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Formulation And Evaluation Of Herbal Pain Relief Balm

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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.

Key words: Natural pain relief balm, Beate leaf, camphor, Eucalyptus oil.

INTRODUCTION

- ✓ Herbal balm is an ayurvedic formulation of powerful essential oils for quick relief from headache, back ache, cold and in relieving pain.
- ✓ Herbal balm composition comprising organic essential oils, organic bees wax and other desired herbal components has medicated topical preparations for application to skin of human beings. Balms are topical preparations for

application to skin to relieve pain and stiffness. This balm contains counter irritant chemical compounds such as methyl salicylate. Petroleum jelly is the common base for any kind of balms.

- ✓ Pain is an unpleasant feeling often caused by intense or damaging stimuli, such as stubbing a toe, burning a finger, putting alcohol on a cut and bumping the funny bone. The international association for the study of pains widely used definition states, pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.
- ✓ Pain motivates the individual to withdrawn from damaging situations, to protect a damaged body parts while it kills and to avoid similar experiences in future. Most pain resolves promptly hence the pain stimulus is removed and the body has healed, but sometimes pain persists despite removal of stimulus and apparent healing of the body and sometimes pain arrive in the absence of any detectable stimulus, damage or disease.
- ✓ Pain management is a significant concern globally, with millions relying on conventional pharmaceuticals. However, these medications can have adverse effects and addiction potential. Herbal pain relief balms offer a natural, safer alternative.

Table 1.1: Causes Of Pain

Type of pain		causes
Headache		Irritated, inflamed or damaged nerves
Foot pain		Arthritis, a fractured or broken bone, gout, tendinitis, plantar fasciitis
Arthritis pain		Enough damage can result in bone grinding directly on bone
Chronic pain		Ongoing cause of pain such as arthritis or cancer
Muscle pain		Tension, stress, overuse and minor injuries
Neck pain		Poor posture

REVIEW OF LITERATURE

1. **las sahu,etAL 2024** 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

2. **Ghode Shweta P, Chatur Vibhavari M, and Choudhari Pooja (et al. 2019)** Cosmetics have been in high demand since antiquity. These days, attention is focused more on Cosmetics that are derived. Because they are so simple to use, skin care products are just as important as cosmetics. Pain balm is the most popular dermal medication delivery product. It is preferable to utilize formulations to provide a quicker local effect. The primary goal of the current study was to create a pain salve with paracetamol, a medication utilized in the therapy for the alleviation of mild to moderate pain, including headache, toothache, and backache. When taken as directed, paracetamol is thought to be safe. Therefore, the primary goal of the current study was to produce a paracetamol-based pain balm and determine the drug's physical compatibility and stability in the balm formulation before evaluating it using the fundamental key.
3. **Chatur Vibhavari M, Ghode Shweta P, Choudhari Pooja (et al. 2019)** Cosmetics have great demand since ancient time. Now a days, a focus has been shifted more towards derived cosmetic products. Not only cosmetic products, but also to the skin products due to their ease of application. Among all dermal drug delivery products, pain balm formulations are preferably used so as to get the faster local effect. The main aim of the present work was to formulate a pain balm containing paracetamol, a drug used in the treatment for relief of mild to moderate pain such as headache, toothache, backache etc.
4. **Syed Safiullah Ghor, Md Ikram Ahmed (et al. 2015)** Herbal medicine has been used since ancient era for many centuries. In today's life there is need for efficacious therapy for pain and inflammation. In the search for new therapeutic options, novel biomolecules of natural sources are to be investigated. Purpose of this study was to evaluate the analgesic and anti-inflammatory effects of OFCMT (Oily formulation of camphor, menthol and thymol). One of the important and effective parts of herbal plants is essential oil and substances present in different parts of plants. Essential oils are components which are oil soluble that have effective smell and aroma and are separated by use of water and steam distillation and prepared by extraction with solvents and enzymatic hydrolysis.
5. **Md. Ikram Ahmed and Syed Safiullah Ghor (et al. 2015)** Since ancient times, herbal therapy has been used for many ages. Effective pain and inflammation therapy is necessary in today's world. Investigating novel biomolecules from natural sources is necessary in the hunt for new treatment alternatives. The goal of this study was to assess OFCMT's (oily formulation of camphor, menthol, and thymol) analgesic and anti-inflammatory properties. Essential oils and other compounds found in various plant parts are among the most significant and useful components of herbal plants. Essential oils are substances that are soluble in oil and possess a strong aroma. They are extracted using solvents and enzymatic hydrolysis, and they are separated using water and steam distillation. The naturally cooling substance found in peppermint, menthol, is frequently utilized in remedies for arthritis.
6. **Bogdanov, Stefan (et al., 2009).** In ancient Egypt, beeswax was used to create figures and religious artifacts. Stingless-beeswax figurines were common in areas where stingless bees were Produced in Australia and other South American nations 16. An essential component of early seals was beeswax
16. Initially, only pure beeswax was used; resin and color were added later. The first documented tablet made of beeswax in ancient Egypt dates to approximately 1300 BC16. In Europe, writing tablets were still in use well

beyond the Middle Ages. Before paraffin wax was introduced in the 19th century, beeswax and beeswax candles were a profitable industry to produce as exclusive, beeswax is still the most expensive material today

7. **Chitra et al.'s 1994.** study on the anti-inflammatory activity of Piper betle leaf extract, published in the Indian Journal of Pharmacology, is a significant contribution to the field of pharmacology. Although I couldn't find the exact details of the study, related research suggests that Piper betle leaf extract possesses anti-inflammatory properties. Other studies have confirmed the anti-inflammatory activity of Piper betle leaf extract.

1. Coconut oil:



Fig 1.1: Coconat oil

- a. BIOLOGICAL NAME: *Cocos nucifera*
- b. KINGDOM: Plantae
- c. ORDER: Arecales
- d. FAMILY: Arecaceae
- e. SUB-FAMILY: Arecoideae
- f. GENUS: *Cocos* L
- g. SECIES: nucifera

Coconut oil or Copra oil is an edible oil extracted from the kernel or meat of mature coconuts harvested from the coconut palm (*Cocos lucifer*). It has various applications. Because of its high saturated fat content, it is slow to oxidize and thus resistant to rancidification. Coconut oil is one of natures super foods and a truly essential nutrient in any diet or beauty regime. Coconut oil is unique when compared to other oils because it is composed predooming.

2. Eucalyptus Oil



Fig .1.2: Eucalyptus oil

- SCIENTIFIC NAME: eucalyptus globulus labill
- KINGDOM: plantae
- ORDER: myrtales
- FAMILY: myrtaceae
- SUB-FAMILY: myrtales
- GENUS: eucalyptus L her
- SPECIES: eucalyptus oblique L'her

USES;

Augments Skin and Hair; Eucalyptus oil being a powerhouse of antioxidants and volatile oils, diminishes skin inflammation, scalp infections and promotes overall skin and hair health. It is also extremely effective in treating eczema, burns and itching. The high amount of eucalyptol present in the oil decreases sebum production and controls the growth of acne, pimples, zits etc. Mix a few drops of eucalyptus oil with a carrier oil like virgin coconut oil or almond oil and use it as a mask on the face to prevent skin infections and get a clear, glowing complexion. The potent anti-inflammatory and anti-microbial properties also prevent the growth of lice and dandruff on the hair scalp, stimulates blood circulation which in turn prevents hair fall and promotes the growth of new hair.

Relieves pain and inflammation; Owing to the strong analgesic, anti-inflammatory and pain-relieving properties of the active component eucalyptol, this oil is extensively used for providing relief from pain and inflammation in case of arthritis and joint pain. Being a natural vasodilator, it is also used to treat painful muscle spasms, sore muscles as well as neuralgia. Its property to calm and soothe the mind also makes it useful in case of headache and other inflammatory conditions.

To Treat Rheumatoid Arthritis;

Eucalyptus oil infused toothpaste, mouthwashes or dental gels hold high significance in battling the bad bacteria and hence preventing plaque build-up within the oral cavities that may ultimately lead to painful conditions like gingivitis, toothache etc. being rich in eucalyptol and cineole, an antiseptic and a potent bioactive component, the oil also helps in preventing tooth infection and bestows an instant fresh breath. antly of a group of fat molecules.

3.Methyl salicylate



Fig 1.3: Methyl salicylate

- Odor: liquid having the characteristic odor of wintergreen.
- Taste: liquid having the characteristic taste of wintergreen.
- Density: 1.174
- Boiling point: 423° at 760 mm
- Hg Melting point: 16.5° F
- Solubility: less than 1 mg/ml at 66°F

USES

- ❖ Food additives: flavoring agents
- ❖ Industry uses;
 1. Not known or reasonably ascertainable
 2. Odor agents
- ❖ Consumer uses;
 1. cleaning and furnishing care products
 2. not known or reasonably ascertainable
 3. personal care products

1. SODIUM BENZOATE:



Fig 1.4: sodium Benzoate

Sodium benzoate powder is accepted as a preservative by some of the worlds toughest natural product certification. Using sodium benzoate in shampoo and conditioner as a preservative is asafe and effective technique to protect against bacteria and mold forming the bottles.

❖ **TYPE OF INGREDIENT**; preservative

❖ **MAIN BENEFITS**; sodium benzoate is also an effective product stabilizer commonly used in pain.

Sodium benzoate is not a naturally occurring substance. However many foods are natural sources of benzoic acid, its salts, and its esters. Fruits and vegetables can be rich sources, particularly berries such as cranberry and bilberry. Other sources include seafood, such as prawns, and dairy products. Sodium benzoate can act as a food preservative. It is most widely used in acidic foods such as salad dressings (for example acetic acid in vinegar), carbonated drinks (carbonic acid), jams and fruit juices (citric acid), pickles (acetic acid), condiments, and frozen yogurt toppings. It is also used as a preservative in medicines and cosmetics. Under these conditions it is converted into benzoic acid (E210), which is bacteriostatic and fungistatic. Benzoic acid is generally not used directly due to its poor water solubility. Concentration as a food preservative is limited by the FDA in the U.S. to 0.1% by weight. Sodium benzoate is also allowed as an animal food additive at up to 0.1%, per the Association of American Feed Control Officials. Sodium benzoate has been replaced by potassium sorbate in the majority of soft drinks in the United

5 .CAMPHOR :



Fig 1.5: Camphor

Camphor is derived from the wood of camphor laurel and other related trees of laurel family. Camphor is bicyclic mono terpenoid. It is a white crystalline substance with strong odor and pungent test. It is a waxy flammable substance obtained from steam distillation, purification and sublimation of wood, twinges and bark of the tree.

Camphor is produced from alpha-pinene, which is abundant in the oils of coniferous trees and can be distilled from turpentine produced as a side product of chemical pulping. With acetic anhydride as the solvent and with catalysis by a strong acid, alpha-pinene is converted to isononyl acetate. Hydrolysis of this ester gives borneol which can be oxidized to give racemic camphor. By contrast, camphor occurs naturally as D- camphor, the (R)-enantiomer. In the ancient Arab world, camphor was a common perfume ingredient.[32] The Chinese referred to the best camphor as "dragon's brain perfume", due to its "pungent and portentous aroma" and "centuries of uncertainty over its provenance and mode of origin"

Camphor has a very distinct smell. It seems to stimulate nerves and help with symptoms such as pain and itching. In the nose, camphor seems to create a cold sensation so that breathing feels easier. People use camphor for cough, pain, and itching. It is also used for insect bites, acne, and many other conditions, but there is no good scientific evidence to support most of these

Uses;

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

6.Bees Wax:**Fig .2.6: Bees Wax**

Bees wax obtained from the honey comb of the bees *Apis mellifera* and other species of *Apis* belonging to the family *Apidae*. Order *Hymenoptera*. It is also known as yellow wax, *cera alba*. It is yellow to yellowish – brown in color. Insoluble in water and soluble in alcohol, ether, chloroform, carbon etc.

Beeswax is a natural, organic substance that is malleable, chemically soluble, water insoluble, edible and flammable. As a malleable substance it can be molded into different shapes to make a variety of useful and decorative things. Because of its malleability, it's sometimes called "the world's first plastic."

As a soluble substance, it can be melted and mixed with other substances to create many different health & beauty and home care products.

As a water insoluble substance, it can be used to seal joints and water proof surfaces.

As an edible substance, it can be eaten, and while not digestible, it can provide roughage and some beneficial chemicals to the human system.

As a flammable substance, beeswax can be used to make candles that burn cleaner and brighter than paraffin candles.

Uses;

- In preparation of ointments, plasters and polishes.
- Also used in the manufacturing of candles, moulds in dental and electronic industries, cosmetics, lipsticks.
- Is an ingredient of paraffin ointment.

7. Betal Leaf



Fig 1.7: Betal Leaf

- SCIENTIFIC NAME: Piper betle
- KINGDOM : plantae
- ORDER : Piperales
- FAMILY :Piperaceae
- GENUS : Piper
- SPECIES : P.betel

Betel leaf, known scientifically as Piper betle, is a tropical vine that has been used for centuries in traditional medicine, particularly in South Asia. It is often chewed for its stimulant properties, but it also has several medicinal benefits. Some of the notable medicinal properties of betel leaf include

Uses;

Anti-inflammatory Effects: Betel leaf possesses anti-inflammatory properties, which may be beneficial in managing conditions associated with inflammation, such as arthritis.

Wound Healing: Betel leaf extracts have been used in traditional medicine for their potential to promote wound healing and alleviate pain due to its antiseptic and anti-inflammatory properties.

RATIONAL OF THE STUDY:-NEED OF WORK:-

- **Health Benefits**

- 1) Natural pain relief: Herbal balms offer effective pain management without pharmaceuticals.
- 2) Skin health: Soothes irritations, promotes wound healing, and moisturizes dry skin.
- 3) Anti-inflammatory: Reduces inflammation and swelling.
- 4) Antimicrobial: Prevents infections.

● **Market Demand**

- 1) Growing demand: Increasing interest in natural and organic products.
- 2) Holistic wellness: Consumers seek alternative therapies.
- 3) Self-care: Herbal balms cater to the self-care movement.

● **Economic Benefits**

- 1) Job creation: Supports local economies through manufacturing and sales.
- 2) Export opportunities: Global demand for herbal products.
 - Sustainable agriculture: Promotes herbal farming.
 - Research and Development
1. Innovation: Develops novel herbal formulations.
2. Standardization: Ensures quality and consistency.
3. Scientific validation: Supports traditional medicine claims.

● **Environmental Benefits**

1. Eco-friendly: Natural ingredients reduce chemical usage.
2. Sustainable packaging: Opportunities for biodegradable materials.
3. Conservation: Promotes responsible herbal harvesting.

OBJECTIVES:-

1. To study the herbal balm are likely to provide the pain relief for condition that are close to the surface of the skin.
2. To study the present investigation, aim at formulation and evaluation of Herbal pain relief balm using a betel leaf from betel leaf plant and other herbal plants.

PLAN OF WORK:-

The efficiency of Synthetic drug is becoming less popular due to their adverse effects & contraindications. It is well to use indigenous natural medicinal plants which are safe and less expensive also having some or more potency than the established one. Here we will try to find the secret treasure those we can get easily from the plant to make revolution in pharmaceutical field. The drugs with less adverse effects but with high potential to treat disease. Here we will examine the Anti-inflammatory activities and properties of betel leaf. The main aim of the project is to prepare medicated herbal balm for anti-inflammatory activity. Green plant contains a chemical constituent called terpinene which is a bronchodilator used to treat inflammation. Anti-inflammatory properties of betel leaves can help reduce pain and inflammation.

- i. Selection of pure drug;
Betel leaf ,Eucalyptus oil,beex wax,
- ii. Identification tests of drug- 1.stem and hydro distillation.2.extraction of solvent.
- iii. Preparation of reagents-

MATERIALS AND METHODS:

1. Coconut oil
2. Eucalyptus oil
3. Methyl salicylate
4. Sodium benzoate
5. Camphor
6. Beeswax
7. Betel leaf

TABLE NO 2: MATERIAL USE IN FORMULATION OF HERBAL PAIN RELIEF BALM

Sr.No.	INGREDIANTS	QUANTITY	MEDICINAL USES
1.	Coconut oil	50ml.	Solvent
2.	Eucalyptus oil	10ml.	Pain reliver
3.	Petroleum jelly	5gm.	Relive dry skin , healing
4.	Betel leaf	10ml.	Anti-inflamentry
5.	Camphor	5gm.	Relives cough
6.	Methyl salicylate	5gm.	Analgsic , skin absorbent
7.	Sodium benzoate	5gm.	Preservative

Glassware's and instruments

- Measuring cylinder
- Funnel
- Heating mental
- Beaker
- Plate
- test tube
- Stirring rod
- Volumetric flasks
- Burette
- Mortar pastel
- Petri dish

FORMULATION OF HERBAL PAIN RELIEF BALM:

- ❖ Take one container in that weigh and add 5gm of petroleum jelly, place the container in a hot plate and boil it until all the amount of petroleum jelly completely dissolved. Weigh 5ml of methyl salicylate and boil the solution in hot plate.
- ❖ In the dissolved petroleum jelly solution weigh and add 5gm of bees wax, stir it and boil until the beeswax added completely dissolve in the petroleum jelly.
- ❖ After that, weigh and add 5gm of Betal leaf oil to the above solution and boil it until the menthol completely dissolved.
- ❖ Weigh 10ml of eucalyptus oil, stir the solution and boil the solution.
- ❖ Weigh 5gm of sodium benzoate and add it to the solution, stir it well and boil the solution, for complete dissolution of the solution.
- ❖ When all the added ingredients were completely dissolved and turns in to the liquid form then take the solution out of the hot plate and keep the herbal balm solution for cooling. Finally the prepared solution cools down and turns into a semi solid herbal balm.

TABLE NO 3 :FORMULATION OF HERBAL PAIN RELIEF BALM

S.NO	INGREDIENTS	QUANTITY	MEDICINAL USES
1	Coconut oil	50ml	solvent
2	Eucalyptus oil	10ml	Pain reliever
3	Betal leaf oil	10ml	Anti Inflammatory
4	Petroleum jelly	5gm	Relieves dry skin healing
5	Sodium benzoate	5gm	preservative
6	camphor	5gm	relives
7	Methyl salicylate	5gm	Analgesic skin absorbent



Fig:2.1 : PREPARATION OF HERBAL PAIN RELIEFBALM



HERBAL PAIN BALM

RESULT AND DISCUSSION:

TABLE NO 4: OBSERVATION TABLE

Parameter	Observation
PH	6.5
Spread ability	7.4 cm/sec
Viscosity	39010 cps
Patch test	Non allergenic
Phase separation	No phase separation

TABLE NO 5: IDENTIFICATION TEST

Sr. No.	Physical properties & test	Description
1.	Physical state	Semi-solid
2.	Color	White
3.	Odor	fragrant
4.	Solubility	Not soluble in water , but saluble in alcohol and chemical
5.	Melting Point	35°C to 60°C
6.	Assay	Not less than 99.5% on the anhydrous basis
7.	U. V. Spectra	Measures absorbance and purity

PH;

The PH of the prepared formulation was determined by using digital PH meter by dipping the glass electrode completely in to the gel system to cover the electrode. The measurement was carried out in triplicate and the average of the three readings was recorded.

PHASE SEPARATION:

B. marketed pain balm The prepared balm was transferred in a suitable wide mouth container. Set aside for storage, the oil phase and aqueous phase separation were visualizing after 24h. **VISCOSITY;** Viscosity of balm was determined using brook filled viscometer (S-62,model LVDV-E) at 25°C with a spindle speed of the viscometer rotated at 12rpm.

SPREDABILITY:

Two sets of glass slides of standard dimensions were taken. The herbal balm formulation was placed over one of the slides. The other slides was placed on the top of the gel, such that the gel was sandwiched between the two slides in an area occupied by a distance of 7.5cm along the slides. Hundred g weight of gel was placed on the upper slides so that the gel was between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of gel adhering to the slides was scrapped off. The two slides in position were fixed to a stand without slightest disturbance and in such a way that only upper slides to slip off freely by the force of weight tied on it. A20 g weight was tied to the upper slide carefully. The time taken for the upper slide to travel the distance of 7.5 cm and separated away from the lower slide under the influence of the weighed was noted. The experiment was repeated for three times and the mean time was taken for calculation. The spread ability was determined by

placing sample Between two glass slides which was compressed to Uniform thickness by applying definite time period. The time required to separate the two slides was measured as spread ability less time taken for separation of two Slides shown better spread ability calculated by formula.

S=spread ability M=Weight applied to slides
T=time taken to separate the slides

Container of storage

Store it in well closed mouth bottle at room temperature.

Category

Used as an analgesic

Direction for use

To be rubbed externally.

rub gently on the skin with the help of finger.3)Do not apply on the cuts.

Uses

1.Arthritis 2. backache 3.sore muscle4.joint pain 5.leg cramps

The physicochemical parameters of the prepared balm were determined parameters such as color, 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.

TABLE NO.6 PHYSICAL PARAMETER OF HERBAL PAIN BALM

SR.NO	ORGANOLAPTIC CHARACTERS	HERBAL BALM	MARKETED BALM
1	Formulation	Pain Balm	Pain balm
2	Colour	White	White
3	Odour	Fragrant	Fragrant
4	Appearance	Good	Smooth
5	State	Semi Solid	Semi Solid

CONCLUSION

- Herbal balm was prepared by using Hot Processing Technique and were found to be without particles transparent components which are used in formulation are having good compatibility without any significant changes.

- The Eucalyptus leaves extracts have relieving pain property, vitex negundo leaves extracts used to relieve Arthritic pain, cures high fever and alleviates menstrual cramps.

- The prepared formulation showing good physical characteristics.

- Further evaluated by various evaluation parameters such as PH, Extrudability, Spreadability, Viscosity, Patch test and gives good result.
- Based on the study research it can be concluded that herbal components can be effectively formulated as in the form of balm by using Hot
- Processing Technique which having excellent pain-relieving property.

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