



Herbal Drugs in the Management of Trachoma

Talekar Nikita Santosh, Gaikwad Sonal Rajesh, Nirguda Priyanka Narayan, Gaikwad Snehal Anil, Mashere Abhishek Sandip, Badhe Nutan.

Samarth College of Pharmacy, Belhe

Mail Id :- nikitatalekar86@gmail.com

ABSTRACT:

Chlamydia trachomatis is the causative agent of trachoma, a major preventable cause of blindness that mostly affects underprivileged populations in tropical and subtropical areas. Herbal medications are becoming more popular due to the growing prevalence of antibiotic resistance and the need for complementary therapies, even when traditional treatments, such as antibiotics like azithromycin, are effective. The treatment of trachoma has showed promise with a variety of plant-based therapies, including medicinal herbs that have antibacterial, anti-inflammatory, and therapeutic qualities. In order to prevent infection, reduce inflammation, and promote wound healing, species like Echinacea purpurea, Allium sativum (garlic), Curcuma longa (turmeric), and Azadirachta indica (neem) have been researched. The pharmacological characteristics of various herbal medications are highlighted in this review, as is their prospective use as an adjuvant or substitute treatment.

Keywords: Herbal medicine, Anti-microbial herbs, Trachoma treatment, Eye infections, Herbal eye care.

Introduction:

One of the main causes of blindness in developing nations is trachoma, an infectious disease brought on by Chlamydia trachomatis that causes chronic inflammation of the cornea and conjunctiva. If treatment is not received, the condition, which mainly affects children, might result in blindness (1). Because of its antibacterial, anti-inflammatory, and restorative qualities, herbal therapy has been utilised for centuries in many regions of the world to treat infectious disorders, including eye diseases (2). Limitations of Conventional Treatment for Trachoma While conventional antibiotic treatments, such as azithromycin, have been effective in controlling trachoma, the emergence of resistance and the high cost of mass treatment campaigns in low-resource settings necessitate exploring alternative treatment options (3). Despite their potential, the use of herbal drugs in trachoma management faces challenges such as lack of standardization, dosage determination, potential side effects, and variability in efficacy across different plant species (4). Further clinical studies and trials are needed to validate the efficacy and safety of herbal drugs for trachoma treatment. Standardizing herbal formulations and conducting controlled trials are critical steps toward integrating herbal medicine into the management of trachoma (5).

Bioactive Compounds in Medicinal Plants: A Focus on Anti-Trachoma Properties:

The bioactive components found in traditional medicinal herbs have been investigated for possible anti-trachoma effects. These substances, which include tannins, terpenoids, alkaloids, and flavonoids, have antibacterial, anti-inflammatory, and wound-healing properties that make them useful in the treatment of trachoma. Alkaloids found in plants such as Ruta graveolens and Berberis vulgaris exhibit antibacterial properties against Chlamydia trachomatis, preventing bacterial growth and lowering ocular irritation (6). Flavonoids, especially those found in green tea (Camellia sinensis), have antibacterial qualities that aid in the treatment of trachoma-related infections and inflammation (7). According to reports, tannins, such as those in pomegranates (Punica granatum), have antibacterial qualities that include reducing eye discomfort and inhibiting Chlamydia trachomatis (8). Plant terpenoids, such as those found in eucalyptus and Mentha piperita, have antibacterial and anti-inflammatory properties that help control the symptoms of trachoma. These bioactive chemicals found in medicinal plants offer intriguing natural alternatives for the treatment of trachoma. Developing novel therapeutic approaches requires more investigation into their mechanics and effectiveness (9).

1)Neem (Azadirachta indica):

It is well known that neem leaves and extracts have antibacterial qualities that can aid in the fight against bacterial illnesses such as trachoma. Neem may be effective against *Chlamydia trachomatis*, the pathogen that causes trachoma, according to a number of studies (10). Neem's anti-inflammatory qualities can help lessen the swelling and irritation that are frequently observed in trachoma infections, which, if ignored, can cause scarring (11). Neem has been used in traditional medicine for eye care in many parts of the world, especially to treat eye irritations and infections, which are signs of trachoma (12). It has been proposed that including neem into topical ocular formulations, such as ointments or washes, could lessen the incidence of trachoma, especially in areas where the disease is endemic (13).

2)Aloe Vera:

Bioactive substances with anti-inflammatory qualities found in aloe vera include acemannan, anthraquinones, and glycoproteins. Trachoma can cause irritation, oedema, and scarring by inflaming the conjunctiva and other ocular components. Ocular symptoms like redness, oedema, and irritation may be lessened by aloe vera's capacity to lower inflammation (14,15). Aloe vera has shown antibacterial action against a variety of pathogens, such as certain strains of *Escherichia coli* and *Staphylococcus aureus*, and may be useful in treating secondary bacterial infections. Even though *Chlamydia trachomatis* is the main cause of trachoma, co-infections and secondary infections can make the illness worse. Aloe's antibacterial qualities may help avoid or treat these co-infections (16,17). Due to its capacity to encourage tissue regeneration and repair, aloe vera has long been utilised for its wound-healing properties. Chronic inflammation in trachoma results in corneal and conjunctival scarring. The healing qualities of aloe vera may lessen the severity of scarring by calming the inflamed eye surface and promoting the healing of small lesions (18,19). Application and Mechanism of Action in Trachoma: Aloe vera can be applied as a gel, juice, or compress to relieve irritation and lessen inflammation around the eyes. Although it should be used carefully near the eye area, applying diluted aloe vera gel as a compress can help relieve symptoms. Although aloe vera is not a medication for trachoma, it can help reduce symptoms when used in conjunction with antibiotics as part of a larger treatment regimen (20).

3)Turmeric (*Curcuma longa*):



Curcumin, a substance found in turmeric, has potent anti-inflammatory properties. Curcumin can lessen inflammation and tissue damage in trachoma, which involves conjunctival inflammation (21). Turmeric has been shown to have antibacterial qualities, especially against microorganisms like *Chlamydia trachomatis*, which causes trachoma. Curcumin can help treat eye infections because of its antibacterial and anti-chlamydial properties (22). Because of its potent antioxidant qualities, curcumin helps shield ocular tissues from oxidative stress, which is a typical cause of conjunctival damage and scarring associated with trachoma (23). In trachoma, persistent inflammation may cause corneal and conjunctival scarring. According to studies, curcumin's antioxidant and anti-inflammatory qualities may lessen or even prevent scarring (24). Turmeric extracts have showed potential in the treatment of eye illnesses and have been used topically to treat skin infections. Turmeric's topical antibacterial qualities may help with trachoma, but further research is required before it can be used directly (25). When used with antibiotics (such as azithromycin, a first-line treatment for trachoma), turmeric may improve the therapeutic outcome and help eradicate *Chlamydia trachomatis* (26).

4)Chamomile (*Matricaria chamomile*):



Because of its well-known anti-inflammatory properties, chamomile may help reduce the irritation brought on by trachoma. Reduced inflammation has been associated with the availability of flavonoids, particularly apigenin (27). According to some research, chamomile possesses antibacterial properties that may help prevent or treat secondary bacterial infections, which frequently accompany trachoma. This is especially important when it comes to eye infections (28). In order to relieve eye irritation and redness, which are typical signs of trachoma, chamomile is frequently used as an eyewash or compress. It is believed to lessen discomfort and irritation of the conjunctiva (29). Chamomile's ability to aid in conjunctival tissue healing may be attributed in part to its antioxidant qualities. The conjunctival scars must heal in trachoma, and the antioxidants in chamomile may help with tissue regeneration (30). In many traditional medical systems, chamomile has been used to treat eye infections, including conjunctivitis and other inflammatory eye conditions. Although these applications for trachoma have not been thoroughly investigated, the symptoms are similar (31).

5)Echinacea (*Echinacea purpurea*):



Echinacea is well known for its antibacterial and immune-boosting properties, particularly in relation to respiratory illnesses. It is thought to include active substances such as flavonoids, glycoproteins, and alkylamides that boost immunity and could aid in the fight against bacterial infections (32). Echinacea may help by regulating the immune response, improving the body's capacity to eradicate the infection, and lowering the chance of irreversible ocular damage because trachoma is an immune-mediated disease with persistent inflammation that results in scarring (33). The use of Echinacea in topical preparations specifically for trachoma has little direct evidence. Though further research is required to demonstrate safety and efficacy for trachoma, topical treatments (such as eye drops or ointments) may be investigated for controlling ocular symptoms due to Echinacea's anti-inflammatory and antibacterial qualities (34). Since *Chlamydia trachomatis* need antibiotic treatment, Echinacea may serve as a supplement to conventional therapeutic approaches. Theoretically, combining antibiotics like azithromycin with the immune-stimulating and anti-inflammatory qualities of echinacea should improve treatment efficacy, especially in terms of increasing recovery rates and lowering recurrence (35).

Conclusion:

The use of herbal drugs in the treatment of trachoma offers several potential benefits, including their natural antimicrobial properties, ability to reduce inflammation, and overall support for eye health. Herbs such as *Cassia occidentalis*, Echinacea, and Turmeric have shown promise in managing symptoms and promoting healing, offering a complementary approach alongside conventional treatments. However, while herbal remedies can provide supportive care, they should not replace standard medical treatments, such as antibiotics and surgery, which are essential for controlling the infection and preventing blindness. Further research is needed to fully establish the efficacy, safety, and optimal usage of herbal drugs in trachoma management.

REFERENCES:

1. World Health Organization (WHO). (2020). Trachoma. Retrieved from [WHO website].
2. Liu, Z., Xu, S., & Zhang, X. (2021). Herbal medicine in infectious diseases: An overview. *Journal of Herbal Pharmacology*, 12(3), 105-112.
3. Lushbaugh, C., Taylor, L., & Grant, D. (2019). Antibiotic resistance in trachoma: Implications for treatment. *Trachoma Research and Therapy*, 16(1), 38-45.
4. Singh, P., Ahuja, S., & Mittal, A. (2019). Challenges in the use of herbal drugs for eye infections. *Journal of Medicinal Plants*, 28(3), 177-185.
5. Chung, Y., Liu, J., & Zhang, Q. (2022). Future directions in herbal medicine for eye diseases. *Phytomedicine*, 39(5), 58-65.
6. Asadi-Samani, M., et al. (2015). "Medicinal plants and their antimicrobial properties against *Chlamydia trachomatis*." *Phytotherapy Research*.
- 7.
7. Zuo, Y., et al. (2019). "Flavonoids in medicinal plants: Therapeutic properties in trachoma." *Journal of Medicinal Plants Research*.
8. Raza, S. K., et al. (2017). "Antimicrobial and anti-inflammatory effects of tannins in trachoma therapy." *Phytomedicine*.
9. Singh, A., et al. (2020). "Terpenoids as potential therapeutic agents in trachoma." *International Journal of Phytotherapy*.
10. Prakash, P., & Gupta, A. (2010). *Azadirachta indica* (Neem) as an antibacterial agent. *International Journal of Pharmaceutics and Pharmaceutical Sciences*, 2(4), 121-126.
11. Bhaskar, N., & Umesh, S. (2014). Medicinal Properties of Neem: A Review. *Journal of Medicinal Plants Studies*, 2(4), 112-118.

12. Nahar, N., & Sarker, M. (2013). Medicinal Uses of Azadirachta Indica (Neem) in Ophthalmology. *World Journal of Pharmaceutical Research*, 2(3), 2541-2549.
13. Girish, K., & Nithyanand, P. (2007). Neem: A Green Treasure. *Electronic Journal of Environmental, Agricultural and Food Chemistry*, 6(2), 109-114.
14. Ajabnoor, M. A. & Al-Yahya, M. A. (1992). Aloe vera: A valuable herb for modern medicine. In "The International Journal of Pharmacognosy", 30(4): 206-210.
15. Wichtl, M. (2004). Aloe vera, in: *Herbal Drugs and Phytopharmaceuticals*. CRC Press.
16. Surjushe, A., Vasani, R., & Saple, D. G. (2008). Aloe vera: A short review. In "Indian Journal of Dermatology", 53(4): 163-166.
17. Williams, L., & Tapping, R. I. (2003). Aloe vera as a broad-spectrum antimicrobial agent. In "Journal of Medicinal Plants Research", 7(12): 210-215.
18. Olsson, C., & Johansson, L. (2004). Aloe vera gel improves wound healing: A comparative study. In "Acta Ophthalmologica Scandinavica", 82(2): 177-180.
19. Tanaka, M., & Mori, K. (2007). Wound healing effects of aloe vera gel in experimental burns and wounds. In "Japanese Journal of Medical Mycology", 48(2): 101-105.
20. Cohen, R. E., & Bedard, M. (1999). Effect of topical Aloe vera gel on post-operative corneal healing in a rabbit model. In "Journal of Corneal and External Disease", 18(3): 410-413.
21. Houghton, P.J., and Raman, A. (1998). "Herbal Drugs: An Overview." *Phytotherapy Research*. 12(1): 48-52.
22. Ravindran, P.N., and Nirmal Babu, K. (2004). "Turmeric: The Genus Curcuma." CRC Press.
23. Priyadarsini, K.I. (2014). "The chemistry of curcumin: from extraction to therapeutic agent." *Molecular Pharmaceutics*, 11(5), 1006-1030.
24. Fusi, F.M., and Zhao, Z. (2002). "Chronic Inflammation and Scarring in Ocular Diseases: Effects of Curcumin." *Journal of Ocular Pharmacology*, 18(5), 425-430.
25. Shukla, Y., and Singh, M. (2007). "Biological and medicinal properties of turmeric: A review." *Food and Chemical Toxicology*, 45(4), 411-418.
26. Thakur, R.S., and Avsarala, S. (2000). "Turmeric and its Therapeutic Uses." *Indian Journal of Medicinal Research*, 112: 8-10.
27. McKay, D. L., & Blumberg, J. B. (2006). "A review of the bioactivity and potential health benefits of chamomile tea (*Matricaria chamomilla* L.)." *Phytotherapy Research*, 20(7), 519-530.
28. Lahlou, M. (2004). "Studies on medicinal plants: Biological activity of chamomile." *Journal of Ethnopharmacology*, 93(3), 311-317.
29. Chizzolini, M., & Oglesby, T. (2016). "Chamomile as a medicinal herb in the treatment of eye conditions." *Clinical and Experimental Optometry*, 99(4), 369-374.
30. Ebrahimzadeh, M. A., & Farshid, A. A. (2008). "Antioxidant activities of chamomile extract." *Journal of Medicinal Food*, 11(2), 312-315.
31. Tiwari, A. (2011). "Herbal treatment for eye infections: An overview of traditional practices and potential pharmaceutical applications." *Journal of Traditional and Complementary Medicine*, 1(2), 111-118.
32. Rasmussen, C. et al. (2015). "Echinacea and its Effect on Immune Function." *Phytomedicine*, 22(9), 810-818.
33. Schwarz, K. et al. (2005). "Echinacea Immunomodulatory Effects in Infections." *Phytomedicine*, 12(6-7), 453-458.
34. Huang, Y. et al. (2009). "Topical Echinacea as an Anti-inflammatory Agent." *Journal of Ethnopharmacology*, 124(3), 471-475.
35. Melchart, D. et al. (2017). "The Efficacy of Echinacea in Combination with Antibiotics." *BMC Complementary Medicine*, 17, 72.