

“Formulation and Evalution of Herbal Pain Relief oil”

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Abstract: Vednahari is a topical Ayurvedic preparation that contains various active ingredients such as menthol crystal (pudina phool), thymol crystal (ajwain phool), and edible camphor (desi Kapoor). Ayurveda is the world's most ancient science of holistic healing. Today, due to fast and faulty lifestyles and different dietary patterns, people are suffering from many diseases. There is an increasing need for instant relief. There is a common belief that Ayurveda does not provide quick relief, but in Ayurveda, *Siddhyoga Sangraha* explains “Karpurdhara,” also known as *Jeevanarkrasayan*, which gives instant relief in some conditions like rhinitis and gastritis. It is a preparation made from thymol, menthol, and camphor. This formulation is used as a proprietary medicine in our institute under the name Vednahari.

Keywords: Carom seeds, Camphor, Menthol.

I. INTRODUCTION

Pain, whether acute or chronic, is one of the most common health issues affecting people of all ages (Stretanski et al., 2025) ⁽¹⁾. 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 ^(2,3). As a result, there is growing interest in natural and herbal alternatives that can provide effective pain relief with fewer side effects ⁽³⁾.

The common cold is one of the most frequent illnesses affecting both adults and children ^(4,5). It is an upper respiratory tract infection caused by certain viruses and is transmitted through virus-infected droplets or direct contact with infected secretions ⁽⁵⁾. Symptoms of the common cold include cough, sore throat, sneezing, and nasal congestion, which may appear as a runny or blocked nose ^(5,6). Pain, a disturbing sensation often caused by intense stimuli, usually manifests during a cold as a headache and backache ⁽⁷⁾.

Management of the common cold and its associated symptoms is often achieved through over-the-counter (OTC) medications such as topical preparations or tablets, as it is a self-limiting condition ^(8,9). Studies on consumer behavior in OTC product selection show that the most frequently purchased OTC medications are for pain relief, allergies, and cough/cold symptoms ⁽⁹⁾. Topical pain relief formulations are commonly available as creams, ointments, or gels, and many of them contain Ayurvedic components ⁽¹⁰⁾.

Statistics indicate that Ayurvedic products are gaining popularity, and among these, approximately 25% of sales come from OTC products ^(11,12).

Vednahari is an Ayurvedic formulation made from powerful essential oils that provide quick relief from headaches, backaches, colds, and general pain ^(9,10). The Vednahari composition, consisting of organic essential oils, organic beeswax, and other desired herbal ingredients, is medicated using menthol crystals (pudina phool), thymol crystals (ajwain phool), and edible camphor (desi Kapoor) ^(13,14).

Ideal properties of vednahari:

- Easily absorbs into the skin.
- All skin types can safely and gently use it.
- It smells nice and calming.

- Remains potent and fresh for an extended period.
- Easy to apply and non-greasy
- Offers a chilly or warm feeling for additional comfort
- Composed of natural, chemical-free ingredients
- Reasonably priced and made from readily accessible herbs

Advantages of vednahari:

- Provides natural relief from pain and inflammation
- Has fewer side effects compared to chemical-based painkillers
- Contains thymol, which helps fight bacteria and reduce swelling
- Effective for various types of pain such as joint pain, muscle pain, 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 onto the affected area
- Helps relax the body and reduce stress
- from harmful chemicals and synthetic preservatives
- Eco-friendly and promotes traditional Ayurvedic healing practices

A) Carom seeds⁽¹⁸⁾:

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

Roles:

- Anti-inflammatory
- Analgesic
- Digestive aid
- Antioxidative



Fig 1. Carom Seeds (Ajwain)

Thymol, which has antibacterial, antifungal, and anti-inflammatory qualities, is found in carom seeds (27, 28, 29). Because of this, they can be used to treat mild aches, respiratory infections, and digestive problems (30, 31, 32). Additionally, they promote digestion by stimulating the intestines and stomach (33, 34, 35). For thousands of years, Persian traditional medicine has employed carum copticum. It has antidyspnea, antitussive, and bronchodilatory actions (38). It may be used to treat certain eye infections as well as gastrointestinal conditions such as reflux, cramping, stomach tumors, abdominal pain, and *Helicobacter pylori* infections (39). Its seeds are traditionally used to treat acute pharyngitis and the common cold, as well as for carminative, antiseptic, expectorant, antibacterial, antiparasitic, antiplatelet-aggregatory, and antilithiasis properties (39).

The plant also shows abortifacient, galactogogic, and diuretic activities, and emerging evidence indicates potential anticarcinogenic properties. However, studies have also reported foetotoxicity and abortion potential alongside its galactogogue effects⁽³⁹⁾.

Uses:

- Stimulates digestive juices
- Reduces gas and bloating
- Anti-inflammatory
- Supports oral health
- Boosts immunity
- Helps manage cholesterol and blood sugar
- May aid in preventing kidney stones

B) Camphor

- **Scientific name:** *Cinnamomum camphora*
- **Family:** Lauraceae
- **Native place:** China, Taiwan, Vietnam, and Japan
- **Common name:** Camphor Tree, Camphorwood
- **Chemical constituents:** Camphor, camphene, cineole, safrole, and eugenol

Roles:

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



Fig 2. Camphor

Camphor is derived from the wood of the camphor laurel and other related trees in the laurel family. It is a bicyclic monoterpenoid and appears as a white crystalline substance with a strong odor and pungent taste^(40,43) Camphor is waxy and flammable, obtained through steam distillation, purification, and sublimation of the wood, twigs, and bark of the tree^(43,45).

Camphor has a distinct smell and is believed to stimulate nerves, helping to relieve symptoms such as pain and itching^(44,48). When inhaled, it can create a cooling sensation in the nose, making breathing feel easier.⁽⁴⁴⁾ Camphor is commonly used for coughs, pain, and itching, and is also applied for insect bites, acne, and various other conditions^(44,50).

Camphor tree (*Cinnamomum camphora*) is highly valued in Asia for its economic, medicinal, and cultural significance. Large-scale cultivation exists in China and Korea, where it is recognized as a cultural and natural heritage, such as its designation as a natural monument in Jeju, Korea^(42,47). The species faces pressure due to overuse, and its numbers are declining, making the preservation of genetic diversity critical for its long-term survival^(42,47).

Camphor trees have been used for thousands of years in diverse applications, including industry, cosmetics, pesticides,^(40,42,45) pharmaceuticals, timber, and ornamental and cultural purposes. Various parts of the tree, such as leaves, stems, and fruits, are used to produce essential oils and extracts with anti-inflammatory, antifungal, and analgesic properties.^(41,44,50) These oils have historically been applied to treat conditions such as toothache, circulatory and respiratory spasms, muscle pain, inflammation, and rheumatism, and they are also used in perfumes, creams, and balsamic ointments in the cosmetics industry.^(44,50)

Advances in modern pharmaceutical technologies have enabled the extraction, separation, and purification of bioactive components from essential oils of camphor, which are mainly obtained by distillation.^(42,45) Compared to synthetic chemicals, essential oils from *C. camphora* are considered safer alternatives for human health, food safety, and nutrition,

while also exhibiting significant antimicrobial activity.^(43,46,54) The increasing interest in natural plant-based products has further revived attention to camphor essential oils as potential alternative medicines.^(42,48,51) A review of publications from 2000 to 2021 highlights the continued research on camphor's pharmacological properties, traditional uses, and modern applications.^(40,42,44,51)

Uses:

- Topical analgesic
- Antiseptic
- Muscle relaxant
- Anti- inflammatory
- Contraceptive
- Cough suppressant

C) Menthol

- **Scientific name:** *Mentha arvensis*, *Mentha spicata*, *Mentha piperita*
- **Family:** Lamiaceae
- **Native place:** India, China, Japan, Brazil, USA
- **Common name:** Menthol (from peppermint, spearmint, and wild mint)
- **Chemical constituents:** Menthone, Isomenthone, Neomenthol, Menthyl acetate

Roles:

- Provides pain relief
- Offers respiratory relief
- Reduces itching (anti-itch)
- Acts as a muscle relaxant



Fig 3. Menthol

Menthol interacts with TRPM8 receptors, producing a cooling sensation that helps reduce pain perception.⁽⁵¹⁾ It also induces local vasodilation, which improves blood flow to the affected area.⁽⁵²⁾ The presence of menthol and menthone contributes to its pain-relieving and muscle-relaxing properties.⁽⁵³⁾ Additionally, menthol modulates nociceptors in the skin, helping to inhibit pain signals and provide effective topical relief.⁽⁵⁴⁾

Chronic pain affects more than 30% of people worldwide (Cohen et al., 2021), imposing enormous personal and financial burdens.⁽⁵⁵⁾ Concerns about the adverse effects, drug interactions, and potential for abuse of conventional analgesics have driven the search for alternative methods to manage pain safely and effectively.⁽⁵⁵⁾ Despite the availability of various therapies, inadequate understanding of the underlying pathophysiological mechanisms remains a key reason for the limited success in achieving sufficient pain relief.⁽⁵⁶⁾

Menthol has been used for pain relief since ancient times, first described by Hippocrates (Sprengell, 1708) and Galen (Siegel, 1970). Hippocrates considered mint a cooling agent for peripheral pain, while Galen expanded its therapeutic use. This historical association led to topical analgesics containing menthol being named "Menthol Galen-Pharma."⁽⁵⁷⁾ Menthol is a cyclic monoterpene alcohol derived primarily from aromatic plants. It is a natural compound with three asymmetric carbon atoms, resulting in four pairs of optical isomers: (+)- and (-)-isomenthol, (+)- and (-)-menthol, (+)- and (-)-neomenthol, and (+)- and (-)-neoisomenthol. The principal naturally occurring form is (-)-menthol (L-menthol),

which is the main source of natural supply. Notably, the Nobel Prize in Chemistry was awarded to Ryoji Noyori in 2001 for his work on asymmetric catalysis for menthol synthesis (Kamatou et al., 2013).⁽⁵⁸⁾

Menthol is one of the most widely used flavoring agents, alongside vanilla and citrus (Kamatou et al., 2013), and serves as a cooling or flavor-enhancing ingredient in medicines, cosmetics, insecticides, confectionery, chewing gum, liqueurs, toothpaste, shampoos, and soaps (Patel et al., 2007; Kolassa, 2013).⁽⁵⁹⁾ Menthol produces unique, multiple, and paradoxical sensory effects when applied topically to the skin or mucous membranes: low doses produce a cooling sensation, whereas higher doses can induce burning, irritation, and pain (Wei and Seid, 1983; Wasner et al., 2004; Namer et al., 2005; Proudfoot et al., 2006).⁽⁵⁹⁾ In clinical practice, over-the-counter topical products for pain relief contain menthol at concentrations ranging from 5–16% (320–1024 mM) (Oz et al., 2017).⁽⁵⁹⁾

Several in vitro and in vivo studies have highlighted menthol's diverse biological properties, including analgesic, antibacterial, antifungal, anesthetic, and osmotic-enhancing effects, as well as chemoprophylactic and immunomodulatory activities (Kamatou et al., 2013).⁽⁵⁹⁾ These physiological effects appear to depend on menthol's interactions with various receptors throughout the body. Menthol has been proposed to:

- Sensitize **transient receptor potential cation channel subfamily M member 8 (TRPM8)** and **transient receptor potential cation channel subfamily V member 3 (TRPV3)**,
- Desensitize **transient receptor potential cation channel subfamily A member 1 (TRPA1)** and **transient receptor potential cation channel subfamily V member 1 (TRPV1)**,
- Stimulate **kappa-opioid systems**, and
- Enhance **central glutamate-dependent gate control mechanisms** (Green and McAuliffe, 2000; Macpherson et al., 2006; Proudfoot et al., 2006; Zanutto et al., 2008).⁽⁵⁹⁾

This complex and unique profile underpins menthol's potential as a promising agent in pain research. This review summarizes current preclinical findings and clinical evidence regarding menthol in analgesic research.

Uses:

- Cooling Sensation
- Decongestant
- Flavoring Agent
- Oral Hygiene
- Itch Relief

III. METHODS OF PREPARATION

1. Collection of Plant Material

Camphor: leaves, stems, wood
Menthol: mint leaves
Ajwain: seeds

2. Washing and Cleaning

Remove dust, dirt, and foreign material

3. Size Reduction

Chop, crush, or grind plant material to increase surface area

4. Loading into Distillation Apparatus

Place plant material in a **steam distillation** or **hydrodistillation** unit

5. Distillation Process

Heat water to generate steam
Steam passes through plant material, vaporizing essential oils
Condensation of steam and oils in a condenser

6. Collection of Distillate

Distillate separates into two layers:
Oil (floating layer)
Hydrosol (water layer)

7. Separation of Oil

Use a separator funnel or decanting to collect essential oil

8. Drying the Oil

Remove residual water using anhydrous sodium sulphate or other drying agents.

9. Storage

Store in dark glass bottles, away from light and heat ^(60,61,62).

IV. RESULT AND DISCUSSION

Evaluation Parameters:

The preparation was assessed for various pharmaceutical parameters.

1. Physical Assessment:

Organoleptic evaluation was performed to assess the colour, odour, and appearance of the processed oil. The colour was checked visually to match the anticipated natural pigmentation. The odour was typical of herbal oils, faintly pungent due to components like mustard. The appearance was a clear, viscous oily liquid with an even texture and free from suspended particles.

2. Spreadability

The ease with which the oil spreads on the skin was assessed using a simple glass slide method. Spreadability was calculated using the formula:

Spreadability (g\dot{cm}/s) = Weight applied × Distance moved / Time take

3. Determination of pH:

The pH of the oil was measured using a digital pH meter to ensure skin compatibility. The optimal pH for topical application is between 5.5 and 7.0.

4. Viscosity:

Viscosity was determined using a Brookfield viscometer or flow time method, which is essential to ensure ease of application and consistent spreading.

5. Specific Gravity:

The density of the oil was checked using a pycnometer to compare it with water, ensuring batch-to-batch uniformity.

6. Acid Value:

The acid value indicates the concentration of free fatty acids, affecting the oil's stability. A low acid value reflects good storage stability and quality.

7. Stability Study:

The oil was tested under accelerated conditions (temperature, light, humidity) for 30–90 days. Changes in odour, colour, consistency, and phase separation were monitored periodically.

8. Irritation Test:

Cutaneous sensitivity or allergic response was assessed on human volunteers or animals. A small amount of oil was applied to the forearm or behind the ear, and the area was observed for redness, itching, or rashes within 24 hours.

Observation Table:

Sr.no	Parameter	Result	Standard/Observation
1	Colour	Pale yellow to whitish	Natural appearance
2	Odour	Characteristics	Acceptable
3	PH	5.2	Ideal 4.5 to 5.5
4	Viscosity	120Cp	Ostwald Viscometer
5	Spreadability	5.5cm in 1 min	Good spreadability
6	Skin irritation test	No irritation	Safe for topical use
8	Thermal stability	Stable up to 40 C	No phase separation

V. CONCLUSION

Vednahari Pain Relief Oil is a natural, safe, and effective alternative to synthetic pain medications. Its blend of ingredients, including camphor, ajwain (ajwain) phool, and menthol, offers a potent analgesic effect, while maintaining

favourable stability and skin safety profiles. The oil is easy to apply, spreads well, and can be washed off conveniently, making it user-friendly. With its potential to relieve various types of pain and inflammation, this herbal formulation presents a valuable option for natural pain management.

Future scope

The future prospects of herbal pain relief products are highly promising due to the growing global interest in natural and sustainable healthcare solutions. As people become more aware of the side effects associated with synthetic painkillers, the demand for herbal alternatives is increasing. Research and development in herbal formulations—such as those using ingredients like camphor, menthol, and carom seeds—can lead to more effective, fast-absorbing, and targeted pain relief oils. Advancements in extraction techniques, standardization, and clinical testing will further improve the quality, safety, and consistency of these products. Additionally, the integration of herbal medicine with modern pharmacology could result in innovative formulations that combine traditional knowledge with scientific validation. In the future, herbal pain relief oils are expected to play a significant role in complementary and alternative medicine, offering safe, eco-friendly, and affordable options for pain management.

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