

A REVIEW ON ANTI-INFLAMMATORY AND ANALGESIC POTENTIAL OF SELECTED AYURVEDIC HERBS IN A POLYHERBAL OINTMENT FOR CERVICAL SPONDYLOSIS

Ayushi¹, Pratima Bhatiya², Kalpana Thakur^{*}, Sneha Kumari³, Chakshu Verma⁴, Bharti⁵,
Harshita Sharma⁶, Parul⁷, Ankita Thakur⁸, Sunidhi Verma⁹

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Orchid id – 0009-0001-4246-8328

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Orchid id – 0009-0008-6307-1320

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Orchid id – 0009-0002-7781-0397

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Orchid id – 0009-0006-3450-5092

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Orchid id- 0009-0000-8263-6827

School of Pharmaceutical Sciences

Lovely Professional University Jalandhar (Punjab) 144411

Orchid id- 0009-0004-4674-8660

*Corresponding Author

Kalpana Thakur

Assistant Professor

Department of Ayurveda, Yoga & Naturopathy

Career Point University, Bhoranj (Tikker- Kharwarian), Hamirpur, MDR35, [H.P.] -176041,
India

Research Scholar

Lovely School of Pharmaceutical Sciences, Lovely Professional University, Phagwara,
Punjab, 144411

Received: Feb 20, 202

Accepted: Mar 21, 2026

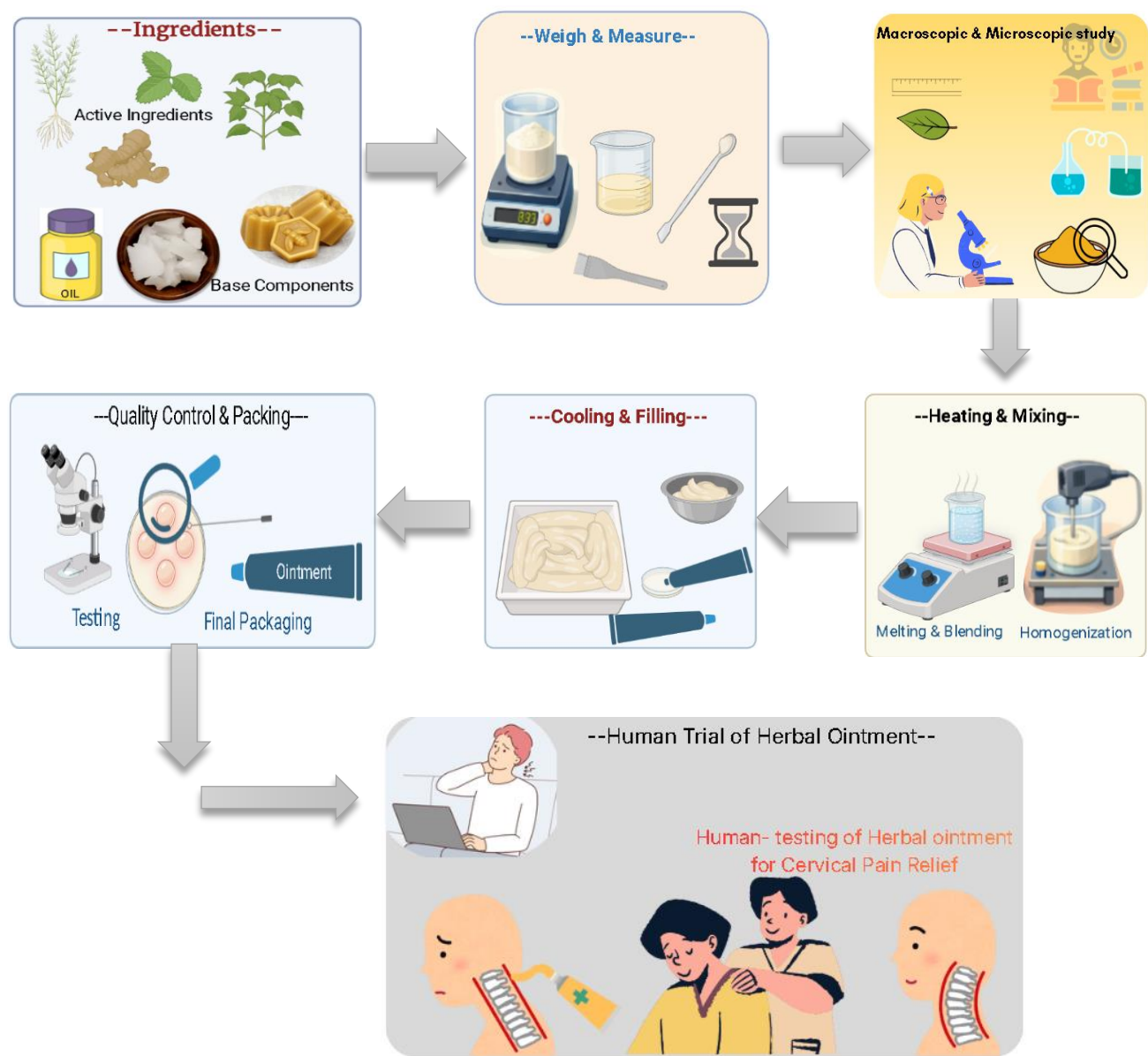
Published: Mar 25, 2026

Abstract

The present review aims to explore the traditional and pharmacological significance of five Ayurvedic herbs—Damnaka (*Artemisia vulgaris*), Apamarga (*Achyranthes aspera*), Eranda (*Ricinus communis*), Nirgundi (*Vitex negundo*) and Haridra (*Curcuma longa*)—in the management of cervical spondylosis, a degenerative disorder of the cervical spine. Information was collected from classical Ayurvedic literature and recent scientific studies to evaluate their active constituents, pharmacological properties, and therapeutic potential. The review revealed that these herbs possess strong anti-inflammatory, analgesic, antioxidant, and anti-arthritis activities due to the presence of flavonoids, alkaloids, terpenoids, and curcuminoids. They act mainly by inhibiting COX and LOX enzymes and reducing pro-inflammatory cytokines, which help in relieving pain, stiffness, and inflammation. Among them, Nirgundi and Haridra show potent anti-inflammatory effects, Eranda provides lubrication and reduces muscle spasms, while Apamarga and Damnaka promote local healing and circulation. The combined use of these herbs in a polyherbal topical ointment may offer a safe, effective, and economical approach for the management of cervical spondylosis. Integrating Ayurvedic wisdom with modern pharmacological research can provide a promising natural therapy for long-term cervical pain relief.

Keywords: *Cervical spondylosis, Analgesic, Apamarga, Inflammation, Traditional.*

Graphical abstract



Introduction

Ayurveda deals with drugs of plants, animal, metal and mineral origin, where maximum drugs are of plant origin. Cervical spondylosis is caused by degenerative disc disorder and typically results in sporadic neck pain in middle-aged and older patients. This pain typically responds to activity adjustment, neck immobilization, isometric exercises, and medication. [1]

A prevalent progressive degenerative disease of the human spine, cervical spondylosis is frequently brought on by age. It is classified as “vertebral osteophytosis secondary to degenerative disc disease” due to the osteophytic forms that arise with increasing spinal segment degeneration. Degenerative illness of the cervical spine, including the cartilaginous and ligamentous tissues, is the leading cause of cervical cord and root dysfunction in people over 55. Advances in neuroimaging, including magnetic resonance (MR) imaging, have helped clarify pathogenic pathways and eased diagnosis and treatment. [1] Cervical spondylosis typically affects middle-aged or elderly patients. It can induce neck pain syndromes, myelopathy, and radiculopathy. Neck pain and stiffness that radiates into the shoulders or occiput can be chronic or episodic, with extended periods of remission. [2] The main pathogenetic factors in cervical spondylitis myelopathy and cervical spondylitic radiculopathy were first detected in the 1960s and 1970s. [3]

Traditionally, *Damnaka*, *Apamarga*, *Eranda*, *Nirgundi*, and *Haridra* have long been utilized in Ayurvedic medicine to treat musculoskeletal diseases, inflammation, and pain. *Damnaka* (*Artemisia vulgaris*) is a traditional analgesic, anti-inflammatory, and warming herb that is often used externally to treat muscle stiffness and localized discomfort. *Apamarga* has traditionally been valued for its shothahara (anti-inflammatory), vedanasthapana (analgesic), and kaphahara (mucolytic) properties, which make it effective for swelling, joint soreness, and musculoskeletal problems. *Eranda* (*Ricinus communis*) is widely used as an anti-inflammatory, antiarthritic, and snehana (lubricating) agent; its oil is regularly applied for relieving muscle spasm, nerve pain, and stiffness in disorders such as cervical spondylosis and sciatica. *Nirgundi* (*Vitex negundo*) is one of the most recognised Ayurvedic herbs for pain, swelling, and inflammation. It has traditionally been used as a poultice or oil for cervical discomfort, frozen shoulder, sprains, and arthritic disorders due to its strong vatashamaka and analgesic properties. *Haridra* (*Curcuma longa*) has been revered as a powerful anti-inflammatory, antioxidant, and wound-healing herb, frequently used to alleviate edema, stiffness, and painful inflammatory disorders. Collectively these herbs have a long-standing traditional reputation for easing pain, reducing inflammation, boosting circulation, and restoring mobility, making them ideal for use in a topical formulation to treat cervical pain.

In traditional medical systems like Ayurveda, Unani, and Siddha, herbal ointments constitute a significant class of topical drug delivery systems. These external formulations work locally to lessen cervical spondylosis-related pain, inflammation, muscle stiffness, and spasms. These ointments frequently contain medicinal herbs with established analgesic, anti-inflammatory, antioxidant, and muscle-relaxant qualities. Targeted action, fewer systemic side effects, increased patient compliance, and ease of use are just a few benefits of topical administration.

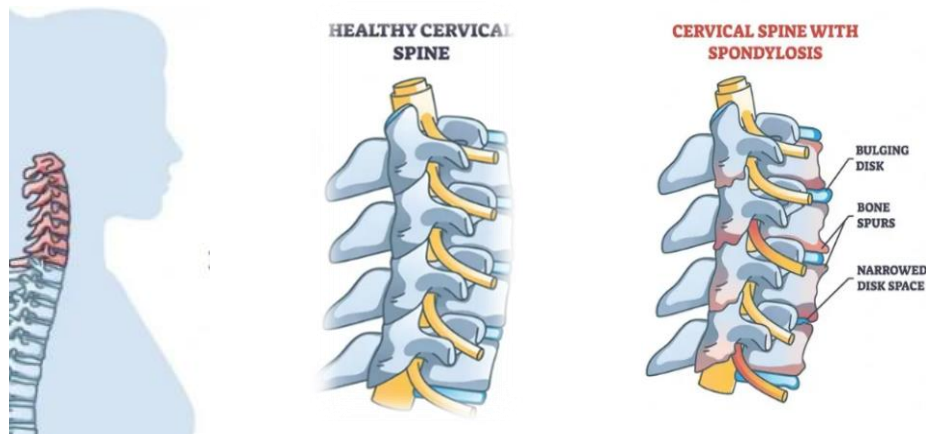


Fig.1 Cervical Spondylosis

The development, standardization, and assessment of herbal ointments for musculoskeletal conditions have received more attention in recent years. Cervical spondylosis can be effectively treated with a polyherbal remedies that include plants like Nirgundi, Eranda, Haridra, Apamarga and Damnaka. Nevertheless, there are still few thorough reviews that include traditional knowledge, pharmacological data, and formulation details of these herbal ointments.

Etiology of Cervical Spondylosis

- Age-related degeneration
- Intervertebral disc dehydration & degeneration
- Poor posture / prolonged neck flexion
- Previous trauma or injury
- Genetic predisposition
- Ligament thickening & disc herniation

Pathophysiology

- Disc degeneration → loss of water content & elasticity
- Reduced disc height → narrowing of intervertebral space
- Osteophyte formation (bone spurs) at vertebral margins
- Ligament thickening (especially ligamentum flavum)
- Spinal canal narrowing (cervical stenosis)
- Nerve root compression → pain, tingling (radiculopathy)
- Spinal cord compression → weakness, gait issues (myelopathy)
- Inflammation & ischemia → further nerve damage

Plant drugs used in Cervical spondylosis

Sr. no.	Common Name	Botanical Name	Family	Part Used	Figures
1.	Damnaka	<i>Artemisia vulgaris</i>	Asteraceae	Whole plant	 Fig1.1 Damanaka
2.	Apamarga	<i>Achyranthes aspera</i>	Amaranthaceae	Whole plant	 Fig1.2 Apamarga
3.	Eranda	<i>Ricinus communis</i>	Euphorbiaceae	Whole plant	 Fig1.3 Eranda
4.	Nirgundi	<i>Vitex negundo</i>	Lamiaceae	Leaf Roots Seeds	 Fig1.4 Nirgundi
5.	Haridra	<i>Curcuma longa</i>	Zingiberaceae	Rhizome	 Fig1.5 Haridra

Table1. Table of Plant drugs used in Cervical spondylosis.

Active chemical constituents & Pharmacological activity of Drugs

Sr.no	Plants	Active Constituents	Pharmacological Activity
1.	<i>Damnak</i>	✓ Artemisin ✓ Volatile oils, essential oil components (1,8-cineole, camphor, thujone and related terpenoids). ✓ Monoterpenes and sesquiterpenes. ✓ Flavonoids and tannins.[4]	✓ Anti-inflammatory [5] ✓ Antioxidant[6] ✓ Analgesic [7] ✓ Antispasmodic [7] ✓ Anti-arthritis[7] ✓ Anti-microbial / antifungal[8] ✓ Insecticidal / larvicidal ✓ Carminative (digestive support) ✓ Wound-healing supportive
2.	<i>Apamarg</i>	✓ Alkaloids. ✓ Saponins. ✓ Flavonoids (polyphenolic compounds). ✓ Tannins and other phenolics. ✓ Glycosides and steroids. ✓ Terpenoids, coumarins, quinones and lectins[9]	✓ Anti-inflammatory [9] ✓ Analgesic ✓ Antimicrobial (bacterial & fungal) [9] ✓ Antioxidant[9] ✓ Anti-arthritis ✓ Wound-healing [10] ✓ Diuretic ✓ Anthelmintic ✓ Immunomodulatory ✓ Antidiabetic (mild) [11]
3.	<i>Eranda</i>	✓ Triglycerides of ricinoleic acid[12] ✓ Fatty acids: oleic, linoleic, stearic, palmitic, etc.[12] ✓ Ricin ✓ Alkaloids (e.g., ricinine)[13]	✓ Anti-inflammatory ✓ Analgesic ✓ Anti-oxidant ✓ Anti-arthritis / anti-rheumatic ✓ Anti-microbial ✓ Emollient & skin-protective ✓ Anti-edema activity [13]

4.	<i>Nirgundi</i>	✓ Vitexdoin D ✓ Negundin A ✓ Flavonoids (e.g., luteolin derivatives, casticin). ✓ Iridoid glycosides and other glycosidic compounds. ✓ Volatile oils (essential oil components) and terpenoids. ✓ Lignans, steroids, alkaloids (reports of specific alkaloids such as nishindine), and other phenolics. [13]	✓ Anti-inflammatory (very strong; inhibits prostaglandins) [14] ✓ Analgesic ✓ Anti-arthritis ✓ Antimicrobial[15] ✓ Antioxidant[16] ✓ Muscle-relaxant ✓ Anti-edema ✓ Anti-asthmatic / bronchodilator [17] ✓ Wound-healing ✓ Neuroprotective
5.	<i>Haridra</i>	✓ Curcuminoids: curcumin (major), demethoxycurcumin, bisdemethoxycurcumin.[18] ✓ Volatile oil constituents: ar-turmerone, α- and β-turmerone, other sesquiterpenes and monoterpenes. ✓ Phenolic compounds and other minor terpenoids[18]	✓ Anti-inflammatory [19] ✓ Analgesic ✓ Antimicrobial ✓ Antioxidant[19] ✓ Wound-healing [20] ✓ Anti-edema ✓ Anti-pruritic ✓ Anti-allergic ✓ Anti-arthritis ✓ Depigmenting

Table.2. Chemical constituents and Pharmacological activities.

Traditional Uses

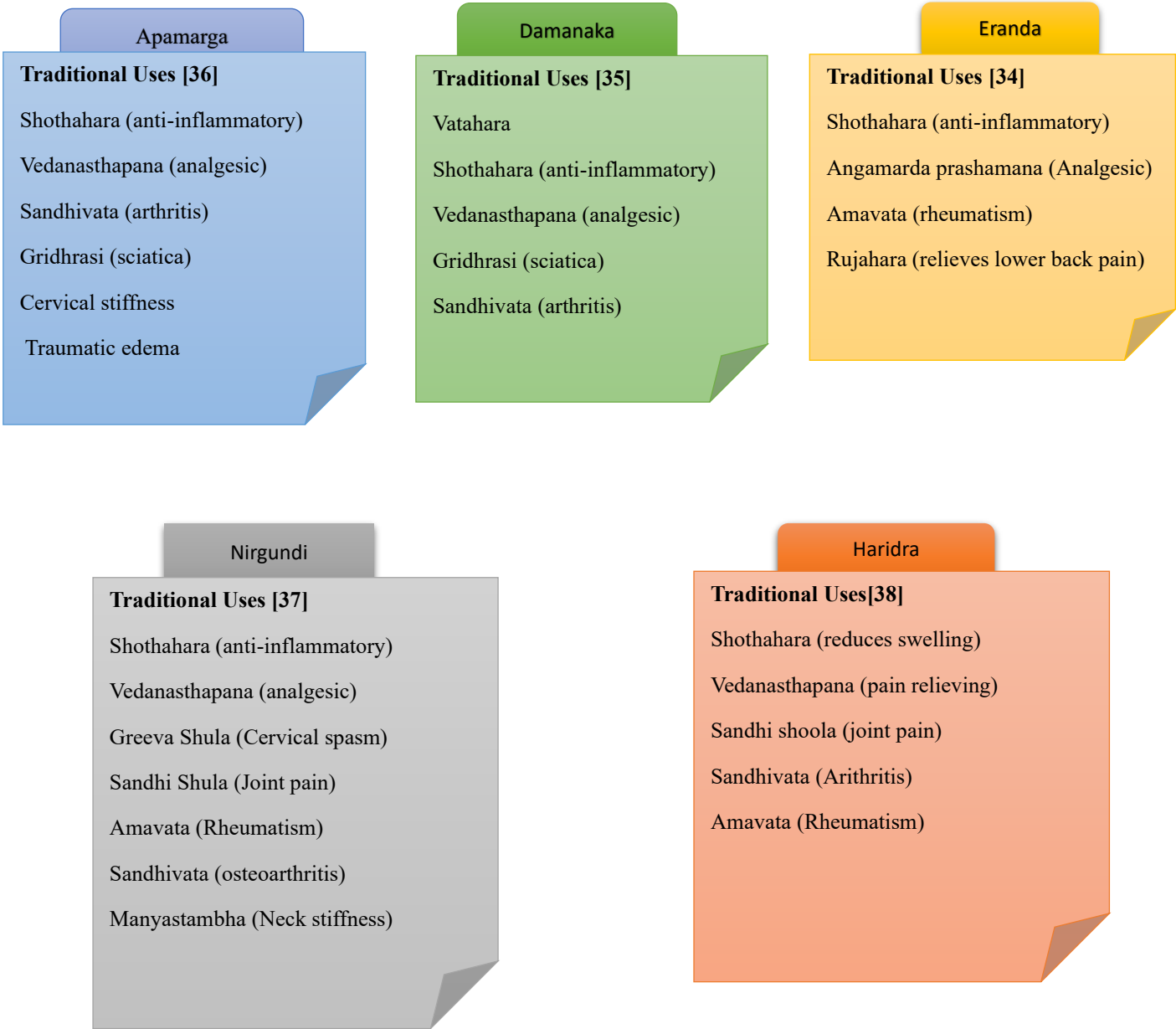


Fig1.6 Traditional uses of drugs used in Cervical pain.

Pharmacological Activity

Polyherbal ointments give effective treatment for cervical discomfort by combining anti-inflammatory, analgesic, and anti-arthritic properties. The phytoconstituents suppress the COX/LOX pathways and pro-inflammatory cytokines, which reduces local inflammation and muscle spasms. Peripheral analgesic action reduces pain transmission while increasing neck mobility and functional movement. [21]

1. *Apamarga*

Action	Model	Part of plant	Research work
Anti-inflammatory	Wistar rats (in vivo)	Leaves & seeds, alcoholic extract	Significant inhibition of carrageenan-induced paw edema and cotton pellet granuloma; alcoholic extract most effective
Analgesic	Rat	Leaves, methanolic extract	Significant analgesic activity in hot plate and brewer's yeast methods; comparable to aspirin. [22]
Anti-arthritic	Wistar rats	Roots, alcoholic extract	Reduced inflammation in carrageenan induced paw edema and cotton pellet granuloma models. [23]

Table.3 Table of Pharmacological actions of Apamarga.

2. *Damnaka*

Action	Model	Part of plant	Research work
Anti-inflammatory	Wistar albino rats	Methanolic leaf extract (200 & 400 mg/kg)	Inhibition of wet cotton pellet weight by 33% and 55.3% and dry cotton pellet weight by 20.07% and 64.06%, respectively. [24]
Anti-inflammatory (MOA)	Experimental studies	Tannins & sesquiterpenoids	Anti-inflammatory effect attributed to inhibition of COX-2 enzyme; exact molecular mechanism yet to be elucidated. [25]
Analgesic	Rats	Methanolic extract	Increased reaction time in tail flick test; acetylsalicylic acid (300 mg/kg) used as standard peripheral analgesic drug. [25]

Table.4 Table of Pharmacological actions of Damnaka.

3. *Eranda*

Action	Model	Part of plant	Research work
Anti-inflammatory	Ayurvedic explanation	Oil	Castor oil reduces Shotha by clearing blocked channels and pacifying Tridosha in inflammatory conditions. [26]
Anti-rheumatic	Clinical study (61 patients with Amavata)	Oil	Oral administration of castor oil (10 mL) alone or with Shunti decoction for 15 days showed significant symptomatic improvement in rheumatism. [27]

Analgesic	Ayurvedic interpretation	Oil	Tikshna, Ushna and Amapachana properties pacify Vata–Kapha Dosha and relieve body ache. [26]
Analgesic	Rats & mice	Leaves	Ethanolic leaf extract (100–500 mg/kg) exhibited central and peripheral analgesic activity in writhing and tail flick tests. [28]

Table.5 Table of Pharmacological actions of Eranda.

4. *Nirgundi*

Action	Model	Part of plant	Research work
Anti-inflammatory	Phytochemical studies	Leaves	Methanolic extract containing negundoside, agnuside and vitegnoside reported for anti-inflammatory potential. [29]
Peripheral & Central analgesic	Acetic acid-induced writhing test and tail flick method	Flowers (ethanolic extract)	<i>Vitex negundo</i> flower extract showed significant analgesic activity, comparable to aspirin and superior in the tail flick model. [30]
Analgesic & CNS depressant	Experimental animal studies	Nirgundi (methanolic extract)	Prostaglandin inhibition and oxidative stress reduction provide analgesic effects, while opioid action is potentiated and anticonvulsant protection is improved. [31]

Table.6 Table of Pharmacological actions of Nirgundi.

5. *Haridra*

Action	Model	Part of plant	Research work
Anti-inflammatory	Carrageenan-induced edema in rats and mice	Rhizome	Petroleum ether, aqueous and alcoholic extracts showed significant anti-inflammatory activity. [32]
Anti-inflammatory	Experimental studies	Essential oil	Essential oil rich in ar-turmerone demonstrated significant anti-inflammatory activity. [32]
Analgesic	Formaldehyde-induced paw licking in Wistar rats	(test drug)	Rats were divided into control, standard (indomethacin 45 mg/kg), and test groups; 0.1 mL of 3% formalin injected into hind paw, and reduction in paw-licking time during 0–10 and 20–30 min was used to assess analgesic activity. [33]

Table.7 Table of Pharmacological actions of Eranda.

Conclusion

Ayurveda largely uses plant-based medications to treat a variety of conditions, providing safe and holistic therapeutic choices. Cervical spondylosis, a degenerative disorder common in middle and old age, causes chronic neck pain, stiffness, and limited mobility, necessitating long-term treatment. Traditional Ayurvedic herbs including *Damnaka*, *Apamarga*, *Eranda*, *Nirgundi*, and *Haridra* have potent analgesic, anti-inflammatory, and muscle-relaxant effects that directly address these symptoms. In the future, a scientifically created polyherbal ointment including these medications could provide an effective, cost-efficient, and patient-friendly topical treatment for cervical spondylosis by merging traditional wisdom with modern pharmaceutical standardization.

Acknowledgement

I would like to express my sincere gratitude to all those who supported and guided me throughout the “Anti-inflammatory and analgesic potential of selected Ayurvedic herbs in a polyherbal ointment for cervical spondylosis”. First and foremost, I am deeply thankful to my academic mentors and research guides for their valuable insights, constructive feedback, and continuous encouragement during the research and compilation of this work.

References

- [1] McCormack BM, Weinstein PR. Cervical spondylosis. An update. *West J Med* 1996;165:43–51.
- [2] BRAIN WR, NORTHFIELD D, WILKINSON M. THE NEUROLOGICAL MANIFESTATIONS OF CERVICAL SPONDYLOSIS. *Brain* 1952;75:187–225. <https://doi.org/10.1093/brain/75.2.187>.
- [3] PALLIS C, JONES AM, SPILLANE JD. CERVICAL SPONDYLOSIS. *Brain* 1954;77:274–89. <https://doi.org/10.1093/brain/77.2.274>.
- [4] Ekiert H, Pajor J, Klin P, Rzepiela A, Ślesak H, Szopa A. Significance of *Artemisia Vulgaris* L. (Common Mugwort) in the History of Medicine and Its Possible Contemporary Applications Substantiated by Phytochemical and Pharmacological Studies. *Molecules* 2020;25:4415. <https://doi.org/10.3390/molecules25194415>.
- [5] Pandey J, Bhusal S, Nepali L, Khatri M, Ramdam R, Barakoti H, et al. Anti-Inflammatory Activity of *Artemisia vulgaris* Leaves, Originating from Three Different Altitudes of Nepal. *The Scientific World Journal* 2021;2021:1–8. <https://doi.org/10.1155/2021/6678059>.
- [6] Mohammed HA, Qureshi KA, Ali HM, Al-Omar MS, Khan O, Mohammed SAA. Bio-Evaluation of the Wound Healing Activity of *Artemisia judaica* L. as Part of the Plant's Use in Traditional Medicine; Phytochemical, Antioxidant, Anti-Inflammatory, and Antibiofilm Properties of the Plant's Essential Oils. *Antioxidants* 2022;11:332. <https://doi.org/10.3390/antiox11020332>.
- [7] Abad MJ, Bedoya LM, Apaza L, Bermejo P. The *Artemisia* L. Genus: A Review of Bioactive Essential Oils. *Molecules* 2012;17:2542–66. <https://doi.org/10.3390/molecules17032542>.
- [8] Pandey AK, Singh P. The Genus *Artemisia*: a 2012–2017 Literature Review on Chemical Composition, Antimicrobial, Insecticidal and Antioxidant Activities of Essential Oils. *Medicines* 2017;4:68. <https://doi.org/10.3390/medicines4030068>.
- [9] Nargatti P, Patil S, Wadkar K. Phytochemical Profile and Pharmacological Aspects of *Achyranthes aspera* Linn- An Overview. *J Pharm Res Int* 2021;187–206. <https://doi.org/10.9734/jpri/2021/v33i34B31860>.
- [10] Venkadassalapathy SD, Ramasamy M, Balashanmugam, Victor DJ, Subramanian S, Praveen JAA, et al. In Vitro Antibacterial, Cytotoxicity and Wound Healing Activities of Methanol and Aqueous Extracts from *Achyranthes aspera*. *J Pharm Bioallied Sci* 2023;15:S764–70. https://doi.org/10.4103/jpbs.jpbs_175_23.

- [11] Jain NK, Anand S, Keshri P, Kumar S, Sengar AS, Bajhaiya MK, et al. A Comprehensive Review of Ethnomedicinal, Phytochemical and Pharmacological Activity Profile of *Achyranthes aspera*. *Pharmacognosy Res* 2024;16:472–82. <https://doi.org/10.5530/pres.16.3.57>.
- [12] YEBOAH A, YING S, LU J, XIE Y, AMOANIMAA-DEDE H, BOATENG KGA, et al. Castor oil (*Ricinus communis*): a review on the chemical composition and physicochemical properties. *Food Science and Technology* 2021;41:399–413. <https://doi.org/10.1590/fst.19620>.
- [13] Abomughaid MM, Teibo JO, Akinfe OA, Adewolu AM, Teibo TKA, Afifi M, et al. A phytochemical and pharmacological review of *Ricinus communis* L. *Discover Applied Sciences* 2024;6:315. <https://doi.org/10.1007/s42452-024-05964-5>.
- [14] Rasadah MA, Farediah A, Wong CL, Ong BK, Mat Ali R, Ahmad F. ANTI-INFLAMMATORY ACTIVITY OF EXTRACTS AND COMPOUNDS FROM VITEX NEGUNDO. vol. 17. 2005.
- [15] Kamruzzaman M, Bari SMN, Faruque SM. In vitro and in vivo bactericidal activity of Vitex negundo leaf extract against diverse multidrug resistant enteric bacterial pathogens Asian Pacific Journal of Tropical Medicine Bactericidal activity Vitex negundo Enteric pathogenic bacteria. 2013.
- [16] Nagarsekar KS, Nagarsenker MS, Kulkarni SR. Evaluation of Composition and Antimicrobial Activity of Supercritical Fluid Extract of Leaves of Vitex negundo. n.d.
- [17] Balkrishna A, Solleti SK, Singh H, Verma S, Sharma N, Nain P, et al. Herbal decoction Divya-Swasari-Kwath attenuates airway inflammation and remodeling through Nrf-2 mediated antioxidant lung defence in mouse model of allergic asthma. *Phytomedicine* 2020;78:153295. <https://doi.org/10.1016/j.phymed.2020.153295>.
- [18] Bagad AS, Joseph JA, Bhaskaran N, Agarwal A. Comparative Evaluation of Anti-Inflammatory Activity of Curcuminoids, Turmerones, and Aqueous Extract of *Curcuma longa*. *Adv Pharmacol Sci* 2013;2013:1–7. <https://doi.org/10.1155/2013/805756>.
- [19] Memarzia A, Khazdair MR, Behrouz S, Gholamnezhad Z, Jafarnejhad M, Saadat S, et al. Experimental and clinical reports on anti-inflammatory, antioxidant, and immunomodulatory effects of *Curcuma longa* and curcumin, an updated and comprehensive review. *BioFactors* 2021;47:311–50. <https://doi.org/10.1002/biof.1716>.
- [20] Islam Reshad R Al, Alam S, Raihan HB, Meem KN, Rahman F, Zahid F, et al. *In Silico* Investigations on Curcuminoids from *Curcuma longa* as Positive Regulators of Wnt/ β -catenin Signaling Pathway in Wound Healing 2020. <https://doi.org/10.1101/2020.03.19.998286>.
- [21] Saher T, Manzoor R, Abbas K, Mudassir J, Wazir MA, Ali E, et al. Analgesic and Anti-Inflammatory Properties of Two Hydrogel Formulations Comprising Polyherbal Extract. *J Pain Res* 2022;Volume 15:1203–19. <https://doi.org/10.2147/JPR.S351921>.
- [22] Singh N. A Review on Pharmacological Aspects of *Achyranthes Aspera*. *International Journal of Pharmacognosy & Chinese Medicine* 2019;3:1–10. <https://doi.org/10.23880/ipcm-16000188>.
- [23] Vijaya Kumar S, Sankar P, Varatharajan R. Anti-inflammatory activity of roots of *Achyranthes aspera*. *Pharm Biol* 2009;47:973–5. <https://doi.org/10.1080/13880200902967979>.
- [24] Siwan D, Nandave D, Nandave M. *Artemisia vulgaris* Linn: an updated review on its multiple biological activities. *Futur J Pharm Sci* 2022;8:47. <https://doi.org/10.1186/s43094-022-00436-2>.
- [25] Ashok PK, Upadhyaya K. Evaluation of Analgesic and Anti-inflammatory Activities of Aerial Parts of *Artemisia vulgaris* L. in Experimental Animal Models. *Journal of Biologically Active Products from Nature* 2013;3:101–5. <https://doi.org/10.1080/22311866.2013.782761>.
- [26] Gupta R, Kaundal M, Sharma P. A REVIEW OF ERANDA (*RICINUS COMMUNIS* LINN.) IN AYURVEDA CLASSICS. *Certified Journal | Anubhav et al World Journal of Pharmaceutical Research* 2023;12. <https://doi.org/10.20959/wjpr20239-28446>.

- [27] Thejaswini C, Rao VR, Shubhashree MN, Naik R, Bhat S, Shiddamallayya N, et al. A narrative overview of pharmacological activities of Eranda (*Ricinus communis* L.) beeja (seeds) and taila (oil): Ayurvedic and scientific perspectives. *Journal of Drug Research in Ayurvedic Sciences* 2025;10:120–9. https://doi.org/10.4103/jdras.jdras_96_24.
- [28] Zheng C-J, Li H-Q, Ren S-C, Xu C-L, Rahman K, Qin L-P, et al. Phytochemical and Pharmacological Profile of *Vitex negundo*. *Phytotherapy Research* 2015;29:633–47. <https://doi.org/10.1002/ptr.5303>.
- [29] ANALGESIC AND ANTIINFLAMMATORY ACTIVITIES OF VITEX NEGUNDO Linn. n.d.
- [30] Maniyar YA, Sriraj D. Peripheral and central analgesic activity evaluation of ethanolic extract of Vitex Negundo flowers in experimental animals. *Int J Basic Clin Pharmacol* 2017;6:2701. <https://doi.org/10.18203/2319-2003.ijbcp20174791>.
- [31] Ahuja SC, Ahuja S, Ahuja U. Full-length paper Nirgundi (*Vitex negundo*)-Nature's Gift to Mankind. vol. 19. 2015.
- [32] Buch Z, Joshi J, Vaidya A, Amonkar A. Interventional role of Haridra (*Curcuma longa* Linn) in cancer . *Clin Cancer Investig J* 2012;1:45. <https://doi.org/10.4103/2278-0513.99556>.
- [33] Ruknuddin G, Basavaiah R, Biswajyoti P, Krishnaiah A, Kumar P. Anti-inflammatory and analgesic activities of Dashanga Ghana: An Ayurvedic compound formulation. *Int J Nutr Pharmacol Neurol Dis* 2013;3:303. <https://doi.org/10.4103/2231-0738.114877>.
- [34] Jena J, Gupta AK. RICINUS COMMUNIS LINN: A PHYTOPHARMACOLOGICAL REVIEW. n.d.
- [35] Thangjam NM, Taijong J, Kumar A. Phytochemical and pharmacological activities of methanol extract of *Artemisia vulgaris* L. leaves. *Clinical Phytoscience* 2020;6:72. <https://doi.org/10.1186/s40816-020-00214-8>.
- [36] Singh N. A Review on Pharmacological Aspects of *Achyranthes Aspera*. *International Journal of Pharmacognosy & Chinese Medicine* 2019;3:1–10. <https://doi.org/10.23880/ipcm-16000188>.
- [37] Mr. Vishal Kachare, Prof. Ram Ingale, Mr. Nilesh Mutthe, Mr. Pratik Kamble. Antibacterial Activity and Anti-inflammatory Activity VitexNegundo (Nirgudi) Plant Extract. *International Journal of Advanced Research in Science, Communication and Technology* 2024:56–67. <https://doi.org/10.48175/IJARSCT-22610>.
- [38] Sharma A, Manisha Dikshit, Amita Jhunjhunwala, Ashwani K. Som. Extraction process of Haridra & Tulsi essential oil with their medicinal uses. *Journal of Ayurveda and Integrated Medical Sciences* 2022;7:41–7. <https://doi.org/10.21760/jaims.7.5.7>.