

A REVIEW ON HERBAL MEDICINE PLANTS ARE USED FOR THE TREATMENT OF EYE DISORDERS.

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Abstract

This review emphasises the historical significance and current applicability of herbal therapy in treating eye diseases. It looks at the topic in great detail. Eye problems need a variety of treatment options and are a major worldwide health concern. Combining modern scientific study with centuries-old traditional methods, herbal medicine has become a promising new field. The study examines the forms and prevalence of eye problems and emphasises the need for treatment alternatives that are accessible, safe, and effective. It addresses the fundamental ideas that underlie the therapeutic benefits of herbal medicine on ocular health, as well as possible modes of action and pharmacological characteristics. Herbal therapy provides a comprehensive approach to eye treatment that is in line with patient preferences and cultural customs, despite these obstacles. To fully utilise herbal medicine's potential in promoting ocular health, interaction between researchers, healthcare providers, and traditional healers is required. More studies and evidence-based practices are required to confirm the safety and effectiveness of herbal treatments for ocular disorders in a variety of populations.

Keywords. : *herbal eye drops; eye disorders; traditional medicine; ocular health, inflammation*

Introduction

Ophthalmic products and eye drops are the pharmaceutical sterile products that are applied in eye and used for the prevention and treatment for various eye disorders. One of the most vital sense organs in the living world is the eye, and it remains crucial even as technology advances, with people depend heavily on their eyesight for a variety of functions.[1] Eye inflammation and its related complications are significant causes of vision loss.[2] Inflammatory eye disease is a broad category that includes anything from mild illnesses to life-threatening situations. The aetiology of the ocular inflammation may be infectious or non-infectious.[3] Thus, ocular inflammation and infection have the potential to cause blindness.[4] The pharmaceutical system continues to face difficulties in managing eye problems with chemical medications that have no adverse effects. Comparing the herbal medicinal plants to the present conventional medicines, the former are more readily available, less expensive, and have no negative effects.[5] A large percentage of people suffer from eye issues. The usual treatment for these issues is the use of steroids and antibiotics, yet long-term usage of these medications may have negative consequences.[6] Most of the time, there is inadequate scientific proof to justify the use of medicinal plants for modern medicine, yet the fact that hundreds of plants are used globally to prevent or treat disease.[7]

Different herbal ophthalmic preparation

The composition of the herbal eye drop is designed to help with inflammatory and allergic disorders of the eyes. In comparison with expensive synthetic medications, which sometimes have negative side effects and are unaffordable for underprivileged individuals, they are more dependable, affordable, and cause less side effects. The effectiveness of several conventional herbal remedies in treating eye illnesses is currently being confirmed by contemporary research.[8]

The design and development of drug delivery systems, which contain herbal medicinal ingredients for the treatment of ocular disorders, has advanced significantly in the past few years. The drug delivery systems'

morphological, physical, and chemical variances determine their affinity for herbal medicines with varying polarity, which in turn affects the dosage form's design and drug loading. delivery mechanisms with the ability to adjust the rate of medication release to reach a maximum. Early treatments for a variety of eye illnesses included the use of herbal extracts; still further research is necessary to determine whether these treatments have scientific support.[9]

Sweet almond

The seed of the sweet almond, *Prunus dulcis*, a member of the Rosaceae family of plants, is referred to as "Lowz" or "Badam" in traditional Persian medicine [10]. Almond nuts have been used medicinally since prehistoric times. Almond has been utilised in traditional Persian medicine for managing respiratory, urinary systems, and nervous system issues [11]. The oil from sweet almonds has been recommended in traditional Persian medicine to cure dry eyes by pouring the oil into the affected area [12][13]. Because of the ingredients in almond oil, such as triglyceride, it helps relieve dryness and a gritty feeling in the eyes. Furthermore, dry eye disease-related inflammation can be reduced by omega-3 and omega-6 fatty acids. Almond oil also contains vitamin E, which facilitates the pathophysiology of dry eye illness and reduces inflammation [14][15][16]

Fennel

A member of the Umbelliferae (Apiaceae) family, fennel is a useful medicinal herb. For several thousand years, China and India,[17] two East Asian nations, have utilised it in traditional medicine to treat a wide range of illnesses. The infusions of fruits and roots are employed as analgesics, relaxants, estrogens, and anti-inflammatory drugs. It has been demonstrated that fennel seeds possess estrogenic, antioxidant, and antihirsutism properties [18]. Numerous useful chemicals, including volatile compounds, flavonoids, and phenols, have been found through phytochemical investigations [19]. The anti-inflammatory properties of flavonoids are greater than those of other phytochemicals. The fennel seed may help enhance the vision more significantly [20]. Its pharmacological characteristics include anti-inflammatory, antioxidant, antispasmodic, antiseptic, carminative, diuretic, anti-ulcer, and analgesic effects. It is also oculohypotensive. the impact of *Foeniculum vulgare* Mill. aqueous extract on oculohypotensive behaviour in glaucoma clinical studies. [Nafees. S et al., 2022]. A study on animals with selenite-induced cataracts demonstrated the preventive and therapeutic benefits of 0.5% aqueous extract of *Foeniculum vulgare* Mill. seed eye drops. The lens opacity score was much lower in the findings when compared to the group with cataracts [21] [22].

Boerhaavia Diffusa

A unique, multi-action anti-oxidant, anti-inflammatory medication called *Boerhaavia Diffusa* has been approved for the treatment of ocular illness in several different nations. Because of its phytochemical components, *Boerhaavia Diffusa* is effective in treating cataracts. Phytochemicals such as Phenols, Flavonoids, have the anti-inflammatory activity responsible for the treating cataracts [23] [24].

Gotu Kola

The Apiaceae family plant gotu kola is present in all of India's tropical and subtropical regions [25]. It is composed of phenols and phenylpropanoids [26]. It also includes essential oils and flavonoids with high total phenolic content [27]. Antibacterial capabilities may inhibit the development of conjunctivitis-causing infections. Apiaceae plants have been recommended as therapies for eye problems, including conjunctivitis; however, caution must be taken to verify that materials used for eye treatment comply with safety guidelines. [28].

Euterpe oleracea

One species in the Arecaceae family is *Euterpe oleracea* [29]. *Euterpe oleracea* Its leaf and root extracts include a variety of phenolic hydroxycinnamic acid compounds, including 5-O-caffeoylquini, 3-O-caffeoylquinic acid, and 4-O-caffeoylquinic acid, a species in the Arecaceae family. [30]. Particularly present in plant roots are other hydroxycinnamic acids, such as 3-O-caffeoylshikimic acid, 4-O-caffeoylshikimic acid, and 5-O-caffeoylshikimic acid. Furthermore, a family of flavonoids called apigenin di-C-glycosides (ACGs) is present in plant leaves. The following are some examples of these: 6-C-glucosyl luteolin, also referred to as homoorientin; 6-C-hexosyl-8-C-pentosyl apigenin isomers; 8-C-glucosyl luteolin; and 6-C-glucosyl apigenin [31]. Because of its antibacterial properties, the extract used to make the in-situ gel formulation may reduce the incidence of bacterial eye infections [32].

Sesbania grandiflora

Sesbania grandiflora (Linn) belonging to family Leguminosae commonly known as sesbania is often planted for its edible flowers and pods in tropical countries [33]. All parts of *Sesbania grandiflora* are utilized for medicine in Southeastern Asia and India including preparations derived from the roots, bark, gum, leaves, flowers, and fruit [34]. *In situ* gel of the *Sesbania grandiflora* flower extract was active against the microorganisms *P. aeruginosa*, *S. aureus*, *E. coli*, and fungus *C. albicans* which cause the bacterial conjunctivitis [35].

Justicia procumbens Linn

A plant belonging to the Acanthaceae family is called justice *procumbens* Linn [36]. They have been used to treat a variety of illnesses as herbal combinations, infusions, teas, and extracts throughout human history [37]. Conjunctivitis is prevented in the herbal eye ointment formulation by the anti-inflammatory qualities of *Justicia procumbens* Linn leaf extract [38].

Triphala

Historically, herbal remedies have been regarded as one of the most effective ways to preserve human health and balance. They are a representation of some of the oldest medical treatments [39]. A species of *Emblica officinalis* is called triphala [40]. It has been discovered that *Emblica officinalis* has strong anti-inflammatory [41]. Triphala extract was a component of the herbal eye drop mixture. These extracts were revealed to possess antibacterial properties after testing against bacteria that cause eye infections, including *Streptococcus pyogenes*, *S. aureus*, *S. pneumoniae*, and *S. mutans*. with less negative consequences [42]

Achyranthes japonica

The perennial plant *Achyranthes japonica* belongs to the *Achyranthes* genus [43] [44]. Traditional medicine has utilised *Achyranthes japonica* roots to treat dry eye, edoema, menstruation, and arthritis [45]. The literature states that 1% root extract of *Achyranthes japonica* reduced the symptoms of fine dust-induced dry eye syndrome [46]. In conjunctival epithelial cells, the extract demonstrated strong cytoprotective and anti-inflammatory properties [47].

List of Medicinal plants used in various types of Ocular diseases

Sr no.	Herb	Family	Parts used	Uses in eye diseases	References
01	<i>Abelmoschus esculentus</i> (L.)/ Okra	Malvaceae	Fruit, flower	Conjunctivitis	[48,49]
02	<i>Acacia arabica</i> (Lam.) Willd/ Babul	Mimosaceae	Bark	Conjunctivitis	[50,51]
03	<i>Acer tataricum</i> L./ Tatar Maple	Aceraceae	seed	Reduce inflammation, dry eye disease	[52]
04	<i>Adenium multiflorum</i> Koltzsch/ Impala lily	Apocynaceae	Bulb	Sore eyes	[53,54]
05	<i>Ageratum conyzoides</i> L./ Goat weed	Compositae	Leaf	Conjunctivitis, cataract, injury	[55,56]
06	<i>Albizia odoratissima</i> (L.f.) Benth/ Tea Shade Tree	Mimosaceae	Leaf	Ocular infections	[57]
07	<i>Alhagi maurorum</i> Medic/ Seez	Papilionaceae	Flower	Improves eyesight	[58]
08	<i>Asclepias curassavica</i> L./ Blood-flower	Apocynaceae	Leaf	Eye inflammation	[59]

09	Atropa belladonna L./ Deadly nightshade	Solanaceae	Leaf, root	Iritis	[60]
10	Becium dhofarense L. / Dhofari Basil	Lamiaceae	Leaf	Soothe eye itching	[61]
11	Brillantaisia patula Ver texto/ Nkon - kohomanech	Acanthaceae	Whole plant	Cataract	[62]
12	Capparis deciduas Edgew/ Kareera,	Capparidaceae	Leaf	Corneal opacity	[63]
13	Emilia praetermissa Milne-Redh/ Sierra leone	Asteraceae	Leaf	Clears vision	[64]
14	Ginkgo biloba L./ Maidenhair Tree Retinal vein	Ginkgoaceae	Leaf	occlusion, glaucoma	[65,66]

conclusion

All things considered, herbal therapy is a promising new direction for ocular health advancement, but realising its full potential will require ongoing multidisciplinary cooperation and evidence-based approaches. Through combining the best aspects of contemporary research and conventional knowledge, we may improve outcomes and care quality for people throughout the world who suffer from eye problems.

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