

Research Article on Formulation and Evaluation of a Polyherbal Cream for pain relief

Uniket M. Gosavi¹, Pratiksha K. Vyavhare², Swapnil B. Wabale³, Prajakta S. Ban⁴
^{1,4} Assistant Professor, Dept. of Pharmaceutical Quality Assurance, JBVP Vidya Niketan College of Pharmacy, Lakhewadi
^{2,3} Student, JBVP Vidya Niketan College of Pharmacy, Lakhewadi

Abstract—Zingiber officinale, Nyctanthes arbor-tristis, and Eugenia caryophyllus are medicinal plants that have been utilized for centuries in a variety of herbal medicine systems, including Ayurvedic, Homeopathic, and Siddha. The dried leaves of Nyctanthes arbor-tristis, the rhizomes of Zingiber officinale, and the clove buds of Eugenia caryophyllus all contain analgesic properties that reduce inflammation. The creation of polyherbal cream and its evaluation utilizing a variety of evaluation criteria were the main objectives of the current study.

Creams serve several purposes such as moisturizing dry skin, delivering medicinal agents to treat skin conditions like eczema, psoriasis, infections, and providing sun protection or anti-aging benefits. The typical components of a cream include emollients (to soften skin), humectants (to retain moisture), preservatives (to prevent microbial growth), fragrances, colorants, and most importantly, active pharmaceutical or herbal ingredients.

Index Terms—Eugenia caryophyllus, Zingiber officinale, Nyctanthes arbor-tristis Polyherbal cream, Soxhlet apparatus, Maceration.

I. INTRODUCTION

Cream formulation was semisolid formulations intended for topical application. The cream formulations were prepared by using various herbal extracts, herbal oils, and various excipients. There are two main types of cream formulation, such as oil in water (O/W) type of emulsion and water in oil (W/O) type of emulsion. The present formulation was oil in water (O/W) type of emulsion. The cream formulation was various other classes like foundation cream, cleansing cream, cold cream, pain-relieving cream, night and massage cream, head and body cream, vanishing cream and shaving cream

Polyherbal cream

Multiple herbal extracts are combined in polyherbal lotions for joint pain in an attempt to potentially reduce inflammation and pain. These creams target several pathways linked to pain and inflammation and frequently make use of traditional medical techniques, such as those found in Ayurveda. Ginger, clove, Nyctanthes arbor-tristis are a few of the often-utilized herbs.

Advantages of polyherbal cream

- Non-greasy and easily washable:
Polyherbal creams are often formulated as emulsions, making them less oily and easier to remove with water compared to traditional ointments.
- Good spread ability:
They are designed to spread easily on the skin, allowing for efficient application and coverage.
- Longer period of action:
Polyherbal creams can provide a sustained effect at the application site, potentially reducing the need for frequent reapplication, according to a review in the International Journal of Novel Research and Development (IJNRD).
- Wound healing:
Polyherbal formulations can accelerate the wound healing process by stimulating various physiological functions, says a study in ScienceDirect.com.
- Anti-inflammatory and soothing:
They can help relieve discomfort and reduce inflammation caused by skin irritations like rashes, allergic reactions, or insect bites.

Uses of polyherbal cream

- Moisturizing and Hydrating:
Polyherbal creams can help hydrate and moisturize the skin, addressing dryness and related issues like wrinkles and rashes.

- **Treating Skin Conditions:**

Many formulations are designed to address specific skin conditions like acne, eczema, psoriasis, and skin infections.

- **Wound Healing:**

Some polyherbal creams are effective in promoting wound healing by stimulating physiological processes that accelerate the healing process.

- **Reducing Skin Irritation and Inflammation:**

Herbal extracts with anti-inflammatory and soothing properties can help reduce skin irritation, redness, and inflammation associated with various skin conditions.

- **Antimicrobial Properties:**

Certain polyherbal creams are formulated with antibacterial and antifungal ingredients to combat skin infections and prevent further complications.



Fig (a) Polyherbal cream

- To promote the use of Ayurveda and herbal treatments in modern healthcare

Therefore, the development of a polyherbal cream for joint pain is timely and relevant, addressing both the therapeutic need and the public preference for natural, side-effect-free solutions.

II. MATERIAL AND METHOD

The *Eugenia caryophyllus* oil was taken from the market, fresh ginger rhizomes and fresh *Nyctanthes arbor-tristis* leaves are collected from local area of Solapur. The rhizomes of ginger were extracted by using Soxhlet extraction method. The leaves of *Nyctanthes arbor-tristis* were dried at room temperature, further drying the leaves are crushed and made into powder, the simple maceration process was done for the preparation of extract by using methanol as a solvent.

Ingredients

Table No.1 Ingredients

Sr. No.	Ingredient	Role
1.	<i>Zingiber officinale</i> (Ginger)	Anti-inflammatory
2.	<i>Eugenia caryophyllus</i> (Clove)	Antimicrobial
3.	<i>Nyctanthes arbor-tristis</i>	Wound healing
4.	Beeswax	Base/Thickener
5.	Borox	Emulsifier
6.	Methylparaben	Preservative
7.	Methanol	Solvent
8.	Distilled Water	Solvent/Vehicle

1) *Zingiber officinale* (Ginger):



Fig (b) *Zingiber officinale* (Ginger)

Zingiber officinale (Ginger) is traditional medicinal plant belongs to family Zingiberaceae. The part of the plant roots and rhizomes having anti-inflammatory and pain relieving activity. The fresh rhizomes are used for the extraction purpose; extract were used for the preparation of cream. Ginger was used for various purposes

like anti-oxidant, anti-cancer, antimicrobial, skin-nourishing properties. Ginger is primarily used to treat nausea, but it is also used as an anti-inflammatory, a pain remedy, a warming remedy and a cholesterol-lowering herb.

Uses of *Zingiber officinale*:

Medicinal Uses:

Anti-inflammatory: Effective in reducing inflammation in conditions like arthritis.

Digestive Aid: Enhances digestion, relieves nausea, bloating, and indigestion.

Anti-emetic: Used to prevent motion sickness and nausea, especially during pregnancy.

2) *Eugenia caryophyllus* (Clove):



Fig (c) Clove

Eugenia caryophyllus, commonly known as clove, is a key ingredient in many polyherbal creams designed for joint pain relief. It is rich in the active compound eugenol, which provides powerful anti-inflammatory, analgesic, and antioxidant effects. When used in topical formulations, *Eugenia caryophyllus* helps reduce joint inflammation, ease muscle stiffness, and relieve pain by improving local blood circulation and soothing the affected area. Its warming and penetrating properties make it especially effective for conditions like arthritis and rheumatism.

Medicinal Uses:

- Acts as a powerful analgesic (pain reliever), especially for toothaches
- Has strong antiseptic and antimicrobial activity
- Useful in treating respiratory issues, like cough and asthma
- Helps relieve digestive problems, like bloating and nausea
- Shows antioxidant and anti-inflammatory effects

3) *Nyctanthes arbor-tristis*



Fig (d) *Nyctanthes arbor-tristis*

Nyctanthes arbor-tristis was the oldest holistic, sacred and traditional medicinal plant belongs to family Oleaceae. The plant was mentioned in Vishnu Purana and having great importance to treat varieties of diseases, especially rheumatoid arthritis it reduces pain and inflammation.

Nyctanthes arbor-tristis (Parijat / Night Jasmine)

Medicinal Uses:

- Used in Ayurveda for treating fever, arthritis, and malaria
- Acts as a liver tonic and helps in detoxification
- Treats constipation and supports digestive health
- Provides relief in cough, cold, and bronchitis
- Helps in managing skin infections and wounds

4) Beeswax

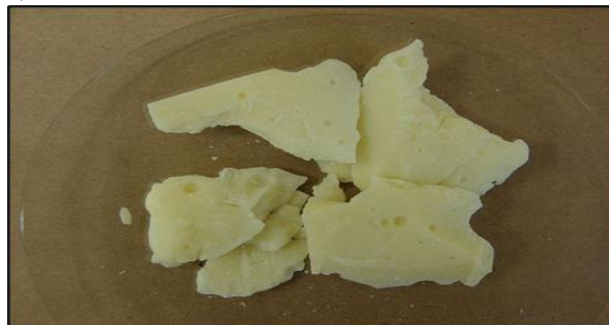


Fig (e) Beeswax

Beeswax is a natural ingredient derived from honeybees and is commonly used in polyherbal creams due to its beneficial properties for skin care. It acts as a natural emulsifier and thickening agent, helping to blend herbal extracts into a smooth and stable cream. One of its key roles is to create a protective barrier on the skin's surface, which helps retain moisture while still allowing the skin to breathe.

Cosmetic & Skincare Uses:

- Acts as a natural thickening agent in creams, lip balms, and lotions
- Used as a moisturizer and emollient – helps soften and soothe the skin
- Provides a protective barrier on skin without clogging pores
- Commonly used in lip care, anti-aging creams, and body butters

5) Borox



Fig. (f) Borox

Borax, also known as sodium borate, is a naturally occurring mineral with antifungal and antibacterial properties. In a polyherbal cream, borax acts as a natural preservative, helping to maintain the stability and shelf life of the formulation. It also enhances the texture and consistency of the cream, making it smoother and easier to apply. Additionally, its mild antiseptic nature supports the healing of minor cuts, skin irritations, and infections, complementing the therapeutic effects of the herbal ingredients.

Medicinal Uses:

- Used as a mild antiseptic for skin infections and wounds
- Helpful in treating mouth ulcers and sore throat (in diluted form)
- Used externally to relieve itching, fungal infections, and eczema
- Traditionally used in Ayurveda and Unani systems for detoxifying purposes

6) Methylparaben



Fig. No (f) Methylparaben

Methylparaben is a commonly used preservative in cosmetic and pharmaceutical products, including polyherbal creams like Rain Up. It helps prevent the growth of harmful bacteria and Mold, thereby increasing the shelf life of the cream. In Rain Up polyherbal cream, methylparaben ensures the stability and safety of the herbal ingredients by protecting them from microbial contamination. Although it is generally considered safe in small amounts, its use is carefully regulated to avoid potential skin sensitivities in some individuals.

Cosmetic Use:

- Acts as a preservative in products like creams, lotions, shampoos, deodorants, and makeup.
- Prevents the growth of bacteria, mold, and yeast.

- Extends shelf life and maintains product quality.
- Used in concentrations of 0.1% to 0.3%

Methyl Paraben ($C_8H_8O_3$) is composed of a benzene ring, a hydroxyl group (-OH) at the para position, and a methyl ester group ($-COOCH_3$), making it the methyl ester of p-hydroxybenzoic acid.

7) Methanol



Fig. (g) Methanol

Methanol is often used as a solvent in the preparation of polyherbal creams due to its excellent ability to extract bioactive compounds from medicinal plants. It helps in dissolving both polar and non-polar phytochemicals, ensuring maximum therapeutic efficacy of the herbal formulation. In such creams, methanol is usually removed during

1. Uses

- Laboratory and Pharmaceutical Uses:
- Used as a solvent for extracting active constituents from plants (in herbal research)
- Acts as a reagent in chemical synthesis
- Used in chromatography and other analytical techniques

2. Structure:

Simplest alcohol with one methyl group ($-CH_3$) and one hydroxyl group (-OH)

3. Physical Properties:

Colourless, volatile, flammable liquid

Boiling Point: $64.7^\circ C$

Soluble in water and many organic solvents

4. Chemical Nature:

Polar solvent, dissolves both polar and non-polar compounds

Hydrogen bonding ability due to -OH group processing to ensure safety, but its role is crucial during the initial extraction phase. Its use enhances the quality, consistency, and effectiveness of the polyherbal product by ensuring better absorption of active ingredients into the skin.

8) Distilled water



Fig. (h) Distilled water

Distilled water is commonly used in polyherbal creams as a base or solvent to dissolve water-soluble plant extracts and other ingredients. It is free from impurities, minerals, and microorganisms, which ensures the stability and safety of the final product. Using distilled water helps maintain the purity of the formulation and prevents unwanted chemical reactions that could occur with tap or untreated water. It also aids in the smooth texture and spread ability of the cream, enhancing its application and absorption on the skin.

Method

1) Extraction of zingiber officinale oil

- 1) Ginger was taken from market, cleansing them.
- 2) Chopping of cleaned ginger and make into slices.
- 3) Take 25 gm of chopped ginger and 100 ml of solvent (methanol).
- 4) Ginger slices and methanol were transfer into Soxhlet apparatus, heat at $80^\circ C$ for 8 h.
- 5) Receiver collects the concentrated extract.
- 6) Filtration of extract and further centrifuge extract.
- 7) The distillation of centrifuged extract was done and ginger oil was obtained.

Uses

- Used as a solvent to dissolve herbal extracts, active ingredients, and other components
- Acts as a base for creams, lotions, gels, and toners
- Hydrates and softens the skin when applied topically
- Used in the preparation of emulsions and suspensions
- Acts as a carrier to deliver herbal actives deep into the skin

Molecular Structure:



Fig. (i) Extraction Method

2) Maceration of nyctanthes arbor-tristis

- Take 10 gm dried leaves powder and 50 ml of alcohol.
- Mix properly and pour into 100 ml of volumetric flask. The volumetric flask was placed into REMI RSB 12 mechanical shaker.
- The shaking was continued up to three days. Concentrated extract was collected and filter. This filtrate was used for the preparation of cream.

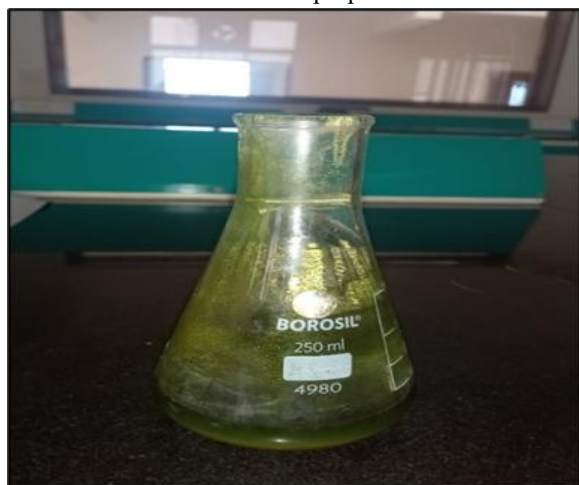


Fig (j) Nyctanthes arbor tristis leaves powder

3) Formulation of Polyherbal Cream (Slab Method) – Flow Chart:

1. Oil Phase Preparation:

- Take *Eugenia caryophyllus* oil, *Zingiber officinale* oil, and beeswax in Beaker 1
- Heat on water bath
- Stir until uniform mixing

2. Aqueous Phase Preparation

- Take *Nyctanthes arbor-tristis* extract, distilled water, white soft paraffin, and borax in Beaker 2
- Heat on water bath
- Mix thoroughly

3. Cream Formation:

- Add oil phase to aqueous phase (with continuous stirring)
- Stir until semisolid mass is formed

4. Slab Method:

- Transfer semisolid mass onto slab
- Rub with spatula to maintain smooth consistency

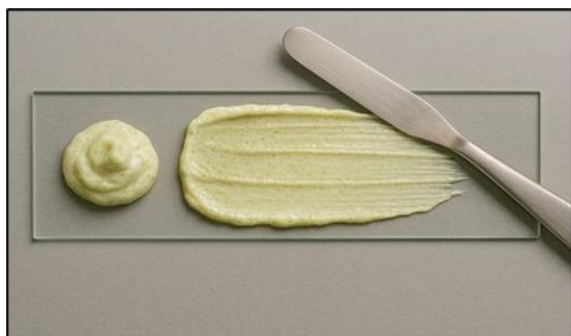


Fig. (k) Slab Method



Fig (l) Polyherbal Cream

5. Final Step:

- Evaluate the cream

Evaluation of cream

Physical evaluation

Formulated herbal cream was further evaluated by using the following physical parameters. Color, Odor, Consistency, and state of the formulation [9].

- a) Colour: The colour of the cream was observed by visual examination. The result was shown in table 2.
- b) Odor: The Odor of cream was found to be characteristics.
- c) Consistency: The formulation was examined by rubbing cream on hand manually. The cream having

smooth consistency. Cream did not leave greasy substances on skin surface after application.

d) State: The state of cream was examined visually. The cream having a semisolid state. Results were shown in table 2.

- PH

PH of prepared herbal cream was measured by using digital pH meter. The solution of cream was prepared by using 100 ml of distilled water and set aside for 2 h. PH was determined in three time for the solution and the average value was calculated. Results were shown in table 2.

- Spread ability

Spread ability of formulated cream was measured by placing sample in between two slides then compressed to uniform thickness by placing a definite weight for a definite time. The specified time required to separate the two slides was measured as Spread ability. Lesser the time taken for separation of two slides result shown better Spread ability. Spread ability was calculated by the following formula: Where S= Spread ability M= Weight tide to the upper slide L= Length of glass slide T= Time taken to separate the slides [10]. Results were shown in table 2.

- Washability

Formulation was applied on the skin and then ease extends of washing with water was checked. Results were shown in table 2

- Non-irritancy test

Herbal cream formulation was evaluated for the non-irritancy test. Observation of the sites was done for 24 h 28 [11]. Results were shown in table 2.

- Viscosity

Viscosity of cream was done by using Brooke field viscometer at the temp of 25 °C using spindle no. 63 at 5rpm. Results were shown in table 2.

- Phase separation

The prepared cream was transferred in a suitable wide mouth container. Set aside for storage, the oil phase and aqueous phase separation were visualizing after 24h. Results were shown in table 2.

Table 2: Results of polyherbal cream

Sr. No.	Parameters	Results
1.	Colour	white green
2.	Odour	Characteristics
3.	Consistency	Smooth
4.	State	Semisolid
5.	pH	6.5
6.	Spreadability	7.4 g. cm/sec
7.	Washability	Easily washable
8.	Non-Irritancy Test	Non irritant
9.	Viscosity	39010 cps
10.	Phase Separation	No phase separation

The present research was the formulation and evaluation of polyherbal cream. The evaluation parameters were coming under results, like the physical evaluation of polyherbal cream, PH of the cream, Spreadability, Washability, non-irritancy test, viscosity and phase separation of the polyherbal pain relieving cream was shown in table 2.

III. DISCUSSION

The present work was the formulation and evaluation of polyherbal cream. The present work was focus on the revealing pain activity of herbal extracts or herbal oils. This cream formulation was used in rheumatoid arthritis to reduce joint pains. This cream formulation was o/w type of emulsion; hence this formulation was easily washed with plane water after application. The prepared formulation was good Spread ability. Viscosity and PH of the cream was good. Cream does not show any type of phase separation during storage. The cream was non-grassy in nature and easily removable after application. The formulation was Non-irritant and not harm to the skin.

IV. CONCLUSION

The *Eugenia caryophyllus* oil, *Zingiber officinale* oil and *Nyctanthes arbor-tristis* leaves extracts having pain relieving property and prepared in polyherbal cream formulation. Formulation of cream was done by slab method and further evaluated by various evaluation parameters such as physical properties, PH,

spread ability, Washability, non-irritancy test, viscosity and phase separation of cream and gives good results.

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