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Research Article

Development and Assessment of a Natural Pain-Relieving Balm Using Essential Oils

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ABSTRACT

There has been an increasing focus on development of new routes of drug administration to provide tailored treatments for patients, without decreasing efficacy of analgesia, in proportion to the progression of the knowledge of pain mechanisms. While acute pain acts as an alarm, chronic pain is a syndrome requiring meticulous selection of analgesic drugs of high bioavailability for long-term use. Such criteria are challenges that topical medications aim to overcome, allowing progressive delivery of active component, maintaining stable plasma levels, with a good safety profile. This review presents recent findings regarding topical formulations of the most widely used drugs for pain treatment; Disclosed herein is a herbal balm composition and the method of preparing said composition. The composition comprising extracts of organically certified herbs, organic essential oils and organic beeswax, wherein the extract is prepared employing a super critical fluid extraction (SCFE) and where in the essential oils used herein is obtained by cold pressed method. The oils used in it is used as a pain killer.

INTRODUCTION

An herbal balm, known for its Ayurvedic blend of potent essential oils, offers rapid relief from back pain and headaches. It also alleviates general discomfort and symptoms of colds. The balm consists of beeswax and organic essential oils, alongside additional botanical ingredients. These medicinal elements are applied externally to the skin. When used topically, balms help diminish stiffness and alleviate pain. One of the counterirritants found in these topical treatments is methyl salicylate. Petroleum jelly is often used as a base in balms. Pain is an uncomfortable feeling stemming from harmful or forceful stimuli, such as tripping over an object. Experiences like burning a finger, cutting oneself with alcohol, or hitting one's "funny bone" can all result in pain.

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The International Association for the Study of Pain offers a precise definition, describing pain as unpleasant emotional and sensory experiences related to potential or actual bodily harm. Pain serves as a deterrent against injury, protecting affected body parts during the healing process and preventing future occurrences. Most pain subsides quickly once the cause is addressed and the body recovers, though discomfort may linger at times, and pain can also occur without any obvious injury or illness.[1] The pain balm works by inducing irritation at the application site, thus alleviating the sensation of pain without addressing its cause. This is referred to as the counter-irritancy principle. Commonly, a balm is a semi-solid formulation designed for external use, typically containing medicinal properties. Pain balm is an example of a formulation aimed at relieving mild to moderate pain. Tension headaches affect up to 78% of people, making them very common and regrettably some of the most overlooked and difficult to treat conditions[2]. Menthol, a naturally occurring substance derived from plants, is recognized for its cooling properties. It is a frequent component in pain treatments for sports injuries, arthritis, and other painful conditions. Camphor, which comes from the wood of the Cinnamomum amphora tree, has been used for a long time as an antiseptic, analgesic, antipyretic, counterirritant, and rubefacient. In recent years, the significance of administering medications through the skin for therapeutic effects has increased.[3]

Objective: [4]

1. To encourage relaxation and reduce tension.
2. As a remedy for the common cold.
3. Lessen discomfort and inflammation.
4. Reduce mild joint or muscular discomfort.
5. To lessen inflammation in the muscles.

ADVANTAGES:

- Offers prompt pain and inflammation relief.
- Easy to apply directly to the area that is impacted.
- Targets particular pain points.
- A substitute for oral painkillers.
- Easy to use and transport. Few systemic adverse effects.

DISADVANTAGES:

1) May result in allergic reactions, skin inflammation, or redness.
2) It might not offer comprehensive or long-lasting pain relief.
3) It might only offer short-term respite, necessitating repeated use.
4) May exacerbate specific illnesses or interfere with other drugs.
5) Not appropriate for every location.
6) Brief respite.

MATERIAL AND METHODS

For the preparation of the pain relief balm, we selected wintergreen oil sourced from Vedaoils.com. This oil was chosen due to its natural analgesic (pain-relieving) properties, making it an effective active ingredient for our formulation. Additionally, the product is 100% pure, safe for topical use, and is accompanied by a Certificate of Analysis (COA), ensuring its quality and authenticity. These factors contributed to our decision to prefer and utilize this particular source of wintergreen oil in our formulation. In order to guarantee the availability of premium and verified materials for the preparation, the majority of the ingredients needed for the formulation came from the college laboratory. Among these were beeswax, methyl salicylate, petroleum jelly, menthol, coconut oil, and sodium benzoate. All of these components met the required laboratory standards and were easily available inside the institutional structure. However, the laboratory

stock did not contain two particular components: camphor and Nirgundi oil. Therefore, to guarantee authenticity and respect to traditional medicinal norms, these were purchased from a licensed local Ayurvedic store.

Material Plant Profile:

Figure No: 1 Wintergreen Oil

Scientific Name: Gaultheria procumbens
Kingdom: Vegetabilia
Order: Ericales
Family: Ericaceae
Sub-Family: Vaccinioibeae
Genus: Gaultheria
Species: Gaultheria procumbens L[5]

Description:

Gaultheria procumbens : plantae : Ericales : Ericaceae : Vaccinioideae : Gaultheria : G.procumbens Wintergreen oil is an essential oil traditionally derived from the leaves of the wintergreen plant. Wintergreen oil is the term used in various goods to refer to the chemically synthesised active ingredient, methyl salicylate. Wintergreen oil has been utilised for several health issues over the years, such as tooth decay, inflammation, and aches and pains. Currently, anecdotal data supports many of wintergreen oil's health advantages. To evaluate this essential oil's health benefits, more research is required. Gaultheria procumbens leaves are the source of wintergreen oil, a sweet, minty, and fragrant essential oil that has been utilised for ages in aromatherapy and traditional medicine. Native to North America, wintergreen is a low-growing, shrub-like plant that thrives in moist, woodland environments. The leaves of the plant contain a high concentration of methyl salicylate, a compound similar to aspirin, which gives wintergreen oil its distinctive aroma and therapeutic properties.[6]

Uses:

1.Pain Relief Wintergreen oil contains methyl salicylate, a compound similar to aspirin, which makes it an effective natural pain reliever. It can be used to:

- Relieve muscle and joint pain
- Reduce arthritis pain and inflammation
- Soothe headaches and migraines
- Ease menstrual cramps

2.Aromatherapy Wintergreen oil's sweet, minty aroma makes it a popular choice for aromatherapy. It can: -

- Reduce stress and anxiety
- Promote relaxation and calmness
- Improve mood and reduce symptoms of depression
- Enhance focus and concentration

3.Anti-Inflammatory Wintergreen oil's anti-inflammatory properties can help reduce inflammation and promote healing in the body. It can: - Reduce inflammation and pain in muscles and joints - Help reduce inflammation and promote healing in wounds - Soothe and calm skin irritations and inflammation

4.Antimicrobial Wintergreen oil's antimicrobial properties can help prevent the growth of microorganisms. It can:

- Help prevent the growth of bacteria and fungi
- Reduce the risk of infection
- Soothe and calm skin irritations and inflammation. [7,8,9,10]

Description Of Formulation Of Herbal Pain

Three trial batches—Batch A, Batch B, and Batch C—were formulated with varying proportions of ingredients to evaluate their impact on the overall quality, consistency, and weight of the final herbal pain balm. The goal was to identify a formulation that met all the required parameters such as uniformity, Spreadability, stability, and total target weight. Upon comparative assessment, Batch B was found to be the most suitable among the three. It exhibited ideal characteristics including a smooth and homogenous texture, ease of application, and excellent physical stability under normal storage conditions. Additionally, Batch B accurately achieved the target formulation weight of 100 g, making it the most appropriate choice for standardization and further evaluation. Thus, Batch B was selected as the final optimized formulation for the herbal pain balm and used for subsequent studies involving stability, efficacy, and performance evaluation.

Table No.1: Materials Used in Formulation Of Herbal Pain

Sr. No	Ingredients	Quantity (Batch A)	Quantity (Batch B)	Quantity (Batch C)	Uses
1	Coconut oil	45ml	50ml	57ml	Solvent
2	Wintergreen oil	7ml	10 ml	13ml	Pain reliever
3	Nirgili oil	6ml	11ml	11ml	Relieves arthritic pain
4	Petroleum jelly	4gm	5gm	7gm	Relieves dry skin, healing
5	Menthol	3gm	5gm	8gm	Counter irritant
6	Camphor	4gm	5gm	6gm	Relives cough
7	Methyl salicylate	2gm	5gm	7gm	Analgesic, skin absorbent
8	Sodium benzoate	2gm	5gm	7gm	Preservative
9	Bees wax	3gm	5gm	8gm	Relaxant

Balm

Procedure:

Formulation Of Herbal Pain Relief Balm:

1) Weigh out a container, add 5 grammes of petroleum jelly, set the container on a hot plate, and bring it to a boil until the petroleum jelly has completely dissolved. Pour 5 ml of salicylate into a heated plate and bring it to a boil.
2) Weigh out 5 grammes of beeswax, add it to the dissolved petroleum jelly solution, stir, and heat until the beeswax is fully dissolved in the petroleum jelly.
3) Next, weigh out five grammes of menthol crystals, add them to the solution above, and bring it to a boil until the menthol has completely dissolved.

4) Weigh out 10 ml of vitex negundo oil, mix it, and bring it to a boil.
5) Weigh out 10 ml of wintergreen oil, mix it, and bring it to a boil.

6)To ensure that the solution dissolves completely, weigh out 5 grammes of sodium benzoate, add it to the mixture, stir it thoroughly, and bring it to a boil.
7) Remove the solution from the hot plate and let the herbal balm solution to cool when all of the added components have fully dissolved and turned into a liquid. At last, the prepared solution cools and becomes a herbal balm that is semi-solid. [11,12]

Figure No: 2 Herbal pain relief balm

Assessment Of the Prepared Herbal Concolution:

Physical Parameters: The fragrance was detected, and colour and clarity were examined with the unaided eye on a white background.

PH: By completely immersing the glass electrode in the gel system to cover it, the PH of the generated formulation was determined using a digital PH meter. During the measuring procedure, three readings were obtained, and the average of the three was recorded.

Phase Separation: A suitable wide mouth container was used to transport the produced balm. After 24 hours, the separation of the oil phase and aqueous phase was visible, and it was set away for storage.

Viscosity: Using a Brookfield viscometer (Brookfield viscometer RVT) with spindle number 7, the viscosity of the gel was determined.[13]

Spreadability: By sandwiching the sample between two glass slides that had been squeezed to a consistent thickness over a predetermined amount of time, the Spreadability was assessed. Spreadability, which is determined by the formula

$$S=M*\frac{L}{T}$$

was tested by measuring the time needed to separate the two slides. Better Spreadability was demonstrated by the shorter time required to separate the two slides.[14]

Patch Test: Put the product on a tiny patch of skin, such the inside of your arm or the bend of your elbow, where it won't be inadvertently touched or removed. Apply as thickly as you would typically use the product, using a quarter-sized amount. For as long as it would typically remain on the skin, leave it on. Leave the product on for at least five minutes or as instructed if you're testing anything you typically wash off, like a cleanser. For seven to ten days, repeat the test twice daily.[15]

Accelerated Stability Studies: The prepared herbal balm formulation was subjected to three months of accelerated stability testing at 50°C ± 1°C and one week at room temperature. The following parameters were monitored on the 0th, 15th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, and 90th days while the herbal balm formulation was maintained at room temperature and at a higher temperature.

RESULTS AND DISCUSSION

The physicochemical parameters of the prepared balm were determined parameters such as colour, odour, appearance and PH were tested. The formulations exhibited good in appearance characteristic as well as PH was found in the range 7.0 which is the desired PH of the skin.

RESULT:

Table No .2: Results of Evolution Test's

Parameter	Result
Colour	Cream White
Odour	Characteristics
Appearance	Pain balm
Texture	Smooth
PH	6.3
Phase separation	No phase separation
Consistency	Smooth
Spreadability	7.3gm cm/sec
Solubility	Soluble in boiling water
Non-irritancy	No irritation
Washability	Easily washable

CONCLUSION

Transparent ingredients utilised in the formulation of the herbal balm, which was made utilising the Hot Processing Technique, were found to be particle-free and to have high compatibility without undergoing any notable modifications. Extracts from eucalyptus and vitex negundo leaves are used to treat high fevers, ease menstrual cramps, and relieve arthritis by reducing discomfort. The developed compound exhibits favourable physical properties. PH, Extrudability, Spreadability, Viscosity, Patch test, and other assessment parameters are further assessed, and the results are favourable. According to the study, it is possible to formulate herbal ingredients into a balm with superior pain-relieving properties by employing the Hot Processing Technique.

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