ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may922

A Comprehensive Review on Medicinal Herbal Textiles for the Management and Treatment of Arthritis

Roja Mallarapu[1]; Dr. Anshu Sharma[2]

[1]PhDScholar, [2]Professor and Head of the Department
[2]PG Department of Textile Science and Apparel Design,
SNDT Women's University, Mumbai, India.

Publication Date: 2026/05/25

Abstract: Arthritis is an acute or chronic inflammatory disorder with wide variety of symptoms like deformities of joints that significantly reduces the mobility, affecting the quality of life. Although Conventional pharmacological treatments are effective but are often associated with adverse side effects due to long-term use. The tradition of Indian medicinal knowledge plays an important role in polyherbal formulation of arthritis treatment. Indian medicinal plants such as Ashwagandha, Eucalyptus, Turmeric, Neem and Vitex Negundo possess clearly documented anti-inflammatory and analgesic properties which will be useful in arthritis treatment. The integration ofbioactive compounds from medicinal plants intosustainable textiles offers a promising strategy for arthritis pain management. Recent advancements in managing arthritis treatment have been identified with alternative therapeutic approaches involving sustainable functional textiles with herbal extracts. This review explores the role of Indian Medicinal plants in the development of herbal medical textiles by incorporating the herbal extracts into textiles for arthritis pain management.

Keywords**:** *Analgesic, Anti-Inflammatory, Arthritis, Ayurvedic Treatment, Bioactive Compounds, Herbal Plants, Herbal Textiles, Indian Medicinal Plants, Neem, Nirgundi, Phytochemicals, Sustainability, Turmeric.*

How to Cite: Roja Mallarapu; Dr. Anshu Sharma (2026) A Comprehensive Review on Medicinal Herbal Textiles for the Management and Treatment of Arthritis. *International Journal of Innovative Science and Research Technology*, 11(5), 1549-1552. https://doi.org/10.38124/ijisrt/26may922

I. INTRODUCTION

Arthitis is a disease condition with major symptoms like joint pains, swelling and stiffness which may decrease mobility of the joint and may lead to joint deformities. Arthritis has to be controlled with pain relieving medications, anti-inflammatories, non-steroidal drugs are used for managing arthritis symptoms. However, the prolonged use of these drugs may lead to adverse side effects and economic burden. These limitations and side effects led to growing interest in alternative sustainable and biocompatible pain relieving treatment strategies, particularly those derived from medicinal plants (Elakkiya. et al, 2020).

India is a country with rich heritage of plant-based medicinal systems such as Ayurveda, Siddha and Unani. These traditional medicinal systems of India are prevalently used for the treatment of inflammatory disorders, including arthritis. The integration of bioactive compounds and phytochemicals from medicinal plants into textiles has emerged as an innovative and interdisciplinary approach and can be termed as Herbal Textiles or Ayurvastra. It involves treating fabrics with herbal extracts that impart anti- inflammatory and analgesic properties to reduce joint pain, inflammation and stiffness for arthritis management. Medical textiles, including supportive garments like knee braces, elbow sleeves, gloves and compression bandages or wraps can be functionalized with herbal extracts. Herbal compounds such as alkaloids, glycosides, terpenoids, flavonoids etc, possess antiarthritic activities (Jain. S et al, 2021). The advanced textile finishing techniques like microencapsulation, herbal coating and green synthesis of herbal nanoparticles and helps in sustained release of bioactive compounds from herbal extracts and to impart the extracted bio active compounds in medical textiles which helps in sustained release of bioactive compounds onto the skin which enhances sustainable treatment to improve patient centric solutions, and minimizes side effects (Sangeetha. P and Ashok. A). The

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may922

convergence of traditional Indian medicine with modern textile technology is an innovative, eco-friendly, and cost-effective solution for arthritis treatment.

Further advancementsin sustainable textile finishing techniques expanded the potential of herbal medical textiles in Arthritis healthcare applications. Furthermore, this comprehensive review aims to explore Indian medicinal plants incorporated into textiles for arthritis pain management, focusing on phytochemical properties, mechanisms of action, functional textile methods, and therapeutic benefits.Therefore, the study seeks to bridge the gap between Indian traditional medicinal knowledge and sustainable textile finishing technology leading to an innovative healthcare textile in Arthritis treatment.

II. MEDICINAL PLANTS WITH ANTI-ARTHRITIC ACTIVITY

India is an extensive land of medicinal plants known for their therapeutic benefits. Among these there are hundreds of medicinal plants with anti-arthritic effects. Here are some of the most commonly available joint pain relieving medicinal plants for arthritis treatment in India:

Table 1 Herbal Plants for Arthritis and their Medicinal Uses

S. No.	Common Name, Scientic Name of the Plant	Plant Parts	Medicinal Uses
1.	Ashwagandha, Withania Somnifera	Roots	Immunomodulatory, anti-stress effects, relieves joint pains and improves skin health
2.	Atibala, Abutilon Indicum	Root	Provides relief in muscle spasms, body pains and joint pains
3.	Eucalyptus, Eucalyptus Globulus	Leaves	Relieves joint pains as it contains anti inflammatory and antiseptic properties.
4.	Ginger, Zingiber Officinale	Root	Reduces pain and inflammation caused by arthritis andespecially to reduce the symptoms of rheumatoid arthritis
5.	Guduchi/Giloy, Tinospora Cardifolia	Stem	Useful to treat all types of arthritis and fever and also enhances immunity
6.	Indian Frankincense, Boswellia Serrata	Bark (gum resin)	Helps in relieving joint pains and headache
7.	Lemon Grass, Cymbopogon Citratus	Leaves and stem	Reduces abdominal pain, muscle pain, joint pains, headache and symptoms of high fever.
8.	Moringa, Moringa Oleifera	Pods and leaves	Reduces inflammation by altering oxidative stress and relieves joint pains.
9.	Neem , Azadirachta Indica	Leaves, seeds and bark	Possesses anti-inflammatory and antimicrobial activities to control arthritis joint pain.
10.	Nirgundi, Vitex Negundo	Leaves	Acts as wound healing agent and reduces back ache, joint pains and headache,.
11.	Rosary pea, Abrus Precatorious	Leaves and roots	Useful in relieving joint pains, paralysis and fungal skin infections
12.	Turmeric, Curcuma longa	Root	Contains curcumin, which exhibits strong anti-inflammatory, anti septic and antioxidant properties

The different plant parts like leaves, stem, roots and bark have been traditionally used in Ayurvedic medicine for the treatment of arthritis and are increasingly being validated through modern scientific research.

III. THERAPEUTIC MEDICAL TEXTILES IN ARTHRITIS MANAGEMENT

Medical textiles are an emerging sector in the present world with the combination of advanced textile science and medical science. These include bandages, wound dressings, compression garments, and orthopedic supports. Fibres used in medical textiles should be non-toxic and anti allergic. In the context of arthritis, the disease can be characterized by joint pain, stiffness, inflammation and reduced mobility. Medical textiles can be helpful to deliver therapeutic agents to affected joints, subsequently reduce the joint pain.

The following are the different therapeutic roles of medical textiles for arthritis pain management:

- *Compression Therapy*

Compression therapy means applying controlled pressure on joints and surrounding tissues by using textile based products like knee braces, knee sleeves, elbow supports, hand gloves etc. The developed compression garments exert pressure due to elastic fibers and the structure of the fabric which supports underlying tissues to relieve from pain.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may922

➢ *Heat Therapy*

Heat therapy involves delivering mild and controlled warmth to joints and muscles by using thermal wraps and heat retention fabrics. Heat present in the thermal wraps and fabrics in direct contact with the affected joints increases blood circulation, reduces joint stiffness, improves mobility and therefore reduces the joint pain. Few of the thermal wraps include knee braces, shoulder wraps, back supports etc.

IV. HERBAL FINISHING TECHNIQUES IN TEXTILES

The incorporation of herbal extracts into textiles to impart functional properties like anti- inflammatory, analgesic, anti-microbial and antioxidant can be achieved through various techniques:

- Pad-dry cure method: Simple methods where fabrics are soaked in herbal extracts to impart the necessary properties.
- Microencapsulation: Encapsulating active compounds from herbal extracts through spray drying, solvent evaporation then applied to fabric through padding or coating in microscopic carriers for controlled release of imparted functional properties into the skin.
- Nano-finishing: Dip-Dry method or Green synthesis method is used to extract nanoparticles from herbal plantto improve durability and bioavailability of herbal agents.

Among these, nano-finishing technique ensures sustained release of bioactive compounds for the treatment of arthritis.

V. HERBAL MEDICAL TEXTILES IN ARTHRITIS APPLICATIONS

Herbal-treated textiles can be used as products like knee braces, Gloves, socks, gowns, joint supports, and therapeutic wraps in arthritis treatment. The herbal treated medical textiles in continuous exposure of the affected area to bioactive compounds, helps to reduce inflammation, pain and swelling. The controlled release mechanism of bio active compounds onto skin allows for prolonged therapeutic action, reducing the need for frequent medication.

Most of the fibres used in herbal textiles are cotton, silk and other regenerated fibres like acrylics.

VI. MECHANISM OF ACTION

Bioactive compounds of herbal plants incorporated in medical textiles for continous contact with the skin, releases anti inflammation and analgesic properties and phytochemicals inhibits the production of inflammatory mediators such as prostaglandins and cytokines. This action of mechanism thereby protects the joint tissues from cartilage degeneration. Some compounds also modulate immune responses, which is particularly beneficial in autoimmune forms of arthritis.

VII. ADVANTAGES OF HERBAL MEDICAL TEXTILES

- Reduced side effects like gastro intestinal, cardiovascular complications when compared to oral medications
- Eco-friendly and biodegradable as they are derived from plant based materials making a sustainable choice for health care applications
- Herbal medical textiles are well tolerated by human body as they are produced with natural sources and less likely to cause skin allergies, irritation and toxicity.
- The use of advanced finishing techniques like nanoparticle finishing in herbal textiles allows the release of active compounds onto skin for prolonged therapeutic action and hence reduces the need for repeated medication.
- Improved patient compliance as they are comfort for regular use and ease of application.

VIII. LIMITATIONS AND CHALLENGES

Despite their potential, herbal medical textiles face several challenges:

- Variability in herbal extract composition
- Limited clinical validation to prove herbal textiles can reduce inflammation and pain, as most of the information is based on small scale observations and indirect data.
- Lack of standardization in production of herbal extracts, so the dose and duration of exposure to skin is unpredictable.
- Herbal textiles are not primary therapy for disease modifying and only for relieving from disease symptoms like pain, stiffness and inflammation.

IX. FUTURE PERSPECTIVES

- Nanotechnology and biotechnology can further enhance the efficiency and reliability of herbal medical textiles.
- Future research should focus on the clinical trials of arthritis patients measuring the scores of anti-inflammation, analgesic and anti-oxidant properties.
- Development of smart textiles integrated with herbal therapy and health monitoring.
- Development of eco certified ayurvedic medical textile brands by maintining concentration for daily wear and for to relieve severe pain.

X. CONCLUSION

The combination of traditional knowledge with modern textile technology aids to develop fabrics providing therapeutic benefits like anti-inflammatory, analgesic and anti-oxidant properties. The integration of bioactive compounds into medical textiles represents an advancement in the field of ayurvedic medicine and medical textiles. Herbal extract developed supported garments for arthritis management helps in relieving joint pain and stiffness. Advancements in nanotechnology and encapsulation techniques have greater

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may922

ability to improve the durability, wash fastness to make the developed herbal textiles suitable for longterm use. However, furthermore research and standardization are required to fully realize the potential of herbal textiles.

REFERENCES

[1]. Aditya, S.N. Aparna, R.A. et al. 2024. Herbal Analgesic oil. International Journal for Research Trends and Innovation, 9(6):108-120.

[2]. Aggarwal, R. 2018. Ayurvastra: A way to sustainable Living. Trend in Textile Engineering and Fashion Technology.

[3]. Alemu, R.B. Murugesh, K.B. et al. 2023. Studies on Healthcare and Hygiene Textile Materials treated with Natural Antimicrobial Bioactive Agents Derived from Plant Extracts. AATCC Journal of Research, 11(2):73-89.

[4]. Elakkiya, V. Kannan, K. et al. 2020. Advances in Ayurvedic Medicinal Plants and Nanocarriers for Arthritis treatment and Management:A Review. Journal of Herbal Medicine, 24.

[5]. Ferrari, AV. Perea, JPM, et al. 2022. Effect of Compression by elastic bandages on pain and function in individuals with knee osteoarthritis: protocol of a randomized controlled clinical trial. BMJ open.

[6]. Gokarneshan, N. 2026. Role of Textiles in the treatment of Rheumatoid Arthritis. Orthopedics and Rheumatology Open Access Journal, 25(2):556169.

[7]. Jain, P. and Panday, D. 2023. International Journal of Pharmaceutical Research and Applications, 8(60):448-459.

[8]. Jain, S. Vaidya, A. et al. 2021. Antiarthritic Activities of Herbal Isolates: A Comprehensive Review. Coatings, 11,1329.

[9]. Jayanth, B.N.V. Prayaga, M.P. et al. 2020. Traditional Medicinal Plants used to treat Arthritis by Tribal People in Eastern Ghats of Andhra Pradesh, India. International Journal of Botany Studies, 3(3):16-22.

[10]. Jyothirmai, S. and Sasmita, P. 2016. Ayurvastra- Herbal Clothing. International Journal of Advance Research and Innovative Ideas in Education, 2(4):1166-1171.

[11]. Mamta and Anita, R. 2015. Ayurvastra: A Miracle Mediherbal cloth. Medicinal Plants-International Journal of Phytomedicines and Related Industrie, 7(1):1

[12]. Prafull, P.K. Vijay, S.S. et al. 2015. Herbal Clothing: An Ayurvedic Doctor. Rest Journal on Emerging trends in Modelling and Manufacturing, 1(1):26-31.

[13]. Rangari, N.T. Kalyankar, T.M. et al. 2012. Ayurvastra: Herbal Couture Technology in Textile. International Journal of Research in Ayurveda and Pharmacy, 3(5).

[14]. Sangeetha, P and Ashok, A. 2026. Advancements in Medical Textiles and Integration of Herbal Extracts. International Journal of latest technology in Engineering, Management & Applied Science, 15(1).

[15]. Shruthi, T. Jaidev, G. et al. 2024. Ayurvastra Merging Traditional Medicine with Sustainable Fashion;Medicinal Textiles. Data Analytics and Influencer Marketing for Cultivating Brand Evangelism andAffinity:351-378.

[16]. Twinkle, J.B. Dhruv, M. et al. 2022. Preparation and Evolution of Polyherbal Formulation For Arthritis. Journal of Pharmacognosy and Phytochemistry, 11(4):311-318.