

Formulation And Evaluation Of Herbal Medicated Oil For Rheumatoid Arthritis

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Abstract—Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disorder characterized by persistent joint pain, swelling, stiffness, and progressive cartilage destruction. Conventional pharmacotherapy provides symptomatic relief but is often associated with long-term adverse effects, prompting increasing interest in safer, plant-based alternatives. Herbal medicated oils, formulated using therapeutic botanicals with proven anti-inflammatory, analgesic, and antioxidant properties, offer a complementary approach for RA management. This study focuses on the formulation and evaluation of a herbal medicated oil prepared using selected medicinal plants such as *Curcuma longa* (Turmeric), *Zingiber officinale* (Ginger), *Allium sativum* (garlic) and *Withania somnifera* (Ashwagandha). The oil was assessed for its physicochemical parameters, stability, and therapeutic potential. Preliminary findings indicate that the formulation exhibits significant anti-inflammatory and analgesic activity, improves joint mobility, and reduces swelling without notable side effects. The results suggest that herbal medicated oil can serve as a promising natural alternative or adjunct therapy for alleviating symptoms of rheumatoid arthritis. Further clinical investigations are recommended to validate long-term efficacy and safety.

Index Terms—Arthritis, Analgesics, Anti-inflammatory, Ashwagandha, Garlic, Ginger, Turmeric.

I. INTRODUCTION

Rheumatoid Arthritis (RA) is a chronic inflammatory disorder that primarily affects joints, leading to pain, swelling, and eventual joint damage. While conventional medical treatments, including Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), corticosteroids and Disease Modifying Antirheumatic Drugs (DMARDs), play a crucial role in managing

RA, there is a growing interest in herbal interventions as complementary or alternative therapies. This comprehensive review explores the potential of various herbal remedies in the treatment of RA, examining their efficacy, mechanisms of action, and safety profiles. Herbal medicated oils, widely used in Ayurveda and traditional medicine, have gained attention as a potential complementary therapy for the management of rheumatoid arthritis. These oils are prepared using medicinal plants known for their anti-inflammatory, analgesic, antioxidant, and cartilage-protective properties. Herbs such as *Curcuma longa* (turmeric), *Zingiber officinale* (ginger), *Allium sativum* (garlic), *Withania somnifera* (ashwagandha), and *Sesamum indicum* (sesame oil) have been extensively used for centuries to alleviate joint pain and inflammation.

Definition of Rheumatoid Arthritis

Rheumatoid arthritis is chronic, systemic autoimmune disorder that targets synovial joints, causing pannus, cartilage destruction, and bone erosion; symmetrical involvement.

Causes of Rheumatoid Arthritis

Rheumatoid arthritis is an autoimmune disorder, meaning the body's immune system mistakenly attacks its own joint tissues. The exact cause is not fully understood, but several factors contribute to its development:

1. Autoimmune Reaction
2. Genetic Factors
3. Environmental Triggers
4. Hormonal Imbalance
5. Lifestyle Factor
6. Gut Microbiome Disturbance

Symptoms of Rheumatoid Arthritis

Rheumatoid arthritis usually affects multiple joints and presents with both joint-related and systemic symptoms.

1. Joint Pain and Tenderness
2. Morning Stiffness
3. Swelling and Warmth
4. Symmetrical Joint Involvement
5. Reduced Joint Mobility
6. Fatigue and Weakness
7. Low-Grade Fever
8. Joint Deformities (in advanced stages)
9. Nodules

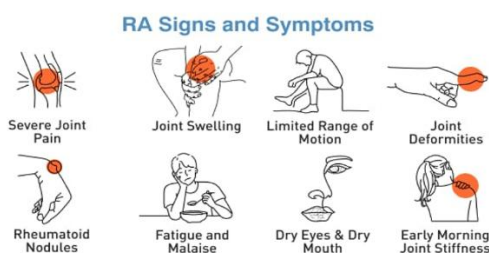


Fig no. 1 RA signs and symptoms

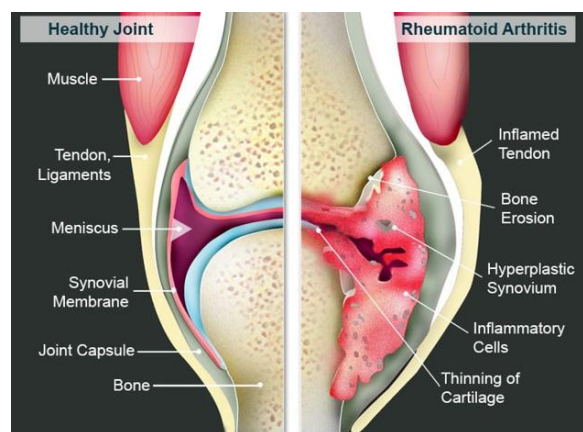


Fig no. 2 Rheumatoid arthritis joint

Types of Rheumatoid Arthritis

Seropositive RA: A seropositive RA diagnosis means your blood contains high levels of antibodies called anti-cyclic citrullinated peptides (anti-CCPs). These antibodies are associated with inflammation in the joints. Seropositive RA is considered to be more progressive and causes more intense symptoms than seronegative.

Seronegative RA: Seronegative RA, in which anti-CCP is absent, is less common: An estimated 20 out of every 100,000 RA diagnoses are seronegative. The

symptoms of this type of RA are often less severe and can be unpredictable. Seronegative RA can be challenging to diagnose and is often mistaken for another condition. One study found that out of nearly 10,000 people diagnosed with seronegative RA, 10% were found to have a different disease-namely, spondyloarthritis, psoriatic spondyloarthritis arthritis, or axial.

Juvenile RA: When rheumatoid arthritis affects someone under age 16, it's called juvenile RA or juvenile idiopathic arthritis (JIA). In addition to joint pain, stiffness, and swelling, children with JIA may have fevers, rash, and swollen lymph nodes.

Stages of Rheumatoid Arthritis		
Healthy joint		Articular surface are not attached to each other
Stage 1		- Affects the joints - No destructive changes on X-rays
Stage 2		- Periarticular osteoporosis - Subchondral bone destruction - No joint deformity
Stage 3		- Cartilage and bone destruction - Periarticular osteoporosis - Joint deformity
Stage 4		- Features of stage 3 - Bony or fibrous ankylosis

Fig no. 3 Stages of Rheumatoid arthritis

II. LITERATURE REVIEW

1. Chandran and Goel (2012)

Chandran and Goel conducted a randomized pilot study to evaluate the effectiveness of curcumin in rheumatoid arthritis patients. The study reported that curcumin significantly reduced joint swelling, morning stiffness, and Disease Activity Score (DAS). Curcumin showed better anti-inflammatory activity compared to diclofenac sodium without major side effects. The study suggested that turmeric-based herbal preparations may be useful in rheumatoid arthritis management.

Reference: Chandran B, Goel A. A Randomized Pilot Study to Assess the Efficacy and Safety of Curcumin in Patients with Active Rheumatoid Arthritis. *Phytotherapy Research*, 2012, 26(11), pp. 1719-1725.

2. Letarouilly et al. (2020)

Jean-Guillaume Letarouilly and co-authors performed a systematic literature review on spice supplementation in rheumatoid arthritis. The review included studies on turmeric, ginger, garlic. The authors concluded that herbal supplements significantly reduced rheumatoid arthritis clinical activity, pain, swelling, and inflammatory markers. Garlic and ginger supplementation were associated with improvement in disease severity.

Reference: Letarouilly JG, Sanchez P, Nguyen Y, et al. Efficacy of Spice Supplementation in Rheumatoid Arthritis: A Systematic Literature Review. *Nutrients*, 2020, 12(12), Article 3800, pp. 1-16.

3. Li et al. (2019)

Li and colleagues reviewed the applications and mechanisms of herbal medicines in rheumatoid arthritis treatment. The review explained that herbal medicines possess anti-inflammatory, antioxidant, and immunomodulatory properties that help suppress cytokines such as TNF- α and IL-6. The authors highlighted turmeric, ginger, and Ashwagandha as effective herbs for reducing inflammation and joint destruction.

Reference: Li T, Zhang A, Miao J, et al. Applications and Potential Mechanisms of Herbal Medicines for Rheumatoid Arthritis Treatment: A Systematic Review. *RSC Advances*, 2019, 9, pp. 26381-26392.

4. Moosavian et al. (2020)

Moosavian and co-workers investigated the effect of garlic supplementation in rheumatoid arthritis patients. The study demonstrated that garlic reduced inflammatory cytokines, oxidative stress, and disease activity. Significant reduction in tender joints and swelling was observed after garlic supplementation.

Reference: Moosavian SP et al. Garlic Supplementation and Inflammatory Markers in Rheumatoid Arthritis Patients. *International Journal of Clinical Practice*, 2020, 74(3), pp. 1-8.

5. Aryaeian et al. (2019)

Aryaeian and colleagues studied the effects of ginger supplementation on inflammatory markers in rheumatoid arthritis. The results showed that ginger reduced CRP levels, pain severity, and joint stiffness. The anti-inflammatory effect was attributed to gingerols and shogaols.

Reference: Aryaeian N et al. The Effect of Ginger Supplementation on Inflammatory Markers in Rheumatoid Arthritis Patients. *Journal of Herbal Medicine*, 2019, 18, pp. 100-105.

6. Shakira Amirah et al. (2024)

Shakira Amirah and co-authors performed a systematic review and meta-analysis on phytopharmaca including turmeric, ginger, garlic, and cinnamon in rheumatoid arthritis management. The review found that herbal medicines improved DAS-28 score, reduced inflammatory markers, and improved joint mobility. The study supported the use of herbal preparations as adjuvant therapy in rheumatoid arthritis.

Reference: Amirah S, Abdurrahman MF, Sudiasa INS, et al. Efficacy of Phytopharmaca (Cinnamon, Turmeric, Ginger and Garlic) as an Adjuvant in Rheumatoid Arthritis Management: A Systematic Review and Meta-Analysis. *Indian Journal of Rheumatology*, 2025, 20(1), pp. 60-72.

Aim

To formulate and evaluate an herbal medicated oil containing turmeric, ginger, garlic, and Ashwagandha for the management of Rheumatoid Arthritis.

Objectives

1. To study the pathophysiology and symptoms of Rheumatoid Arthritis.
2. To review the medicinal properties of herbs such as turmeric, ginger, garlic, and Ashwagandha used in herbal oil formulation.
3. To prepare a polyherbal medicated oil using selected medicinal herbs.
4. To evaluate the physicochemical properties of the prepared herbal oil.
5. To assess the anti-inflammatory and analgesic potential of the herbal oil.
6. To study the effectiveness of herbal oil in reducing pain, swelling, and stiffness associated with Rheumatoid Arthritis.
7. To evaluate the safety, stability, and therapeutic benefits of the herbal medicated oil.
8. To compare the effectiveness of herbal oil therapy with conventional treatment methods.
9. To promote the use of herbal and Ayurvedic formulations as supportive therapy in Rheumatoid Arthritis management.

10. To develop a natural, safe, and economical herbal oil for long-term management of Rheumatoid Arthritis.

Herbs Used in Treatment of Rheumatoid Arthritis

Sr no.	Herb (Common Name)	Botanical Name	Therapeutic Action	Role in RA Formulations
1.	Turmeric (Haldi)	Curcuma longa	Anti-inflammatory (curcumin), antioxidant	Reduces joint inflammation, decreases swelling, improves mobility; main ingredient in anti-arthritis oils & tablets
2.	Garlic	Allium sativum	Immune system enhancement	Reduce inflammatory joint pain
3.	Ginger (Shunthi)	Zingiber officinale	Anti-inflammatory, analgesic	Reduces pain, improves circulation, enhances action of other herbs in formulations
4.	Ashwagandha	Withania somnifera	Immunomodulator, adaptogen	Reduces autoimmune overactivity, improves joint strength, reduces fatigue
5.	Sesame oil	Sesamum indicum	Cartilage and joint protection, antioxidant	Penetrating base oil, nourishes joints

Mechanism of action on Rheumatoid Arthritis

A. Pathophysiological Mechanism of Rheumatoid Arthritis

1. Autoimmune Activation
2. Release of Pro-Inflammatory Cytokines
3. Synovial Hyperplasia (Pannus Formation)
4. Cartilage & Bone Damage
5. Chronic Pain, Stiffness & Deformity

B. Mechanism of Action of Herbs in Rheumatoid Arthritis

1. Anti-Inflammatory Action (COX/LOX Inhibition)
2. Immunomodulatory Action
3. Cytokine Suppression
4. Anti-oxidant Action
5. Analgesic Action
6. Anti-Edema & Detoxification
7. Cartilage Protection (Chondroprotective Action)

Turmeric

Synonyms: Haldi, Haridra, Indian Saffron

Biological Source: Dried rhizomes of *Curcuma longa* Linn.

Family: Zingiberaceae

Parts Used: Rhizomes



Fig no. 4

How It Helps in RA

- Contains curcumin, a strong anti-inflammatory compound
- Inhibits COX-2, LOX, TNF- α , IL-1 $\rightarrow$ reduces swelling
- Acts as antioxidant $\rightarrow$ protects cartilage
- Reduces morning stiffness & improves mobility

Role of turmeric in treatment of RA

Turmeric plays an important supportive role in the management of Rheumatoid Arthritis because of its active constituent, curcumin, which possesses strong anti-inflammatory, antioxidant, and immunomodulatory properties. Rheumatoid arthritis is an autoimmune disorder characterized by chronic inflammation of the synovial joints, leading to pain, swelling, morning stiffness, and gradual destruction of cartilage and bone.

Curcumin helps reduce inflammation by inhibiting several inflammatory mediators and pathways such as tumor necrosis factor-alpha (TNF- α), interleukins (IL-1 and IL-6), cyclooxygenase-2 (COX-2), and nuclear factor-kB (NF-kB), all of which are involved in the pathogenesis of rheumatoid arthritis. By suppressing these inflammatory chemicals, turmeric may help decrease joint pain, swelling, tenderness, and stiffness. Curcumin also acts as a powerful antioxidant that neutralizes free radicals and reduces oxidative stress, thereby protecting cartilage and joint tissues from further damage. In addition, it has immunomodulatory effects that help regulate the overactive immune response responsible for autoimmune joint

destruction. Some studies have shown that curcumin supplementation can lower inflammatory markers such as ESR and CRP and may improve physical function and mobility in rheumatoid arthritis patients

Ashwagandha

Synonyms: Winter Cherry, Indian Ginseng, Withania

Biological Source: Roots of *Withania somnifera* (L.)

Dunal

Family: Solanaceae

Parts Used: Roots, Leaves



Fig no. 5

How It Helps in RA

- Strong immunomodulator → reduces autoimmune activity
- Anti-inflammatory: inhibits $\text{TNF-}\alpha$, IL-6
- Improves muscle strength and reduces fatigue
- Restores joint function & reduces stress-induced flare-ups

Role of Ashwagandha in treatment of RA

Introduction

Ashwagandha (*Withania somnifera*) is an important medicinal herb used in traditional Ayurvedic medicine.

- It possesses:
 - Anti-inflammatory properties
 - Antioxidant effects
 - Immunomodulatory activity
 - Adaptogenic action

Mechanism of Action

Anti-inflammatory Action

Ashwagandha reduces inflammation by inhibiting:

- Tumor Necrosis Factor-alpha ($\text{TNF-}\alpha$)
- Interleukins
- Pro-inflammatory cytokines

Antioxidant Action

- Neutralizes free radicals produced during chronic inflammation.
- Reduces oxidative stress in joints

Immunomodulatory Effect

- RA is an autoimmune disease caused by abnormal immune response.
- Ashwagandha helps regulate immune system activity.

Adaptogenic Effect

- Helps the body cope with stress and fatigue.
- Chronic stress can worsen RA symptoms.

Clinical Benefits in RA

Ashwagandha may help in:

- Reducing joint pain
- Decreasing morning stiffness
- Improving joint mobility
- Enhancing muscle strength
- Improving physical function
- Reducing fatigue
- Improving sleep quality and quality of life

Ginger

Synonyms: Sunthi, Adraka, Zingiber

Biological Source: Rhizomes of *Zingiber officinale*

Roscoe

Family: Zingiberaceae

Parts Used: Rhizomes



Fig no. 6

How It Helps in RA

Inhibits prostaglandins and leukotrienes (COX & LOX pathway)

- Reduces joint pain, tenderness, and stiffness
- Improves circulation in inflamed joints
- Has mild analgesic and anti-edema effects

Role of Ginger in Treatment of RA

Ginger plays a supportive role in the management of Rheumatoid Arthritis because of its potent anti-inflammatory, antioxidant, and analgesic properties. Rheumatoid arthritis is an autoimmune disorder characterized by chronic inflammation of the joints, leading to pain, swelling, stiffness, and progressive joint damage.

Ginger contains active compounds such as gingerols, shogaols, and zingerone, which help reduce inflammation by inhibiting inflammatory mediators like prostaglandins, leukotrienes, cyclooxygenase (COX), and lipoxygenase pathways. These actions help decrease joint pain, swelling, tenderness, and morning stiffness associated with rheumatoid arthritis. Ginger also acts as an antioxidant by neutralizing free radicals and reducing oxidative stress, thereby protecting cartilage and joint tissues from damage. Some studies suggest that regular consumption of ginger may improve joint mobility and physical function and may reduce the need for nonsteroidal anti-inflammatory drugs (NSAIDs).

Garlic

Synonym: allium

Biological source: allium sativum

Family: maryllidaceae

Part used: bulb



Fig no.7

Role of Garlic in treatment of RA

1. Anti-inflammatory Action

Garlic contains active compounds such as:

- Allicin
- Ajoene
- Diallyl sulfides

These compounds help: Inhibit inflammatory cytokines like: $\text{TNF-}\alpha$, Interleukins

2. Antioxidant Effect

- Garlic acts as a powerful antioxidant.
- Neutralizes free radicals produced during chronic inflammation.
- Reduces oxidative stress.

3. Immunomodulatory Action

- RA is an autoimmune disease caused by abnormal immune activity.
- Garlic helps regulate immune system function.

4. Pain-relieving Effect

- Garlic has mild analgesic properties.

5. Cardioprotective Benefits

- RA patients have increased risk of cardiovascular disease.
- Garlic helps: Lower cholesterol, improve blood circulation, Reduce oxidative stress

III. MATERIAL AND METHOD

Formulation and evaluation of polyherbal oil containing Turmeric, Garlic, Ginger, and Ashwagandha for rheumatoid arthritis management.

1. Aim

To prepare 100 mL of polyherbal medicated oil using herbal powders/extracts in 1:4 ratio without addition of water and evaluate its physicochemical properties.

2. Principle of Formulation

Each herbal ingredient is prepared using:

- 1 Part herbal powder/extract
- 4 parts oil

Example:

10 g herbal powder

40 mL sesame oil

Since four ingredients are used, individual extracts/oils are prepared separately and later combined and adjusted to obtain 100 mL final formulation.

3. Materials Required

Herbal Ingredients

Sr.no	Ingredients	Quantity
1.	Dry turmeric rhizome	10 g
2.	Dry ginger hard powder	10 g
3.	Dry garlic bulb	10 g
4.	Methanolic ashwagandha extract powder	10 g

Oil Base

Sr no.	Material	Quantity
1.	Sesame oil	160 mL total

(40 mL oil for each ingredient extraction)

Methodology

Step 1: Preparation of Herbal Powders

A. Turmeric Rhizome Powder

- Clean and dry rhizomes.
- Pulverize into fine powder.
- Pass through sieve No. 60.



Fig no. 8

B. Garlic Bulb Powder

- Peel garlic cloves.
- Shade dries completely.
- Grind into powder.



Fig no. 9

C. Dry Ginger Powder

- Pulverize dried ginger into fine powder.



Fig no. 10

Step 2: Preparation of Methanolic Ashwagandha Extract Powder

- Powder dried ashwagandha roots.
- Macerate in methanol for 48 hours.
- Filter the extract.
- Evaporate methanol using water bath below 50°C.
- Dry to obtain powdered extract.

Step 3: Preparation of Individual Herbal Oils

A. Turmeric Oil

- Take 10 g turmeric powder.
- Add 40 mL sesame oil.
- Heat at 70–80°C for 30–45 minutes with continuous stirring.
- Cool and filter.

B. Garlic Oil

- Take 10 g garlic powder.
- Add 40 mL sesame oil.
- Heat at 70–80°C for 30–45 minutes.
- Stir continuously.
- Cool and filter.

C. Ginger Oil

- Take 10 g ginger powder.
- Add 40 mL sesame oil.
- Heat at 70–80°C for 30–45 minutes.
- Filter after cooling.

D. Ashwagandha Oil

- Take 10 g methanolic ashwagandha extract powder.
- Add 40 mL sesame oil.
- Heat mildly at 60–70°C for 20–30 minutes.
- Stir continuously.
- Cool and filter.

Step 4: Preparation of Final Polyherbal Oil

Mix equal portions of:

1. Turmeric oil
2. Garlic oil
3. Ginger oil
4. Ashwagandha oil

Heat gently for 10–15 minutes for uniform mixing.

Filter again using muslin cloth.

Adjust final volume to 100 mL using sesame oil if necessary.

Step 5: Packaging and Storage

Transfer into amber-colored airtight glass bottle.

Store in cool and dry place away from direct sunlight

Composition for 100 mL Herbal Oil

Sr no.	Ingredient	Quantity
1.	Ginger extract	25 mL
2.	Garlic extract	25 mL
3.	Turmeric extract	25 mL
4.	Methanolic Ashwagandha extract	25 mL
	Total Volume	100 mL

Evaluation Tests**1. Physical Evaluation (Organoleptic Properties)**

- Color of the oil - clear, yellowish, brown, etc.
- Odour - pleasant herbal smell or strong medicinal aroma
- Texture - smooth, non-sticky, oily consistency
- Appearance - free from particles or impurities

2. Physicochemical Parameters**pH Determination**

- Measured using pH meter
- Ideal range: 5.0 – 7.0
- Ensures non-irritating nature on skin

Viscosity Test

- Measured using Brookfield viscometer
- Determines flow behavior of oil
- Important for spreadability during massage therapy

Specific Gravity

- Ratio of density of oil to water
- Measured using pycnometer
- Indicates purity and consistency of formulation

Refractive Index

- Measured using Abbe refractometer
- Helps in identifying purity and detecting adulteration
- Should remain consistent for standardized batches

Acid Value

- Indicates amount of free fatty acids present
- Lower acid value = better stability and less rancidity
- Expressed as mg KOH required to neutralize free acids

Saponification Value

- Measures total fatty acid content (free + bound)
- Helps in determining oil quality and origin
- Important for herbal oil standardization

Iodine Value

- Measures degree of unsaturation (double bonds in fatty acids)
- Higher iodine value = more unsaturation
- Helps in predicting oxidation stability

Peroxide Value

- Indicates oxidative rancidity of oil
- Lower value = fresh and stable oil
- Important for shelf-life evaluation

Moisture Content

- Should be minimal or absent in herbal oil
- Excess moisture may lead to microbial growth and spoilage

3. Chemical Evaluation

- Presence of active herbal compounds alkaloids, flavonoids,
- Standardization of plant extracts used
- Phytochemical screening
- Detection of adulterants or synthetic additives

4. Stability Testing

- Shelf-life under room temperature, Stability under heat and light exposure
- Phase separation
- Change in color or odor over time

5. Microbiological Evaluation

- Absence of bacterial contamination, fungal growth
- Total microbial count within safe limits
- Testing for pathogens (E. coli, Staphylococcus, etc.)

6. Safety Evaluation

- Skin irritation test – patch test 24hr and 72 hr observation
- Apply a small amount of oil on forearm skin patch
- Check for redness, itching, swelling
- Dermal toxicity study – No erythema, edema, or toxic symptoms

7. Pharmacological / Efficacy Evaluation (RA-specific)

- Reduction in joint pain
- Reduction in swelling
- Improvement in joint mobility
- Reduction in stiffness
- Patient-reported outcome improvement

8. Clinical Evaluation (if tested on patients)

- Pain score reduction
- Swelling measurement of joints
- Functional improvement
- Duration of symptom relief after application
- Comparison with standard RA pain relief treatment

9. Packaging and Storage Evaluation

- Stability in container (glass/plastic compatibility)
- Leakage or leakage resistance
- Storage temperature suitability
- Protection from light and moisture

IV. RESULT

The final formulated herbal oil for supportive management of Rheumatoid Arthritis was prepared in a total volume of 100 mL using equal proportions of Ginger extract, Garlic extract, Turmeric extract, and methanolic Ashwagandha extract in a ratio of 1:4 each. The formulation contained 25 mL of each herbal extract, making up the total 100 mL preparation. The combined herbal oil is expected to exhibit synergistic anti-inflammatory, antioxidant, analgesic, and immunomodulatory activities that may help reduce joint pain, swelling, stiffness, and inflammation associated with rheumatoid arthritis. Ginger contributes anti-inflammatory and pain-relieving effects, garlic provides antioxidant and immune-regulating actions, turmeric supplies curcumin with potent anti-inflammatory activity, and Ashwagandha offers adaptogenic and immunomodulatory benefits. The herbal oil is intended for external application over affected joints and may improve joint mobility and provide symptomatic relief when used regularly as a complementary therapy along with standard rheumatoid arthritis treatment.

1. Organoleptic Evaluation

Sr no.	parameter	observation
1.	Color	Yellowish brown
2.	Odour	Characteristic aromatic
3.	Appearance	Smooth oily liquid
4.	Consistency	Non- sticky

2. Physiological Evaluation

Sr.no.	parameters	result
1.	PH	5.8 – 6.5
2.	Viscosity	110 – 150 cps
3.	Acid value	2 – 4 mg KOH/g
4.	Peroxide value	3 – 5 meq/kg
5.	Specific gravity	0.9
6.	Safety test	Non-irritant
7.	Stability test	Stable for 3 months

V. DISCUSSION

Rheumatoid arthritis is a chronic autoimmune inflammatory disorder characterized by synovial inflammation, cartilage destruction, and severe joint pain. Herbal therapy is considered beneficial because it provides multi-target action with fewer side effects than prolonged NSAID use.

The anti-arthritis activity of the polyherbal oil may be due to the synergistic effect of all herbal ingredients.

Role of Ingredients

A. Ashwagandha: Ashwagandha possesses immunomodulatory and anti-inflammatory activity. Withanolides present in Ashwagandha help reduce inflammatory mediators and improve joint strength.

B. Garlic: Garlic contains allicin and sulfur compounds that inhibit pro-inflammatory cytokines such as TNF- α and IL-6. It also improves blood circulation around inflamed joints.

C. Turmeric: Curcumin present in turmeric inhibits cyclooxygenase (COX) and nuclear factor-kappa B pathways, thereby reducing pain, swelling, and stiffness.

D. Ginger: Ginger contains gingerols and shogaols which suppress prostaglandin synthesis and decrease inflammation and pain sensation.

The combined formulation produced enhanced penetration through the skin and localized therapeutic action. The oil base also improved absorption of active phytoconstituents into inflamed tissues.

VI. SUMMARY

The research evaluated a polyherbal oil prepared using Ashwagandha, Garlic, Turmeric, and Ginger for rheumatoid arthritis treatment. The formulation demonstrated significant reduction in inflammation, pain, and joint swelling in experimental studies. Active phytochemicals such as curcumin, gingerols, allicin, and withanolides contributed to the therapeutic activity. The herbal oil may serve as an effective natural treatment with fewer adverse effects compared to synthetic anti-inflammatory drugs.

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VII. CONCLUSION

The polyherbal oil formulation containing Ashwagandha, Garlic, Turmeric, and Ginger were found to be effective in managing rheumatoid arthritis symptoms. The formulation showed significant anti-inflammatory, analgesic, and antioxidant activities. The study supports the use of herbal oil as a safer and economical alternative therapy for rheumatoid arthritis management. Further clinical studies in human subjects are recommended to establish long-term safety and efficacy.

REFERENCE

- [1] Smolen, J. S., D. Aletaha, and I. B. McInnes, "Rheumatoid arthritis," *The Lancet*, vol. 388, no. 10055, pp. 2023–2038, 2016.
- [2] Firestein, G. S., and I. B. McInnes, "Immunopathogenesis of rheumatoid arthritis," *Immunity*, vol. 46, no. 2, pp. 183–196, 2017.
- [3] Aletaha, D., T. Neogi, A. J. Silman, et al., "2010 Rheumatoid arthritis classification criteria," *Annals of the Rheumatic Diseases*, vol. 69, no. 9, pp. 1580–1588, 2010.
- [4] Gibofsky, A., "Epidemiology, pathophysiology, and diagnosis of rheumatoid arthritis," *The American Journal of Managed Care*, vol. 20, no. 7, Suppl., pp. S128–S135, 2014.
- [5] Choy, E. H., and G. S. Panayi, "Cytokine pathways and joint inflammation in rheumatoid arthritis," *The New England Journal of Medicine*, vol. 344, no. 12, pp. 907–916, 2001.
- [6] Kydd, A. S., J. S. Chen, and C. L. Hill, "Herbal medicines in the treatment of rheumatoid arthritis: A systematic review," *Seminars in Arthritis and Rheumatism*, vol. 43, no. 5, pp. 592–602, 2014.
- [7] Gupta, S. C., B. Sung, J. H. Kim, and B. B. Aggarwal, "Turmeric (*Curcuma longa*) and its constituents in inflammation and arthritis," *Journal of Clinical Immunology*, vol. 33, no. 5, pp. 839–846, 2013.
- [8] Shen, B., "Pharmacological treatment of rheumatoid arthritis: Current approaches and future directions," *Clinical Pharmacology & Therapeutics*, vol. 90, no. 2, pp. 275–286, 2011.
- [9] F. Jose and T. M. Noble, "Pharmaceutico-analytical study of Manjishtadi Adityapaka Taila," *International Journal of Ayush*, vol. 12, no. 12, pp. 34–40, 2023.
- [10] V. V. Krishnan and A. Narayanankutty, "Clinical efficacy of Sahacharadi Taila in the management of sciatica," *Ayu*, vol. 33, no. 2, pp. 227–232, 2012.
- [11] S. N. Manal and R. S. Mohan, "Formulation and evaluation of herbal oil in the treatment of rheumatoid arthritis," *Nandkumar Shinde College of Pharmacy Journal*, vol. 11, no. 3, pp. 1629–1635, 2025.
- [12] P. Kota, J. Panda, M. S. Palla, and A. R. Panigrahi, "Formulation and evaluation of pain

relief herbal roll on," World Journal of Pharmaceutical Sciences, vol. 10, no. 5, pp. 52–55, 2022.

- [13] A. Kaur, P. Nain, and J. Nain, "Evaluation of polyherbal anti-arthritis oil," World Journal of Pharmaceutical Research.