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Development, Formulation, And Evaluation Of Natural Miracle Balm

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ABSTRACT

The research initiative titled "Development, Formulation, and Evaluation of Natural Miracle Balm" explores the formulation of an innovative topical product that leverages the therapeutic properties of natural ingredients. This investigation seeks to create a multifunctional balm that is not only safe and effective but also environmentally sustainable, catering to the increasing consumer demand for natural skincare solutions.

With advancements in our understanding of pain mechanisms, there has been a notable transition towards the development of novel drug delivery methods that provide tailored treatments while maintaining analgesic effectiveness. Acute pain functions as a warning signal, whereas chronic pain presents a multifaceted challenge that necessitates the careful selection of highly bioavailable analgesic medications for prolonged use. Topical therapies are designed to meet these challenges by facilitating the gradual release of active compounds, ensuring stable plasma concentrations, and providing a favorable safety profile. This review emphasizes recent findings related to topical formulations for pain management.

The study presents a formulation for an herbal balm along with its preparation methodology. This formulation includes extracts from organically certified herbs, organic essential oils, and organic beeswax. The extraction process employs hydro distillation and solvent extraction techniques. The essential oils incorporated in the formulation act as analgesics.

Keywords: natural pain relief balm, Vitex Negundo oil, ginger essential oil.

INTRODUCTION

Herbal balm, an Ayurvedic concoction of potent essential oils, offers swift relief from headaches, backaches, colds, and general pain. This topical medicinal preparation for human skin comprises organic essential oils, beeswax, and other desired herbal ingredients. Balms are applied to the skin to alleviate pain and stiffness, often containing counter-irritant compounds like methyl salicylate. Petroleum jelly typically serves as the base for various balms.

Pain is an unpleasant sensation frequently triggered by intense or harmful stimuli, such as stubbing a toe, burning a finger, applying alcohol to a wound, or hitting a funny bone. The International Association for the Study of Pain defines it as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." Pain prompts individuals to avoid harmful situations, protect injured body parts during healing, and prevent similar experiences in the future. While most pain subsides once the stimulus is removed and the body heals, sometimes it persists despite apparent recovery or occurs without any detectable cause.

Pain balms function on the principle of counter-irritancy, which suppresses pain perception by creating irritation that overshadows the original pain. These semi-solid compositions are designed for external use and contain medication to alleviate mild to moderate pain. Tension headaches, affecting up to 78% of the population, are among the most neglected and challenging types to manage.
Plant-derived menthol, a naturally occurring substance with cooling properties, is commonly used in pain treatment for sports injuries, arthritis, and other uncomfortable conditions. Menthol is utilized in numerous formulations. Camphor, a natural compound extracted from the Cinnamomum Camphora tree, possesses analgesic, antipruritic, counterirritant, and rubefacient properties. It is highly volatile and readily absorbed through the skin.

Menthol, slightly soluble in water but highly soluble in ether, alcohol, chloroform, and hexane, is an alcohol found in mint oils. It has a white crystalline structure, refreshing scent, and cooling qualities similar to peppermint. With a chemical formula of C10H20O and a molecular weight of 156.37g/mol, menthol is a common ingredient in topical pain relievers due to its anti-irritant and local anesthetic properties. When applied to the skin, menthol is well-known for its cooling sensation.

The need for topical drug applications to achieve therapeutic effects has recently increased. This method of administration has gained popularity due to its effectiveness in delivering medication directly to the affected area.

Mechanism of Pain Relief Balm:

Pain relief balms function as counter-irritants rather than directly alleviating pain. They suppress discomfort by irritating the application site. These balms typically contain three main components: methyl salicylate, menthol, and camphor, which are readily absorbed through the skin. This combination is effective for headaches and rheumatic pains. Additional ingredients may include ginger essential oil, petroleum jelly, Negundo oil, and beeswax.

Common Misconceptions about Pain and Its Treatment:

There is no definitive cure for pain. To eliminate pain, the underlying cause must be surgically removed from the body, which is often impractical or impossible. Pain occurs due to agitated, inflamed nerves at the site of injury or disease. Effective pain relief methods vary among individuals. To achieve pain relief and control, one must identify the appropriate product, methodology, or treatment that significantly reduces their painful condition.

Pain balms provide comfort and soothing effects, inherently offering relief. In physical terms, a balm is a semi-solid preparation applied externally to remedy or soothe irritation. It can also refer to various aromatic resinous substances used in healing preparations. When pain relief balms are applied with pressure and movement, they generate excessive sensory input that blocks pain sensations.

MATERIAL AND METHOD

Table 1 material data

DRUGS	SYNONYM	BIOLOGICAL SOURCE	FAMILY	CHEMICAL CONSTITUENTS	PHARMACEUTICAL USES
1. OLIVE OIL 	Sweet oil, Olea Europaea Oil, and Oleum Olivae.	Olive oil is a fixed oil obtained by expression of the ripe fruits of Olea Europaea Linn. Or Indian olive	Oleaceae	Olive oil contains mixed glycerides of oleic acid (56–85%), palmitic (7–20%), linoleic (3–20%), stearic (1–5%), arachidic (0.9%)	Olive oil is used in the manufacture of pharmaceutical preparations, soaps, textile lubricants, sulfonated oils, and liniments.
2. GINGER ESSENTIAL OIL 	African ginger, Amomum zingiber, Ardraka, Black ginger	Ginger oil is extracted from the ginger rhizome after a distillation process.	Zingiberac -Eae family	Zingiberene: A major component of ginger oil, with concentrations ranging from 19.71% to 37.1%	1. Offer pain relief 2. Ginger oil contains a component called zingiberene, which has been found to have significant pain-relieving properties.
3. NEGUNDO OIL 	Karinochi Nirgudi Simali, Nirgundi	• The biological source of Vitex negundo oil is the leaves and seeds of the Vitex negundo plant.	Lamiaceae	Triterpenes, diterpenes, sesquiterpenes, caryophyllene	ARTHRITIS; The head leaf is used for managing rheumatoid arthritis-related pain and sprains. The oil prepared from the leaves can also be used to cure arthritis.
4. METHYL SALICYLATE 					Pain Relief Methyl salicylate is widely used as a topical analgesic. It penetrates the skin and provides relief from muscle pain, and joint pain.

5. SODIUM BENZOATE 					• Sodium benzoate is commonly used in herbal balms as a preservative to enhance their shelf life and maintain product stability.
6. MENTHOL 	Peppermint camphor.	**:** It is the oil obtained by the distillation of Mentha piperita, belonging to the family Labiatae.	Lamiaceae**.**	Menthone, moment Hone, and methyl acetate, with trace amounts of pulegone, contribute to its aroma, and flavor.	Cooling and soothing in topical products for pain relief, itching, and muscle soreness. Flavoring: in food, beverages, and candies for its minty taste.
7.CAMPHOR 	Gum Camphor, Japan Camphor.Alc anfor	Camphor is a solid ketone, obtained from the volatile oil of Cinnamomum camphora (L.) Nees et Eber, belonging to the family Lauraceae.	Lauraceae.	Camphor oil contains camphor, cineole, pinene, camphene, phellandrene, limonene, and diterpenes.	Camphor is used externally as a rubefacient, and counterirritant and internally as a stimulant, carminative and antiseptic.
8. BEESWAX 	White beeswax, yellow beeswax, cera alba, and cera flava.	Beeswax comes from the glands of worker bees in the beehive Source: Worker bees, aged 12–18 days, have eight wax glands on the underside of their abdomen.	Apidae	Are alkenes, alkanes, free fatty acids, monoesters, diesters, and hydroxy monoesters	Thickening Agent: Beeswax provides a stable, firm consistency to balms, making them easy to apply without being too runny or messy.

METHODOLOGY FOR EXTRACTING OILS

Necessary Items: For extracting Vitex Negundo essential oil
[1] Vitex Negundo leaves (fresh or dried)
[2] Purified water
[3] Clevenger-type hydro distillation equipment
[4] Heat source (mantle)
[5] Funnel for separation
[6] Sodium sulfate (anhydrous) for oil dehydration

Method:
Plant Material Preparation:
[i] Gather Vitex Negundo leaves (fresh or dried).
[ii] Clean thoroughly to eliminate dirt and impurities.
[iii] Allow to air-dry for moisture reduction.
[iv] Grind or cut leaves to enhance extraction surface area.

Hydro distillation Technique:
[i] Insert prepared leaves into the distillation vessel.
[ii] Add adequate purified water.
[iii] Apply heat using a mantle until boiling commences.
[iv] Allow vapor-carrying essential oil to pass through and condense in the apparatus.
[v] Observe the essential oil layer forming atop the collected liquid.

Extraction and Refinement:
[i] Employ a separation funnel to isolate the oil from the water layer.
[ii] Use anhydrous sodium sulfate to remove residual moisture from the oil.
[iii] Store the refined Vitex Negundo essential oil in a dark glass container in a cool environment.

Necessary Items: For extracting Ginger essential oil
[1] Ginger rhizomes (fresh or dried)
[2] Organic solvent (such as ethanol, hexane, or methanol)
[3] Soxhlet extraction apparatus
[4] Rotary evaporation device
[5] Filtration equipment
[6] Anhydrous sodium sulphate

Method:
Ginger Preparation:
[i] Thoroughly wash ginger rhizomes to remove debris.
[ii] Cut or pulverize into smaller pieces.
[iii] Allow to air-dry to decrease moisture levels.

Extraction Using Solvent:
[i] Insert dried ginger powder into a Soxhlet extractor.
[ii] Pour an appropriate solvent (e.g., ethanol or hexane) into the device.
[iii] Warm the solvent to its boiling point, enabling it to circulate through the ginger material multiple times.
[iv] Continue the extraction process for several hours until the solvent exhibits a yellowish hue, indicating essential oil presence.

Solvent Elimination and Refinement:
[i] Employ a rotary evaporator to remove the solvent under low pressure, resulting in concentrated ginger essential oil.
[ii] Dehydrate the extracted oil using anhydrous sodium sulfate.
[iii] Strain and store in a dark glass container at a cool temperature to avoid deterioration.

PROCEDURE FOR HERBAL BALM PREPARATION

Instructions:
1. Liquefy Beeswax and Coconut Oil
Use a double boiler to heat and completely melt the beeswax and coconut oil.
2. Introduce Menthol and Camphor
After melting, add menthol and camphor, stirring continuously until they dissolve.
3. Blend in Methyl Salicylate and Negundo Oil
Take the mixture off the heat and mix in methyl salicylate and Negundo oil.
4. Integrate Sodium Benzoate
Dissolve sodium benzoate in a small quantity of warmed coconut oil before adding it.
5. Fill Containers
Transfer the liquid blend into clean balm containers and let it cool and harden.

Table 2 materials used in the formulation of herbal pain balm

INGREDIENT	PERCENTAGE (%)	WEIGHT	VOLUME
COCONUT OIL	40%	12g	13.5ml
BEESWAX	20%	6g	6.5ml
METHYL SALICYLATE	10%	3g	2.3ml
MENTHOL	6.67%	2g	solid
CAMPHOR	6.67%	2g	solid
NEGUNDO OIL	10%	3g	3.3ml
SODIUM BENZOATE	0.5%	0.15g	solid
GINGER ESSENTIAL OIL	1.67%	0.5g(10 drops)	0.55ml

EVALUATION OF PREPARED HERBAL FORMULATION;

PHYSICAL PARAMETERS:

Visual inspection against a white backdrop assessed clarity and color, while Odor was evaluated through olfactory means.

PH:

A digital pH meter was employed to determine the pH of the prepared formulation. The glass electrode was fully submerged in the gel system. Measurements were conducted three times, and the average was recorded.

PHASE SEPARATION:

The prepared balm was placed in a suitable wide-mouthed container for storage. After 24 hours, the separation of oil and aqueous phases was observed.

VISCOSITY:

A Brookfield viscometer (S-62, model LVDV-E) was used to measure the balm's viscosity at 25°C, with the spindle rotating at 12 rpm.

SPREADABILITY:

Two standard-sized glass slides were utilized. The herbal balm was applied to one slide, and the other was placed on top, sandwiching the gel between them. A 100 g weight was placed on the upper slide to create a uniform thin layer of gel. After removing the weight and excess gel, the slides were fixed to a stand, allowing the upper slide to move freely. A 20 g weight was carefully attached to the upper slide. The time taken for the upper slide from the lower slide was recorded. This process was repeated three times, and the average time was used for calculations.

PATCH TEST:

Apply the product to a small, inconspicuous area of skin, such as the inner arm or elbow crease. Use a quarter-sized amount, applying it as thickly as one would during normal use. Leave the product on for the typical duration of use. For wash-off products like cleansers, keep the patch on for 5 minutes or as directed. Repeat the test twice daily for 7-10 days, as reactions may not occur immediately. If skin irritation develops, promptly remove the product and discontinue use. A cool compress or petroleum jelly can be applied to soothe the skin if necessary.

RESULT AND DISCUSSION

1. PHYSICOCHEMICAL EVALUATION

Table 3 ORGANOLEPTIC PROPERTIES

	PARAMETERS	OBSERVATION
1.	COLOR	LIGHT YELLOW TO GOLDEN BROWN
2.	ODOR	MILD HERBAL SCENT WITH HINTS OF ESSENTIAL OILS
3.	TEXTURE	SMOOTH AND NON-GREASY

2. EVALUATION RESULT OF HERBAL PAIN BALM

Table 4

S.NO	PARAMETERS	RESULTS
1.	PH	6.5
2.	SPREADABILITY	7.4g cm/sec
3.	PHASE SEPARATION	NO PHASE SEPARATION
4.	VISCOSITY	39010cps
5.	PATCH TEST	NON -ALLERGIC

DISCUSSION

The research revealed that a specifically designed natural miracle balm containing Vitex Negundo and ginger essential oil offers therapeutic advantages such as anti-inflammatory, antimicrobial, and wound-healing effects. The ideal combination of waxes and oils enhanced its Spreadability, stability, and skin absorption. The formulation was recognized as the top formulation, demonstrating the most positive results regarding consistency, spreadability, and effectiveness. Subsequent research could include clinical trials to further confirm its benefits for the skin.

SUMMARY AND CONCLUSION

Herbal balm was created utilizing the Hot Processing Technique and was found to contain no particulate matter; the transparent components used in the formulation exhibit good compatibility without any notable alterations.

Extracts from Vitex Negundo leaves are employed to ease arthritic discomfort, treat high fevers, and lessen menstrual cramps.

The developed formulation demonstrates favorable physical characteristics.

It was further assessed using various evaluation criteria such as pH, spreadability, viscosity, and patch testing, yielding positive results.

The research concludes that herbal ingredients can be effectively formulated as a balm through the Hot Processing Technique, which possesses excellent pain-relieving properties.

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Summary: This study details the formulation of a herbal pain-relieving balm using ingredients like menthol, beeswax, castor oil, and eucalyptus oil. The preparation method involves heating the mixture to 80°C with stirring to achieve homogeneity.
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