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Development and characterized analgesic herbal balm using herbs as a medicine

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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 are used as a pain killer.

Key words: Analgesic Herbal balm; Coconut oil; Ayurvedic plant

1. Introduction

Analgesic Herbal balm is an Ayurvedic formulation of powerful essential oils for quick relief from head ache, 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.[1] These 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 Pain motivates the individual to withdrawn from damaging situations, to protect a damaged body parts while it kills and to avoid similar experiences in future.[2] Most pain resolves promptly hence the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.

1.1. Treatment for pain

Analgesic herbal balm is something that is comforting and soothing. It is one which leads the pain. Thus the word relief is inbuilt in the word herbal pain balm a balm in the physical sense is defined as a semi solid preparation applied externally as a remedy or for soothing and irritation. It is also defined as any of various aromatic resinous substances contained in a preparation used for healing and soothing.[4] When pain relief are rubbed, on the area where the pain exits, the pressure and movement produces excess of sensory input that blocks the pain sensation. A cure for pain doesn't exist. To cure pain, the condition causing your pain must be anatomically removed from your body through

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surgery and in most cases this simply is not feasible nor possible, nor label as a cure for pain. Pain results as a result of agitated in famed nurse at the point of injury or diseases. Any pain relief product that works will more often than not be unique to reach of us as individuals. In order to achieve pain relieve and pain control your task is to find the wrights product, methodology or pain relief treatment that allows here dramatic reduction of your pain full condition. [5]

1.2. Analgesic herbal pain relief balm pharmacologically effect on body

Analgesic herbal Pain relief balm works on the principle of counter irritant instead of actually relieving the pain they work on the principle of suppressing the pain by causing irritation on the point where the pain relief balm is applied. Pain balms generally contains 3 components namely methyl salicylate, menthol and camphor all these are easily absorbed through the skin. A combination of these three active ingredients is useful in case of head ache and rheumatic pains. The other ingredients in the pain the pain relief balm are eucalyptus oil, petroleum jelly, negundo oil, bees wax. Although these pain relief balms have a special pharmacological effect in relieving pain, it is actually the amount of pressure applied and the movement that plays a significant role. Role of the balm includes a local anesthetic effect and finally provides a comfortable stage. These products do not have any side effect or allergic reactions such as irritation or darkening of the skin or cause inflammation on the point of application.[4] Hence the consumer develops a liking for the chosen product. Petroleum jelly or petrolatum is the semi solid mixture of hydrocarbons and has become house hold preparation for various medical purposes. Petrolatum has associated with some of negative effects due to improper use including lipid pneumonia when inhaled from the nose. Petrolatum is not a material from renewable sources and not biodegradable which may be a cause of concern for environmental pollution etc. Non organic essential oils are processed from herbal materials cultivated using pesticides and chemical fertilizers. Non organic essential oils are processed by chemical extraction and therefore all chances of presence of solvent residue and pesticides in normal oils. In the recent years, the old is moving towards natural that are free from chemical substances which may be safe and save the planet from the pollution. organic forming is a step forward in this direction to grow herbal materials with out using any pesticides and chemical fertilizers to produce crops that are safe and natural with out any side effects. Herbal balm composition comprising extracts of organically certified herbs, organic essential oils and organic bees wax which are mixed to form a medicated topical application.[7] These application is used for quick relieve from pain. Such as head ache, back ache, arthritic pain. The preparation of balms which can be certified organic balms as per organic certification standards using organic essential oils and organic bees wax. The organic vegetable oil in the formula is of Indian origin like coconut oil. These balms comprise cold balm, lip balm, body balm and foot balm etc. Eucalyptus leaves and oil extracted from it, have been extensively used for treating common respiratory diseases and other infections including cough and cold, fever, sore throat, congestion, joint pain, wounds etc. The tree which goes by the botanical name eucalyptus globulus, though native to Australia is cultivated all over the world now a days. The tree has over 300 species all known for its profound medicinal properties. The curative property of the tree which is also known as 'Blue gum' comes from the oil extracted from its oval shaped leaves.[8]

These leaves are dried, crushed and passed through the stem distillation method or cold- pressed to haul out the essential oil. The oil is colorless but possesses a strong woody aromatic fragrance which is generally diluted before using it directly. In ancient times, the aborigines of Australia made extensive use of the tree. Be it chewing on the roots of the tree are sipping on eucalyptus leaf spiked tea, the medicinal properties of the oil present in the leaf or root helped people in managing fever, cold, body pain and hence eucalyptus became famous as the "Australian fever tea". In the late 1800s when the concentrated oil was extracted, doctors reportedly noted that the oil stimulated sweating and providing relief from chest congestion and sore throat. Later with more researches, doctors started prescribing this oil and formulations containg eucalyptus oil for various respiratory anomalies including asthma, bronchitis, flue and coughs.

The analgesic and anti- inflammatory potentials of essential oils of eucalyptus leaf. Twenty chemical compounds, which were isolated from the leaves essential oil eucalyptus used against cyclooxygenase two, tumor necrosis factor- α and interleukin- 1β convertase to elucidate the analgesic and anti- inflammatory activity. Eucalyptus is one of the major fast growing exotics in Bangladesh, is a tree of the family Myrtaceae. the plants of Myrtaceae possess essential oils that have different biological activities including antimicrobial, antifungal, cytotoxic and anti- inflammatory effects. The oils were used conventionally for the treatment of colds, influenza, cystitis, diabetes, gastritis, kidney disease, laryngitis. The essential oil of eucalyptus leaves possess an inhibitory effect on inflammation in rats. They inhibit cyclooxygenase enzyme and pro-inflammatory cytokines to clarify analgesic and anti- inflammatory activity.

Negundo, also called a five-leaved chaste tree, is a potent ayurvedic plant, that possesses noteworthy therapeutic properties and heals several ailments including asthma, muscle spasms and anxiety. It is scientifically termed vitex negundo and commonly known as "Nishinda" in Bengali, "Nallavalli" in Telugu, "Nagod" in Gujarati and "Nallanochi" in Tamil. Negundo's natural habitats are chiefly in the southern parts of Asia and Africa, being widely cultivated in the tropical environments of China, India, Indonesia, Tanzania, and Madagascar. It is a deciduous shrub, usually 2 to 8

meters in height, with a brown bark and green leaves that hold five leaflets. The flowers are white or blue in color and upon developing, give rise to succulent, oval-shaped, purple fruits or drupes, with a fleshy pulp and seed in the interior. Negundo natural habits are chiefly in the southern parts of Asia and Africa, being widely cultivated in the tropical environments of China, India, Indonesia, Tanzania, and Madagascar. It is a deciduous shrub, usually 2 to 8 meters in height, with a brown bark and green leaves that hold five leaflets. The flowers are white or blue in color and upon developing, give rise to succulent, oval-shaped, purple fruits or drupes, with a fleshy pulp and seed in the interior. Ancients ayurvedic texts praise the curative traits of ' Negundo', which in Sanskrit literally translates to that which protects the body from diseases.[2,4,9] True to its name, this wonderful gift of mother nature offers some fantastic rewards for overall human health. The roots, leaves, flowers, fruits, and bark of the negundo plant are utilized in herbal concoctions in the form of oil, pastes, juices, and powders, to cure disorders ranging from widely prevalent fevers to the very rare leprosy. Today, this magical herb is being naturalized and propagated world- wide, including American and Australia, so the global population can reap the excellent advantages that negundo offers, for overall well-being.[4]

2. Herbal Components of Analgesic herbal pain balm

2.1. Negundo

A vast array of beneficial plant-based compounds with antioxidant and anti-inflammatory traits are present in negundo. These include flavonoids and phenols which display cardioprotective qualities for heart wellness, besides Terpenoids and organic fatty acids that are laden with calming and analgesic properties to relieve mental stress, joint pain and muscle aches. Negundo is also bestowed with alkaloids such as Nishindine, Vitricine, which confer useful anticancer and antimicrobial effects on the body, thus combatting tumor growths and stomach infections. Profuse amounts of vitamin C and vitamin E in negundo leaf and stem extracts showcase natural antioxidant capabilities. This helps protect cells, tissues from oxidative damage by harmful free radicals and also enriches skin texture, nurtures the growth of thick, long silky hair. Housing valuable bioactive constituents such as camphene, pinene, dulcitol, negundo effectively lessens inflammation in the body, which in turn alleviates symptoms of asthma, arthritis, anxiety and enhances digestion, metabolism. Joint pain is one of the most common complaints with many possible causes. Some medicines used for joint pain relief such as NSAIDS have substantial and frequent side effects. Topical route possibly reduces adverse reactions by maximizing local delivery and minimizing systemic toxicity. Plants have been the most important sources of medicines for human health and Iranian traditional medicine is well known for its extensive use of herbal medicines to treat diseases accompanied with joint pain for centuries.[11]

2.2. Coconut oil

Coconut oil or Copra oil is an edible oil extracted from the kernel or meat of mature coconuts harvested from the coconut palm (*Cocos nucifer*). 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 nature's 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 predominantly of a group of fat molecules known as medium chain fatty acids. The coconut palm, *Cocos nucifera*, is an erect palm in which is grown its fruits, used primarily for the extraction of coconut oil for use in cooking. The coconut palm has an erect or slightly curved stem which grows from a swollen base. The stem is smooth, light gray in colour and has prominent leaf scars, the stem is topped with a crown of 60-70 spirally arranged leaves. The leaves are long (up to 7m\23ft). pinnately divided and composed of 200 to 250 tapering leaflets. The inflorescence is a spike produced at the leaf axillary with 20 to 60 branches, each with a female flower at the base and many male flowers. The fruit is a drupe containing a single seed. It is ovoid in shape with 3 sides divided by ridges.[10,12,15]

2.3. Eucalyptus oil

Eucalyptus globulus Labill. Is an aromatic tree in the myrtle family which commonly attains a height of 150-180 feet and a diameter of height 4-7 feet. It has a straight trunk up to two-third of its total height and a well-developed crown. The central trunk and tap root are fringed with many lateral stems and roots. The tap root rarely exceeds a length of 10 feet. The light, yellow brown bark is deciduous. The leaves of the older branches are narrowly lanceolate, often curved, alternate and hung vertically. They are glossy, dark green, thick and leathery. They average in length from 1.5-2 dm. the leaves of the young shoots are ovate, opposite, sessile, and horizontal. They are covered with a gray waxy bloom which is much thicker on the bottom surface of the leaf. Young stems are squared or winged. The white flowers are solitary in the axil on flattened stalks. They are approximately 4-5.5 cm wide. The fruit is 2-2.5 cm across. The numerous seeds are approximately 2×1 mm. seeds are dark brown with a brownish red chaff.[5]

2.4. Vitex negundo

Negundo also known as the five-leaved chaste tree is used popularly in ayurveda, unani, siddha, homeopathy and allopathy to treat a number of ailments. It is effective in treating headaches, venereal diseases such as syphilis, rheumatism, sprains, fever, cough, urinary problems, boils and various other ailments. Negundo oil is an effective analgesic, anti-inflammatory, anti-catarhal and appetizer among many other attributes that benefit us to stay healthy and recover from various illness.[6]

2.5. Menthol

Menthol is an organic compound, more specifically a monoterpenoid, made synthetically or obtained from the oils of corn mint, peppermint, or other mints. It is a waxy, clear or white crystalline substance, and melts slightly.[3]

3. Chemical Components of Analgesic herbal pain balm

3.1. Methyl salicylate

Methyl salicylate is a colorless yellowish or reddish liquid with odor of wintergreen. 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.[10]

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

3.2. Sodium benzoate

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

3.3. 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 taste. It is a waxy flammable substance obtained from steam distillation, purification and sublimation of wood, twigs and bark of the tree.[7]

3.4. 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 colour. Insoluble in water and soluble in alcohol, ether, chloroform, carbon etc.[6]

4. Method of preparation of herbal pain relief balm: standardization of analgesic herbal pain balm formulation

Herbal medicine is not a simple task since many factors influence the biological efficacy and reproducible therapeutic effect. Standardized herbal products of consistent quality and containing well defined constituents are required for reliable clinical trials and to provide consistent beneficial therapeutic effects. Pharmacological properties of an herbal formulation depend on phytochemical constituents present there in. Development of authentic analytical methods which can be reliably profile the phytochemical composition, including quantitative analysis of market bioactive compounds and other major constituents, is a major challenge to scientists. An overview covering various techniques employed in extraction and characterization of herbal medicines as well as herbal nanomedicines standardization is reported. Standardization of herbal formulation is essential in order to assess quality drugs based on the concentration of their active principles physical, chemical, phytochemical standardization and invitro, in vivo parameters. The quality assessment of herbal formulations is of paramount importance in order to justify their acceptability in modern system of medicine. One of the major problems faced by the herbal industry is the unavailability of rigid quality control profiles for herbal materials and their formulations. In India, the development of Ayush government of India launched a central

scheme to develop standard operating procedures for the manufacturing process to develop pharmacopeial standards for ayurvedic preparations.[10] The subject of herbal drug standardization is massively wide and deep. There is so much to know and so many seemingly contradictory theories on the subject of herbal medicines and their relationship with human physiology and mental function. India needs to explore the medicinally important plants. This can be achieved only if the herbal products are evaluated and analysed using sophisticated modern techniques of standardization. World health organization (WHO) encourages, recommends and promotes traditional\ herbal medicines in natural health care programmes because these drugs are easily available at low cost, safe and people have faith in them. The WHO assembly in number of resolutions has emphasized to need to ensure quality control of medicinal plant product by using modern techniques and applying suitable standards.[12]

4.1. 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 bees wax added completely dissolve in the petroleum jelly. After that, weigh and add 5gm of menthol crystals to the above solution and boil it until the menthol completely dissolved.[3]
- Weigh 10ml of vitex Negundo oil, stir the solution and boil the solution.
- 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 turn 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.[6]

4.2. Ingredients quantity medicinal uses

- Coconut oil 50ml Solvent.
- Eucalyptus oil 10ml Pain reliever.
- Vitex negundo oil 10ml Relieves arthritic pain.
- Petroleum jelly 5gm Relieves dry skin, healing.
- Menthol 5gm Counter irritant.
- Camphor 5gm Relives cough.
- Methyl salicylate 5gm Analgesic, skin absorbent.
- Sodium benzoate 5gm Preservative.

5. 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.

Compliance with ethical standards

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Disclosure of conflict of interest

The author has no conflicts of interests to declare.

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