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FORMULATION AND PHYTOCHEMICAL EVALUATION OF AN ANTI-INFLAMMATORY BALM PREPARED USING TERMINALIA ARJUNA EXTRACT

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ABSTRACT

Zandu ultra power balm is topical ayurvedic preparation that contain varies active ingredient such as menthol, terminalia arjuna oil, vitex negundo oil, camphor, coconut oil. 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.

KEYWORD: Natural Pain Relief Balm, Vitex Negundoo Oil, Terminalia Arjuna oil.

INTRODUCTION

Use in common region common cold it seen the symptoms of nose getting block with mucus, for the common cold is arising to exposure to environmental factors such as cold, dryness, dampness. by this our body affected by joint pain, headache, toothache etc. A herbal balm is an Ayurvedic blend made with powerful essential oils for quick relief from headaches, backaches, colds, and other types of pain.[3] non steroidl anti-inflammatory drug are widely consumed among athalet world wide relation muscle injury and soreness.

investigating skeletal muscle pain. These balms are medicated topical formulas applied to the skin to ease pain and stiffness. They are usually made with organic essential oils, beeswax, and other herbal ingredients, and often use petroleum jelly as a base Balms work by including counter-irritant compounds like methyl salicylate, which help relieve discomfort by distracting from pain signals. Pain is an uncomfortable feeling often caused by intense or harmful events like stubbing a toe, burning a finger, or applying alcohol to a cut. The International Association for the Study of Pain defines pain as an unpleasant sensory and emotional experience linked to actual or potential damage to body tissues.[4] The majority of people still prefer herbal remedies over conventional ones, despite the fact that medicinal plants are vital to healthcare and the main source of ingredients for both traditional and mainstream medical formulations.[5] Medicinal plants are vital for healthcare and are the main ingredients for both traditional and modern medicines. Many people prefer herbal remedies over conventional medicines because they are effective, more affordable, and culturally familiar, especially when modern medical options are limited. Herbal medicines play a crucial role, especially among rural and native communities in many developing countries. According to the WHO, about 80% of the global population relies on traditional medicine, and in India, 60% of rural people use herbal remedies. In recent years, the use of herbal supplements has grown significantly, from 2.5% to 12%. Additionally, there is growing interest in nanoparticles made from medicinal plants, like those the Terminalia family, because of their applications in medicine, energy, materials, and other research areas.[7] Terminalia arjuna, commonly known as arjuna, is a tree from the Combretaceae family. Its bark has been used for centuries in the Indian subcontinent to treat chest pain (angina), high blood pressure, heart failure, and abnormal cholesterol levels, based on the practices of ancient physicians. However, more research is needed to fully understand its benefits in treating heart-related conditions. This review aims to provide a detailed summary of experimental and clinical studies on arjuna's effects on cardiovascular diseases, especially those conducted in the last decade. Relevant systematic reviews, meta-analyses, and clinical studies were examined.

How to Apply

1. Clean the Area: Wash and dry the skin where you'll apply the balm.
2. Use a Small Amount: Gently rub a little balm on the affected area until it's absorbed.
3. Repeat as Needed: Apply 2-3 times a day for the best results.[19]

Terminalia arjuna herbal pain balm type

1. Relief Balm: Blended with Terminalia arjuna extract, eucalyptus oil, and camphor, this balm is used for general pain relief, including headaches, joint pain, and muscle soreness.
2. Anti-Inflammatory Balm: Combines Terminalia arjuna with anti-inflammatory oils like turmeric and ginger oil to help reduce inflammation in sore muscles and joints.
3. Cold and Cough Balm: Made with Terminalia arjuna, menthol, and peppermint oil, this type helps relieve congestion and soothe respiratory symptoms when applied to the chest and throat.
4. Skin Healing Balm: Contains Terminalia arjuna tea tree oil, and aloe vera to support wound healing and soothe irritated or inflamed skin.
5. Cardioprotective Balm: Formulated specifically with Terminalia arjuna and other heart-healthy herbs, this balm is applied topically near the chest area to support heart health as a complementary treatment in Ayurveda.[20]

MATERIAL

1. Coconut oil.
2. Terminalia Arjuna oil
3. vitex negundo oil
4. petroleum Jelly
5. Comphor
6. Methyl salicylate
7. menthol crystal
8. bees wax
9. sodium benzoate

1. Coconut Oil

BIOLOGICAL NAME: Cocosnucifera Coconut oil is a type of oil made from the kernels of ripe coconuts harvested from coconut palms. In recent years, coconut oil has been promoted as a "miracle" food. Some media outlets and health experts claim it offers benefits like weight loss, lowering cholesterol, preventing heart diseases, and reducing inflammation. These claims are often used by coconut oil companies to market their product and increase sales.[27]

2. Terminalia Arjuna oil BIOLOGICAL NAME: Terminalia arjuna KINGDOM.: Plantae ORDER: mymyrtale FAMILY: Combretaceae GENUS: Terminalia SPECIES.: T. Arjuna

Ayurvedic medicine: Treats “hridroga” (heart diseases). Unani medicine: Used for cardiac and respiratory issues. Siddha medicine: Treats “maruthuvam” (cardiovascular diseases). Folk medicine: Used for various ailments, including fever and skin conditions.[18][28]

3. Vitex negundoo oil

Vitex negundo oil, derived from the five-leaved chaste tree, belongs to the Kingdom: Plantae, Order: Lamiales, and family: Lamiaceae Homeopathy, and even modern medicine (Allopathy) to treat various health issues. It is helpful for conditions such as headaches, sexually transmitted diseases like syphilis, rheumatism, sprains, fever, cough, urinary problems, boils, and more. Negundo oil has properties that relieve pain (analgesic), reduce inflammation, clear mucus (anti-catarrhal), and improve appetite, making it useful for promoting health and recovery from illnesses.[28][30]

4. Petroleum jelly Types

1. Pure petroleum jelly (Vaseline).
2. Water-soluble petroleum jelly.
3. Hypoallergenic petroleum jelly.
4. Ayurvedic medicine: skin conditions
5. Unani medicine: wound healing.
6. Homeopathic medicine: skin and wound care

5. Comphor

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 odorand pangenttast. It is a waxy flammable substance obtained from steam distillation, purification and sublimation wood twings and bark of the tree.[31][33]

6. Menthol Crystal

melts 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 slightly.[12][13]

7. 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.

8. Sodium Benzoate

Sodium benzoate powder is approved as a preservative by some of the strictest natural product certification standards worldwide. It is commonly used in shampoos and conditioners to prevent bacteria and mold growth, making it a safe and effective preservative.[19]

9. Bees wax

Bees wax obtained from the honey comb of the bees Apismellifera and other species of apis belonging to the family Apidae. Order Hymenptera. 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.[14]

METHADOLOGY

Extraction of coconut oil

Extraction of Coconut Oil Using Hot Processing (Coconut Milk) In the hot extraction process, coconut oil (VCO) is obtained from coconut milk by heating. Heating causes the proteins in the coconut milk to break down, disrupting the milk's emulsion and separating the oil. To extract the oil, the coconut milk is heated to 100-120°C for about 60 minutes until all the water evaporates. The proteins coagulate during this slow heating process, releasing the oil. The oil is then separated from the solid protein residue by filtering it through a muslin cloth. The remaining residue is heated further to extract any additional oil.[21][37]

Extraction of terminalia arjuna oil

The bark of Terminalia Arjuna tree are a popular for health remedy all over the world. The bark have anti-inflammatory and anti-bacterial properties. when distilled in to oil. terminaliaarjunacreats a effective inhelent or chest rub a few drop of Terminalia Arjuna oil in a bath sooths aches and pain.

Find fresh Terminalia arjuna :- terminaliaarjuna tree grow wild in warmer climates. In colder climates, terminaliaarjuna is sold by nurseries as a potted plant or shrub. You'll need a good handful -approximately 1/4 cup of bark for every cup of oil intend to make. Terminaliaarjuna is found at most florists, as it is a favourite addition. In warmer climates, you might fine terminalia arjuna for sale at farmers market or gardening stores. The best time of day to

terminaliaarjuna is early in the morning, when its bark contain a high concentration.[21][38]

• Cut the bark into smaller, thin pieces to speed up the drying process. Spread the piecesasingle layer on a clean, dry surface or drying rack. Place them in direct sunlight. welventilated area to avoid any moisture buildup. Turn the bark pieces periodically (once or twice a day) to ensure even drying. Once fully dried, transfer the bark pieces to a grinder or mortar and pestle. Grind until you achieve a fine powderconsistency. Sift the powder through a fine mesh to remove any remaining larger pieces. formation of fine powder Terminalia.[39]

b:Pour the chosen solvent ethanol into the round-bottom flask, usually filling it to about one- third of its capacity. Attach the Soxhlet chamber with the thimble to the round-bottom flask and secure it with the condenser on top. Heating: Place the round-bottom flask on the heating mantle and set it to a low to moderate temperature, allowing the solvent to evaporate gradually. The solvent vapor will rise and condense in the condenser, then drip back down into the Soxhlet chamber, passing over the powdered bark in the thimble. This cycle repeats continuously as the solvent extracts the oil from the bark, collecting in the round-bottom flask. Extraction Time: Allow the Soxhlet extraction to run for 6-8 hours, depending on the desired yield. Monitor the apparatus regularly to maintain a consistent solvent level. Evaporating the Solvent: Once extraction is complete, remove the round-bottom flask containing the oil-solvent mixture. Use a rotary evaporator or distillation setup to evaporate the solvent, leaving behind the extracted oil. Storage:Collect the Terminalia arjuna oil in an airtight solvent Ambar colour glass container to protect it from light and air, preserving its potency.[11][40]

Extraction of vitex negundo leaves

Fresh or dried Vitex negundo leaves Steam distillation apparatus (including a distillation flask, condenser, and collection flask) Water- Heatin gsource Separator funnel (if necessary) Storage containers (dark glass bottles).

Process

1. **Preparation**

- Collect Vitex negundo plants, wash thoroughly, and cut into small pieces.
- Allow the plant parts to dry in the shade.

2. Extraction

- Boil the dried plant parts with about five times their volume of water- Filter the extract and boil it with a suitable base, such as coconut oil, until all the water evaporates.

3. Filtration and Storage: - Filter the oil to remove any leftover particle - Store the oil in a dark amber glass container to protect it from light and maintain its quality.[41]

Formulation of terminalia arjuna herbal balm

1. Take one container in that weigh and add 0.5gm of petroleum jelly, place the container in a hot plate and boil it until all the amount of petroleum jelly completely dissolved. Weigh 0.5ml of methyl salicylate and boil the solution in hot plate.[37]
2. In the dissolved petroleum jelly solution weigh and add 0.5 gm of bees wax, stir it and boil until. The bees wax added completely dissolve in the petroleum jelly. After that,
3. weigh and add 0.5 gm of menthol crystals to the above solution and boil it until the menthol completely dissolved.
4. Weigh 1ml of vitexnegundo oil, stir the solution and boil the solution.
5. Weigh 1ml of Terminalia Arjuna oil, stir the solution and boil the solution.
6. Weigh 0.5 gm of sodium benzoate and add it to the solution, stir it well and boil the solution, for complete dissolution of the solution.
7. 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.[44]

Table 1: Material use in formulation of herbal pain balm.

INGREDIENTS	QUANTITY	MEDICINAL USE
1.Coconut oil	5ml	Solvent
2.Terminalia arjuna oil	1ml	Pain relieve
3.vitex negundoo oil	1ml	Relieve Arthritic pain
4.petroleum Jelly	0.5gm	Relieve dry skin
5.menthol	0.5gm	Counter irritant
6.comphor	0.5gm	Relieve cough
7.methyl salicylate	0.5 ml	Analgesic ,skin absorbent
8.sodium benzoate	0.5gm	Preservative
9.bees wax	0.5gm	Pain relief

Evaluation of prepared herbal formulation

Physical parameter

The clarity and color of the mixture were checked by holding it against a white background,

and the smell was assessed by sniffing it.

PH

The pH of the formulation was tested using a digital pH meter. The meter's glass electrode was fully immersed in the gel to cover it. The pH was measured three times, and the average reading was recorded.[45]

Spredability

Two standard glass slides were used for the experiment. The herbal balm was placed on one slide, and the other slide was placed on top, sandwiching the gel between them over a 7.5 cm area. A 100 g weight was placed on the top slide to evenly press the gel into a thin layer. After removing the weight, any excess gel on the slides was scraped off. The slides were fixed in place on a stand, ensuring that only the top slide could move freely. A 10 g weight was attached to the top slide, and the time it took for the top slide to travel 7.5 cm and separate from the bottom slide was recorded. The experiment was repeated three times, and the average time was used for calculation.[12][15]

Phase Separation

The balm was stored in a wide-mouth container and left for 24 hours. After this time, it was checked for any separation between the oil and water phases.

Viscosity

The anti-inflammatory balm had the correct viscosity. This was measured using a Brookfield viscometer (model LVDV-E, spindle S-62) at 25°C, with the spindle rotating at 12 rpm.[18][39]

Patch Test

Apply the product to a small area of skin where it won't be accidentally rubbed or washed off, such as the inside of your arm or the bend of your elbow. Use a quarter-sized amount and apply it as thickly as you would normally use the product. Leave it on for the amount of time it would normally stay on the skin. If you're testing a product that you usually wash off, like a cleanser, leave it on for at least 5 minutes or as directed. Repeat the test twice a day for 7-10 days, as a reaction may not happen right away. If your skin reacts, wash the product off immediately and stop using it. You can apply a cool compress or petroleum jelly to soothe your skin if needed.[13]

- **RESULT 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.[15][46]

Tabale 2: Physical parameter herbal pain relief baim.

Sr no	Organoleptic charecters	Herbal balm
1	Formulation	Pain Balm
2	Colour	Light brown
3	Odour	Fragrant
4	Appearance	Good
5	State	Semi solid

Table 3: Evaluation result herbal pain balm.

Sr no	Parameter	Result
1	PH	6.5
2	Spredability	7.4g.cm/sec
3	Phase separation	No phase separation
4	Viscosity	39010 cps
5	Patch test	No allergenic

Table 4: Result of stability study.

Formulation	Period	Colour	PH	Any other
	Room temperture	Brown	7.0	Nil
Pain balm	25°C+2°C/60% +5% RH	Brown	6.8	Nil
	30°C+2°C/65%+5%RH	Brown	6.7	Nil
	30°C+2°C/65%+5%	Brown	6.5	Nil

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 Terminaluaarjuna bark extracts have relieving pain property, vitexnegundo 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 inthe form of balm by using Hot Processing Technique which having excellent pain-relieving property.[15]

Fig. 1: Herbal pain relief balm.

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