedanā, Vrana, Shwāsa, Aruchi, Vibandha, Kāmalā, Jalodara, Krimi, Pāndu, Kāsa, Pratisyāya, Shukrameha, Prameha, Kandu, Shitapitta, Kushtha.	Varnya, Kushthaghna, Raktaprasādana, Raktavardhaka, Raktastambhana, Kandughna, Pāndughna, Vranashodhana, Vranaropana, Hikkānigrahana, Shwāsahara, Vishaghna, Anulomana, Pittarechaka.
<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Pitta <i>shleshmahara</i>	Vyanga ³¹ , Wounds, Ulcers, Skin diseases, Abdominal disorders, Jaundice, Diabetes, Fever, General debility ³²	Lekhana, Varna- Shodhana- Ropana, Vedanāshāmaka, Deepana, Yakriduttejaka, Pittasransana, Svedajanana ³¹ .
<i>Pterocarpus santalinus</i> L. f.	Pacifies severe Rakta and Pitta doshas ²⁴ , Pacifies Pitta ²⁹	Eye diseases, Vomiting, Poisoning, Thirst, Fever caused by Pitta, Diseases caused by vitiation of blood²⁹. Boils, Inflammation, Skin diseases & Headache ³⁴ .	Netra hitam.
<i>Glycyrrhiza glabra</i> L.	Vātapittashāmaka	Vranashota, Visha, Rakta alpatā, Raktapitta, Kandu, Charma roga, Netra roga	Dāha shāmaka, Vedanā sthāpana, Shothahara, Nādibalya, Varnya, Kandughna, Jeevaneeya, Rasāyana, Balya, Chakshushya.

Chemical constituents of plant ingredients, present in Haridrādi Aschyotana

Medicinal plants synthesize various chemical compounds named as secondary metabolites which are beneficial as herbal drugs as well as an alternative source for the Allopathic medical system associated with drug Chemistry. These secondary metabolites include Flavanoids, Cardiac

Glycosides, Cyanogenic Glycosides, Coumarins, Saponins, Anthraquinones, Phenols, Tannins, Volatile oils etc. The consideration of these Metabolites make easy to study the drug action/s in the body. Chemical constituents present in ingredients of Haridrādi Aschyotana are tabulated below [Table 5,6,7,8,9,10,11].

Table 5: Chemical constituents present in *Terminalia chebula* Retz.¹²

Ingredient	Chemical constituents			
	Fruits	Fruit kernels	Flowers	Leaves
<i>Terminalia chebula</i> Retz.	Anthraquinone, Glycoside, Chebulinic acid, Chebulagic acid, Tannic acid, Terchebin, Tetrachebulin, Vitamin C	Arachidic, Behenic, Linoleic, Oleic, Palmitic, Stearic acids	Chebulin	2- α -Hydroxymicromeric acid, Maslinic acid, 2- α -Hydroxy ursolic acid

Table 6: Chemical constituents present in *Terminalia belerica* (Gaertn.)Roxb.¹¹

Ingredient	Chemical constituents			
	Fruits	Seed	Bark	Kernel and its oil
<i>Terminalia belerica</i> (Gaertn.)Roxb.	Chebuloic acid, Ellagic acid (Also from bark and heart wood) and its Ethyl ester, Gallic acid(also from seed coat); Fructose, Galactose, Glucose, and its Galloyl derivative, Mannitol and Rhamnose, β – Sitosterol and Bellericanin	Protein, Oxalic acid.	Oxalic acid and Tannins	Palmitic, Oleic, Linoleic acids

Table 7: Chemical constituents present in *Phyllanthus emblica* L.¹⁰

Ingredient	Chemical constituents				
	Fruits	Seed oil	Bark	Root	Leaves & Fruit
<i>Phyllanthus emblica</i> L.	A good source of Vitamin C, Carotene, Nicotinic acid, Riboflavine, D-glucose, D-fructose, L-rhamnosyl, D-glucosyl, D-mannosyl, D-galactosyl residues, embicol, mucic, Indole acetic acid, Four other auxins- a1, a3, a4, and a5, Two growth inhibitors- R1 & R2; Phyllembic acid and Phyllembin.	Fatty acids	Leucodelphinidin, Procyanidin, 3-O-gallated prodelphinidin, Tannin.	Ellagic acid, Lupeol, Oleanolic aldehyde, 0-acetyl oleanolic acid	Tannins, Polyphenolic compounds, 1,2,3,6-Trigalloylglucose, Terchebin, corialgin, ellagic acid, Alkaloids, Phyllantidine, Phyllantine

Table 8: Chemical constituents present in *Curcuma longa* L.⁹

Ingredient	Chemical constituents
<i>Curcuma longa</i> L.	The major chemical constituents are Curcuminoids (approx. 6%), the yellow colouring principles of which Curcumin constitutes 50-60%, essential oil (2-7%) with a high content of Bisabolane derivatives. The minor component include Desmethoxycurcumin, Bidesmethoxycurcumin, Dihydrocurcumin, Phytosterols, Fatty acids, Polysaccharides

Table 9: Chemical constituents present in *Coscinium fenestratum* (Gaertn.) Colebr.³¹

Ingredient	Chemical constituents	
	Stem	Stem and Root
<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Berberine sulphate, Resinous matter, Berberine ceryl alcohol, Hentriacontane, Sitosterol and its Glucoside, Palmitic acid, Oleic acids, Saponins ³¹ .	Berberubine, Jatrorrhizine, Thalifendine, Palmatine, N-Dimethylindocarpine ³¹ .

Table 10: Chemical constituents present in *Pterocarpus santalinus* L. f.³⁵

Ingredient	Chemical constituents	
	Wood/ Bark	
<i>Pterocarpus santalinus</i> L. f.	Santalin (Santallic acid), Deoxysantalin, Pterostilbene, Pterocarpin (0.25%), Homopteroarpin (0.2%) ³⁵ .	

Table 11: Chemical constituents present in *Glycyrrhiza glabra* L.¹³

Ingredient	Chemical constituents	
	Root	
<i>Glycyrrhiza glabra</i> L.	Glycyrrhizine, Prenylated bioaurone, Licoagron, Licoumarin, Isoflavone, Glyzaglabrin, Quercetin, Quercetin-3-glucoside, Kaempferol, Astragal, Liquiritigenin, Isoliquiritigenin.	

Pharmacological actions of plant ingredients

The Pharmacological actions of plants material and their active compounds are scientifically proven by various

experiments and clinical trials. The Pharmacological actions of the Herbal Ingredients of Haridradi Aschyotana are tabulated below [Table No 12].

Table 12: Pharmacological actions of the Ingredients of Haridradi Aschyotana⁹⁻¹³

Ingredient	Pharmacological actions
<i>Terminalia chebula</i> Retz.	Anti microbial , Anti fungal, Anti bacterial , Anti stress, Anti spasmodic, Hypotensive, Endurance promoting activity, Anti hepatitis B virus activity, Hypolipidaemic, Inhibitory activity against HIV-1 protease, Anthelmintic, Purgative, Anti oxidant ^{36,40} , Anti Secretary ⁴² , Reduce Endothelial dysfunction ⁴³ .
<i>Terminalia bellerica</i> (Gaertn.) Roxb.	Anti fungal, Antihistaminic, Anti bacterial , Purgative, Blood pressure depressant, Activity against viral hepatitis and vitiligo, Anti asthmatic, Broncho dilatatory, Anti spasmodic, CNS stimulant, Amoebicidal, Anti stress and endurance promoting activity.
<i>Phyllanthus emblica</i> L.	Anti microbial , Anti oxidant, Immunomodulatory, Anti fungal, Anti inflammatory, Anti bacterial , Anti ulcer, Spasmolytic, Mild CNS depressant, Hypolipidaemic, Anti atherosclerotic, Anti mutagenic, Anti tumour, Hypoglycaemic, Adrenergic potentiating, HIV-1 reverse transcriptase inhibitory action.
<i>Curcuma longa</i> L.	Anti bacterial , Anti fungal, Anti inflammatory, Anti histamine, Anti Viral ³⁹ , Cholagogue, Insecticidal, Anti protozoal, CNS depressant, Anti platelet ⁴¹ , Anti arthritic, Hypocholesteral, Anti tumour ^{37,38} .
<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Anti Bacterial ³¹ ,
<i>Pterocarpus santalinus</i> L. f.	Aphrodisiac ²⁹ , Antiseptic ²⁴

<i>Glycyrrhiza glabra</i> L.	Anti microbial , Anti viral, Antioxidant, Anti inflammatory, Smooth muscle depressant, Hypolipidaemic, Anti atherosclerosis, Hypotensive, Hepatoprotective, Anti exudative, Spasmolytic, Anti ulcer, Anti mutagenic, Anti pyretic, Anti nociceptive, Expectoant.
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DISCUSSION

Ayurvedic Pharmacological principles are the gateway to identify the effectiveness of a drug therapy. According to Ayurvedic Pharmacodynamic properties of the ingredients of Haridrādi Aschyotana they are responsible for pacifying vitiated Pitta dosha and Rakta, which are predominant in manifestation of the disease, by Madhura, Tikta and Kasāya rasa, Sheeta & Snigdha guna, Sheeta veerya and Madhura vipāka. The provoked Kapha dosha in Abhishyanda is pacified by Katu, Tikta, Kasāya rasa, Rūksha and Laghu guna, Ushna veerya and Katu vipāka of the ingredients. Hence the signs and symptoms of the Abhishyanda is eliminated with pacifying of vitiated doshas in Abhishyanda.

The eye drop formula contains bees honey as an added vehicle. Honey is cooling, absorbent, depletory of body fats, beneficial to vision, clears and heals ulcers, brings up delicate skin and texture, provides comfort and enhances complexion. Honey is Yogavāhi: It has a synergistic action with other drugs. It minutely enters the channels, clears the channels of circulation, and thus promotes the healing of the eye disease. Further Bees honey is a good preservative and Anti microbial agent which increases the shelf life of the herbal eye drop preparation. These properties eliminates the need for preservatives and anti microbial agents for the eye drop to regain its potency.

The results of the study indicate that the 07 plant ingredients of Haridrādi Aschyotana, possess with the features of Chakshushya (Promotes vision), Rasāyana (Rejuvenation), Varnya (Promotes healthiness of the skin membranes), Rakta prasādana (Purifies blood), Kandughna (Anti pruritic), Vrana shodhana & Ropana (Ulcer healing property), Vedanā shāmaka (Analgic), Dāha shāmaka (Refrigerant) which is important in healing of Ocular pathologies including Conjunctivitis.

The present study demonstrate that *Terminalia chebula* Retz., *Terminalia belerica* (Gaertn.) Roxb., *Phyllanthus emblica* L., *Curcuma longa* L., *Coscinium fenestratum* (Gaertn.) Colebr. and *Pterocarpus santalinus* L. f. have the Anti bacterial property which suppresses the Bacterial growth with early remission of Bacterial conjunctivitis. While *Glycyrrhiza glabra* L. has the Anti microbial property which too, inhibit the growth of Micro organisms. The herbal ingredients has the property of Anti inflammatory which is beneficial in subsiding the features of inflammation such as lacrimation, redness, chemosis, photophobia, grittiness, pain, oedema, discomfort and foreign body sensation of the eye/s.

The study reveals number of Phytochemicals present in different parts of plant material. The chemical constituents of herbal ingredients are also important in the healing process, as the particular pharmacological properties are based on the active ingredient of the plant material as a drug, without isolating the active compounds. *Terminalia chebula* Retz. contains Glycosides which are significantly diuretics thus transfer fluid from tissues to the circulation reducing oedema. *Phyllanthus emblica* L. contains Tannins which has the power

of improving resistance to infections and act as strong Astringent reducing excessive secretions. Also contains Phenol compounds which possess with Anti septic and Anti inflammatory properties. The study demonstrate the Anti oxidant & Free radical scavenging activity of secondary metabolites present in the herbal ingredients which reduces the free radical induced Oxidative stress, leading to healthiness of visual perception. Further the Immunomodulatory activity of plant drugs prevent degenerative diseases of the eyes such as cataract, Age related Macular degeneration (ARMD), etc. where there is no successful treatment modality.

CONCLUSION

The Haridrādi Aschyotana is an effective poly herbal eye drop formula, in the management of Abhishyanda w.s.r. to Bacterial Conjunctivitis caused due to susceptible pathogens, by considering Ayurveda Pharmacokinetic, pharmacodynamic properties, Phyto chemicals and scientifically proven pharmacological actions of ingredients. The shortcomings of Health sector in combating epidemics of Bacterial Conjunctivitis, due to complications and lack of awareness can be effectively managed by the Ayurvedic as well as Traditional Ophthalmologic preparations.

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REFERENCES

1. Singhal GD. Susruta Samhita of Susruta. Second edition. Delhi: Chaukhamba Sanskrit Pratishthan. 2007. pp27-32
2. Srikantha Murthy. Astanga Hrdayam . Sixth edition, Vol.3. Varanasi: Chaukhamba Krishnadas Academy . 2012. pp. 137- 139
3. Srikantha Murthy. Astanga Hrdayam . Sixth edition. Varanasi: Chaukhamba Krishnadas Academy . 2012. pp. 142-145
4. Khurana AK, Khurana B. Ophthalmology. 5th Edition. New Delhi: New age international Ltd., (P)Publishes. 2012. pp. 54-55
5. Srikantha Murthy. Astanga Hrdayam . 9th edition, Vol. 1. Varanasi: Chaukhamba Krishnadas Academy. 2012. pp. 276-277
6. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 1. Colombo: Department of Ayurveda; 1994. p.278
7. Dhyani SC. Rasa Panchaka: Ayurvedic Principle of Drug Action. Varanasi: Chaukhamba Krishnadas Academy. 1994. p. 16
8. Dhyani SC. Rasa Panchaka: Ayurvedic Principle of Drug Action. Varanasi: Chaukhamba Krishnadas Academy. 1994. p. 24-26
9. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants used in Ayurveda. Vol. 1. New

- Delhi: Central Council for Research in Ayurveda & Siddha. 2001. p.152-155
10. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants used in Ayurveda. Vol. 3. New Delhi: Central Council for Research in Ayurveda & Siddha. 2001. p. 11-14
 11. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants used in Ayurveda. Vol. 3. New Delhi: Central Council for Research in Ayurveda & Siddha. 2001. p. 158-161
 12. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants used in Ayurveda. Vol. 1. New Delhi: Central Council for Research in Ayurveda & Siddha. 2001. p.282- 286
 13. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants used in Ayurveda. Vol. 1. New Delhi: Central Council for Research in Ayurveda & Siddha. 2001. p.561-566
 14. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Department of Ayurveda. 1994. P. 13
 15. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Department of Ayurveda. 1994. p. 54
 16. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Department of Ayurveda. 1994. p.96
 17. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Dept. of Ayurveda. 1994. p. 108
 18. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Dept. of Ayurveda. 1994. p. 127
 19. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Dept. of Ayurveda. 1994. p. 147
 20. [Anonymous]. Ayurveda Pharmacopoeia. Vol 1, Part 2. Colombo: Dept. of Ayurveda. 1994. p. 166
 21. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan. 2002. p. 19-20
 22. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan; 2002. p. 52
 23. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan; 2002. p.76-80
 24. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan. 2002. p.193
 25. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan. 2002. p. 194-196
 26. Kamat SD. Studies on Medicinal Plants & Drugs in Dhanvantari- Nighantu. Delhi: Chaukhamba Sanskrit Pratishthan. 2002. p.591- 594
 27. Sinhg A. Bhāvaprakāsha Nighantu. Varanasi: Chaukhamba Publishes. 2007. p. 1-7
 28. Sinhg A. Bhāvaprakāsha Nighantu. Varanasi: Chaukhamba Publishes. 2007. p.37
 29. Sinhg A. Bhāvaprakāsha Nighantu. Varanasi: Chaukhamba Publishes. 2007. p. 52
 30. Sinhg A. Bhāvaprakāsha Nighantu. Varanasi: Chaukhamba Publishes. 2007. p.409-413
 31. [Anonymous]. Phytochemical Investigations of certain Medicinal Plants used in Ayurveda. New Delhi: Central Council for Research in Ayurveda & Siddha. 1990. p.57
 32. Vaidyaratnam PS. Indian Medicinal Plants, Acompendium of 500 species. Hyderabad, India: Universities press (India) Private Limited. 2010. p. 191-196
 33. Vaidyaratnam PS. Indian Medicinal Plants, Acompendium of 500 species. Hyderabad, India: Universities press (India) Private Limited. 2010. p.259- 261
 34. Jayaweera DMA. Medicinal Plants (Indigenous & Exotic) used in Ceylon. Part 3. Colombo: The National Science Council. 1981. p. 234-235
 35. [Anonymous]. The Wealth of India. New Delhi: Publications & Information Directorate, CSIR. 1969. p. 305- 307
 36. Naik GH, Priyadarsini KI, Naik DB, Gangabharathi R, Mohan H. Studies on the aqueous extract of *Terminalia chebula* as a potent anti oxidant and a probable radio protector. Phytomedicine 2004 ; 11: 530-538,
 37. Jiang JL, Li jin X, Zhang H, Su X, Qiao , Yuan YJ. Identification of Anti tumour constituents in Curcuminoids from *Curcuma longa* L. based on the composition- activity relationship. J Pharmaceutical & Biomedical Analysis, 2012;70: 664-670
 38. Ferreira FD, Kimmelmeier C, Arroiteia CC, Costa CLD, Mallmann GA, Janeiro V, et al,. Inhibitory effect of the essential oil of *Curcuma longa* L. and Curcumin on aflatoxin production by *Aspergillus flavus* Link. Food Chemistry, 2013;136: 306-310
 39. Kim HJ, Yoo HS, Kim CJ, Park CS, Choi MS, Kim M, et al,. Anti viral effect of *Curcuma longa* L. extract against hepatitis B virus replication. J Ethnopharmacology, 2009; 124: 189-196
 40. Srivastava P, Raut HM, Wagh RS, Puntambekar HM, Kulkarni MS. Purification and Characterization of an antioxidant Protein(16kDa) from *Terminalia chebula* fruit. Food Chemistry, 2012; 131: 141-148
 41. Lee HS, Antiplatelet property of *Curcuma longa* L. rhizome- derived a- turmerone. Bio resource Technology, 2006; 97: 1372-1376
 42. Mishra V, Agrawal M, Onasanwo SA, Madhura G, Rastogi P, Pandey HP, et al,. Anti- secretory and cysto- protective effects of chebulinic on gastric ulcers. Phytomedicine, 2013; 20: 506- 511
 43. Sun Lee H, ChangKoo Y, JooSuh H, Yong kim K, WonLee K. Preventive effects of chebulic acid isolated from *Terminalia chebula* on advanced glycation endproduct – induced endothelial cell dysfunction. J Ethnopharmacology, 2010; 131: 567- 574.

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