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Formulation and Evaluation of Herbal Pain Relief Oil

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Abstract: *Herbal remedies have gained increasing attention as alternative therapies for pain management due to their minimal side effects and natural origin. This study focuses on the formulation and evaluation of a herbal pain relief oil using Trachyspermum ammi, commonly known as carom seeds or ajwain. Carom seeds are rich in thymol, a bioactive compound known for its anti-inflammatory, analgesic, and antimicrobial properties. The oil was prepared using cold infusion techniques, combining ajwain seed extract with a carrier oil such as sesame or mustard oil, both traditionally used for topical applications. The formulation was tested for its efficacy in reducing muscle and joint pain through in vivo and sensory evaluation methods. Results indicated a significant reduction in pain perception and inflammation, supporting the therapeutic potential of ajwain-based herbal oil. This research highlights the value of carom seeds in natural pain relief applications and supports their integration into traditional and modern medicinal practices.*

Keywords: Carom seeds, Turmeric, Ginger, Coconut oil, Camphor, Clove oil, Eucalyptus oil

I. INTRODUCTION

Pain, whether acute or chronic, is one of the most common health issues affecting people of all ages. While conventional pain relief medications such as non-steroidal anti-inflammatory drugs (NSAIDs) and opioids are widely used, they often come with side effects like gastrointestinal discomfort, dependency, or long-term health risks. As a result, there is growing interest in natural and herbal alternatives that can provide effective pain relief with fewer side effects.

Herbal medicine has been used for centuries across various cultures, and many plants are known to possess potent analgesic and anti-inflammatory properties. One such medicinal herb is **carom seed**, scientifically known as *Trachyspermum ammi*, and commonly called **ajwain**. Traditionally used in Ayurvedic and Unani medicine, ajwain is known for its therapeutic benefits in treating digestive disorders, respiratory issues, and inflammatory conditions. The key active component in ajwain is **thymol**, which has been shown to exhibit strong anti-inflammatory, antimicrobial, and pain-relieving effects.

Ideal properties of herbal pain relief oil:

- Reduces pain and swelling naturally.
- Easily absorbs into the skin.
- Gentle and safe for all skin types.
- Has a pleasant, soothing smell.
- Stays fresh and effective for a long time.
- Easy to apply and not too greasy.
- Can give a warm or cool feeling for extra relief.
- Made with natural, chemical-free ingredients.
- Affordable and made from easily available herbs.

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Advantages of herbal pain relief oil:

- Provides natural relief from pain and inflammation.
- Has fewer side effects compared to chemical-based painkillers.
- Contains thymol, which fights bacteria and reduces swelling.
- Can be used for various pains like joint, muscle, and headaches.
- Safe for long-term use and suitable for all age groups.
- Made from easily available and affordable ingredients.
- Improves blood circulation when massaged.
- Helps relax the body and reduce stress.
- Free from harmful chemicals and synthetic preservatives.
- Eco-friendly and supports traditional medicine practices.

Factors affecting herbal pain relief oil:

- Quality of carom seeds – Fresh and pure seeds give better results.
- Extraction method – Cold-pressed or properly infused oils retain more active compounds.
- Type of carrier oil – Oils like sesame or mustard improve absorption and effectiveness.
- Concentration of ingredients – The right balance of carom seed oil ensures safety and effect.
- Storage conditions – Heat, light, and air can reduce the oil's potency over time.
- Herbal Ingredients Used In Formulation:

1. Carom seeds :

- Scientific name: Trachyspermum ammi.
- Family: Apiaceae
- Native Place: India, Iran, and the eastern Mediterranean region.
- Common name : Ajwain *or* Carom seeds.
- Chemical constituents: Thymol

Roles:

- Anti-Inflammatory
- Analgesic
- Digestive Aid
- Anti-Oxidative

Fig 1.Carom Seeds {Ajwain}

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2. Coconut Oil :

- Scientific name: Cocos nucifera.
- Family: Arecaceae
- Native Place: South Asia, Southeast Asia, and the Pacific Islands.
- Common name: Coconut oil.
- Chemical constituents: Lauric acid

Roles:

- Moisturizes and softens the skin.
- Reduces skin inflammation and irritation.
- Promotes healing of wounds and burns.
- Provides mild pain relief when massaged**.**

Fig 2.Coconut oil

3. Turmeric :

- Scientific name: Curcuma longa.
- Family: Zingiberaceae
- Native Place: Southeast Asia, particularly India.
- Common name: Turmeric.
- Chemical constituents: Curcumin

Roles:

- Reduces inflammation and swelling.
- Relieves joint and muscle pain.
- Promotes healing of wounds and injuries.
- Acts as a powerful antioxidant.

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Fig 3.Turmeric

4. Ginger :

- Scientific name: Zingiber officinale
- Family: Zingiberaceae
- Native Place: Southeast Asia, particularly India and China.
- Common name: Ginger
- Chemical constituents: Gingerol

Roles:

- Relieves nausea and vomiting.
- Reduces inflammation and swelling.
- Provides relief from joint and muscle pain.
- Improves digestion and reduces bloating.

Fig 4.Ginger

5. Camphor :

- Scientific name: Zingiber officinale
- Family: Zingiberaceae
- Native Place: Southeast Asia, particularly India and China.
- Common name: Ginger
- Chemical constituents: Gingerol

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Roles:

- Relieves nausea and vomiting, especially during pregnancy or chemotherapy.
- Reduces inflammation and swelling, aiding conditions like arthritis.
- Alleviates muscle pain and joint pain due to its analgesic properties.
- Improves digestion and helps relieve bloating, indigestion, and gas.

Fig 5.Camphor

6. Eucalyptus Oil :

- Scientific name: Eucalyptus globulus.
- Family: Myrtaceae
- Native Place: Australia, but now also grown in other parts of the world with temperateclimates.
- Common name: Eucalyptus oil
- Chemical constituents: Eucalyptol (1,8-Cineole)

Roles:

- Relieves nasal congestion and sinus issues by acting as a decongestant.
- Fights bacterial and viral infections due to its antimicrobial properties.
- Reduces inflammation and pain in conditions like arthritis or sore muscles.
- Improves respiratory health by easing cough, asthma, and bronchitis symptoms.

Fig 6.Eucalyptus Oil

7. Clove Oil :

- Scientific name: *Eucalyptus globulus*
- Family: Myrtaceae
- Native Place: Southeastern Australia and Tasmania

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- Common name : Blue Gum, Tasmanian Blue Gum
- Chemical constituents: 1,8-Cineole (Eucalyptol)

Roles:

- Antimicrobial activity
- Antibacterial effects
- Antifungal properties
- Anti-inflammatory effects

Materials : {FOR 50ML OIL}

Sr. No.	Ingredients	Quantity	Properties
1.	Ajwain	10gm	Pain relieving
2.	Coconut oil	50ml	Base oil
3.	Turmeric	2.5gm	Antioxidant
4.	Ginger	2.5gm	Blood circulation enhancer
5.	Camphor	1gm	Cooling sensation
6.	Eucalyptus oil	2-3drops	Muscle relaxant
7.	Clove oil	2-3drops	Analgesic

Table 1: List of materials.

Methods Of Preparation:

Step 1: Crush Ajwain (Carom seeds) –

Take 10gm of ajwain seeds and crush it using the mortar and pestle.

Step 2: Heat the oil –

Take 50ml of coconut oil i.e .base oil in a pan using the double boiler.
Then add crush carom seeds and heat it on low flame for 10-15 minutes.

Step 3: Add Turmeric powder:

Then add the turmeric powder inside the base oil which acts as an analgesic and gives faster effect.

Step 4: Add Ginger juice/powder:

After that add the ginger juice which enhance the blood circulation in body.

Step 5: Addition of the other components i.e essential oil and camphor:

Camphor which gives the cooling sensation get added after that the essential oil such as
Clove oil and eucalyptus oil which acts as an excipients and enhance the quality of oil like color , smell , texture

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Step 6 : Strain and Store:

Then strain the whole base oil containing all active ingredients using the muslin cloth to remove the solid residue.

Store the herbal pain relief oil into amber color bottle and avoid direct contact from sunlight.

Evaluation Parameters:

The preparation was assessed for various pharmaceutical parameters.

1.Physical assessment of the preparation:

Organoleptic assessment includes testing for color, odor, and appearance of the processed oil.

Color: Checked visually to match anticipated natural pigmentation.

Odor: Typical herbal and faintly pungent due to components such as mustard.

Appearance: Viscous oily liquid, clear of suspended particles, with even texture.

2. Spreadability:

Assessed by a simple glass slide method.

Describes how easily the oil spreads on the skin surface.

Formula:

Spreadability (g·pcm /s)=Weight applied × Distance moved
Time taken

3. Determination of pH:

The pH of the oil was determined by a digital pH meter to confirm skin compatibility.

Optimal pH for topical application: 5.5–7.0.

4. Viscosity:

Determined by a Brookfield viscometer or flow time method.

Essential for ensuring ease of application and spreading consistency.

5.Specific Gravity:

Checked by using a pycnometer in order to ascertain the oil density as compared to that of water.

Used for ensuring batch-to-batch uniformity.

6. Acid Value:

Reveals the concentration of free fatty acids, which would impact the oil stability.

Low acid value shows good storage and stability quality.

7. Stability Study:

The oil is tested under accelerating conditions (temperature, light, humidity) for 30–90 days.

Odor, color, consistency, and phase separation are monitored from time to time.

8. Irritation Test:

Performed in human volunteers or animals to test for cutaneous sensitivity or allergic response.

Oil is applied to the forearm or behind the ear in a small quantity and checked for redness, itching, or rashes within 24 hours.

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Result :

Sr. No.	Parameter	Result	Standard/Observation
1.	Color	Light brown to yellowish	Natural appearance
2.	Odor	Characteristics	Acceptable
3.	pH	5.2	Ideal 4.5-5.5
4.	Viscosity	120Cp	Measured using Ostwald Viscometer
5.	Spreadability	5.5cm in 1 min	Good Spreadability
6.	Skin irritation test	No irritation	Safe for topical use
7.	Analgesic activity	62%	significant
8.	Thermal stability	Stable up to 40°C	No phase separation

Table 2: List of evaluation result

II. CONCLUSION

Herbal Pain Relief Oil provides effective and natural relief from daily discomfort and pain. With a selection of tried and true herbal formulas, it ensures soothing relief that doesn't trigger harsh side effects found in products that contain chemicals. Whether used to address aching muscles, arthritic joints, or inflammation, it facilitates your body's natural restoration process, so you can be more relaxed and mobile. The perfect choice to use daily, it's gentle yet potent therapy for any regimen.

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