



Formulation Evaluation Of Herbal Ointment For Wound Healing

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1. Introduction

Ointment- Ointment is a smooth, thick, oily preparation that is applied to the skin to protect it, help heal wounds, or deliver medication. It usually contains a combination of oil (like petroleum jelly or lanolin) and water, but with a much higher oil content, making it greasy and able to stay longer on the skin compared to creams or lotions. Ointments are the semisolid dosage forms intended for external application to skin or mucous membrane. Ointments are semisolid dosage form which usually act as visco-elastic materials. When shear stress is applied, they generally contain medicinal ingredients and are used to be applied externally to the body for therapeutic effect. Many therapeutic agents used for topical application to intact or broken skin or to mucous membranes are presented in the form of Semisolid consistency variously designated as ointments, creams, pastes etc. It is used mainly as protective or emollient for the skin. The first step towards the goal is screening of plants used in Popular medicine. Along with other dosage forms, herbal drugs also used in the form of Ointment. Any greasy or oily semi solid preparation usually medicated can be applied externally to the skin in order to heal or soothe or protect it. It is viscous semi solid preparation used topically on a variety of body surface. Drug ingredients can be dissolved, emulsified or suspended in the ointment base. The word ointment comes from a Latin ungere meaning anoint with oil. Ointments are semisolid dosage form which usually act as visco-elastic materials when shear stress is applied. They generally contain medicinal ingredients and are used to be applied externally to the body for therapeutic effect. Many therapeutic agents used for topical application to intact or broken skin or to mucous membranes are presented in the form of semisolid consistency variously designated as ointments, creams, pastes etc. It is used mainly as protective or emollient for the skin. Ointments are viscous, unctuous, semisolid arrangements containing both dissolved or suspended useful ingredients. The ointment base wishes to be heated to above its melting temperature previous to the addition of the alternative ingredients. Low-shear or blending speeds are normally used while the ointment base or completed system is cold/thick. Mixing speeds and shear may be elevated while the ointment base is liquid, to uniformly disperse the useful ingredients. Mixers used for ointments normally appoint dual-movement counter-rotating blades with facet scrapers, to hold the fabric in regular motion and offer green warmth switch from the partitions of the combination vessel. External powder eductors may be used to comprise stable ingredients. Ointments are semisolid structures which commonly behave as viscoelastic substances whilst shear strain is implemented. They typically include medicaments and are supposed to be

implemented externally to the frame or to the mucous membrane. Non-medicated ointments generally mentioned as ointment bases intended for the practise of medicated ointments or used as such for emollient or lubricating effects. In prescription practice, diverse different phrases also are used as such for emollient used to designate numerous variant i.e. creams, pastes, cerates. Many medicaments intended for topical software to intact or damaged pores and skin or to mucous membranes, were offered withinside

the shape of semisolid consistency variously specific as ointment, creams, salves, pastes and so forth and used in particular as defensive or emollient for the pores and skin. Modern day

All ointments encompass a base which mainly acts as a provider for the medicaments. The nature of the bottom additionally controls its performance. Hence choice of ointment base may be very vital aspect in their formulation. For medical information of percutaneous absorption of ointment bases it is important to get acquainted with pores and skin shape when it comes to drug absorption. Herbal capsules also are formulated withinside the shape of ointment. The ointment base is ready and the ointment is formulated with the aid of using incorporating the lively components withinside the base at simplest ratio with the aid of using trituration. After the of of entirety of formulation, high-satisfactory of the ointment is classified in phrases of irritancy, spreadability, diffusion and stability. Traditional medicinal drug is an vital supply of probably beneficial new compounds for the improvement of chemotherapeutic agents. The first step in the direction of this intention is the screening of plant life utilized in famous medicinal drug. Along with other dosage forms, natural capsules also are formulated withinside the shape of ointment. An ointment is a viscous semisolid education used topically on quite a few frame surfaces. These consist of the pores and skin and the Mucous membranes can be found in the eyes, vagina, anus, and nose. Ointments can be either medicated or non-medicated. Medicated ointments have an active ingredient that is either dissolved, suspended, or emulsified in the base. These ointments are applied topically for various reasons, such as serving as protectants, antiseptics, emollients, antipruritics, keratolytics, and astringents. Pharmaceutical ointments are semisolid formulations designed for external use, mainly on the skin and mucous membranes. These ointments can be applied to the skin with or without massage. They may be oily, such as white ointment; completely devoid of oily components, like polyethylene glycol ointment; or consist of emulsions made from fatty or wax-like substances that contain a significant amount of water, such as hydrophilic ointment. Ointment formulations are semisolid topical preparations consisting of a medication combined with a suitable base, intended for application on the skin, mucous membranes, or wounds. They primarily serve protective, lubricating, and localized therapeutic purposes, and certain medications can also yield systemic therapeutic effects through absorption into the bloodstream. Ointments are characterized by their ability to maintain stable and prolonged blood concentration, safety and reliability, quick efficacy, ease of administration, and potential for widespread use. The wound healing ointment showed excellent local tolerability, receiving better evaluations than treatment using dressings alone. Notable differences in AUC values for re-epithelialization and overall wound healing effectiveness favored the ointment over dry wound healing methods. Wounds treated with the ointment healed more quickly, and both the designated as ointments, creams, salves, pastes etc used mainly as protective or emollient for the skin. The first step towards this goal is the screening of plants used in popular medicine. Along with other dosage forms, herbal drugs are also formulated in the form of ointment. Ointments are preparations applied to the skin, eyes, and mucus membranes used as medicines, moisturizers, or cosmetics. Ointments are

best used on dry skin because they trap moisture and are not well absorbed into the skin. When used for medical purposes, ointments are used for a variety of conditions, such as: Cuts and scrapes, Burns, Bites, Hemorrhoids. Ointments are also used to promote more complete absorption of the active ingredient or medication. An ointment is an oil-based topical formulation with a semi-solid consistency and a greasy look, suitable for application on the skin. The active therapeutic agents are dispersed in a medium typically composed of 80% oil and 20% water. This evenly mixed water and oil medium creates a thick suspension. This preparation is designed to provide a dense and viscous application, ensuring the effective absorption of the medicines through the skin. Additionally, ointments are often used to treat infections, as they offer a higher availability of therapeutic agents, making them particularly effective for skin conditions. According to the technical definition of ointments, each preparation is assigned a specific number that indicates the water content percentage in the formulation, known as the water number.

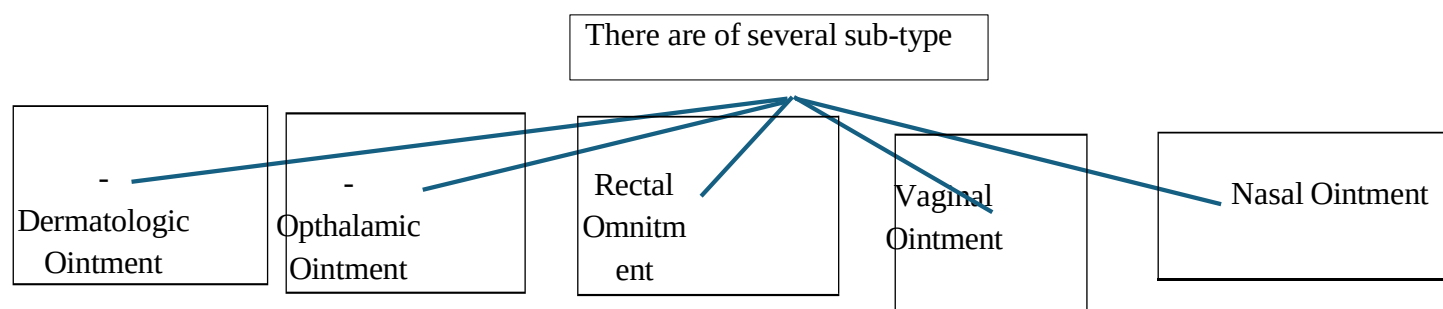
1.1 Type of Ointment

1 Unmedicated Ointment -

Unmedicated ointment are used for physical effect such as Protectant or lubricant. This ointment do not contain any drugs they are useful as emollients. eg -Petroleum jelly.

2 Medicated Ointment –

Either dissolved or dispersed in a vehicle as fine powder eg – Steroids. This medication used as a moisturizer to treat or prevent skin irritation (such as skin burns from the therapy). Medicated Ointment are used to treat infection, inflammation and pruritus. This ointment contains drug which show local or systemic



1. Dermatologic Ointment –

This Ointment are applied topically on the external skin. The ointment applied to the affected area a thin layer and spread evenly using gentle pressure with fingertips.

1. Epidermic Ointment – The drugs present into these type of ointment exert their actions on the epidermis of the skin

2. Endodermic Ointment – The drugs present in these type of Ointment exert their actions on the depends layer of cutaneous tissue

3. Diadermic Ointment – The drug present in these type of ointment enter into the deeper layer skin and finally in the systemic circulation and exert systematic effect.

2. Ophthalmic Ointment –

This are sterile preparation which are applied inside the lowery eye lid only unhydrous base used in their preparation Ointment is a nonirritating mixture of semisolid and solid hydrocarbons, such as paraffin, that melts at the body physiological temperature (Rathore and Nema, 2009). There are two most common types of ointment, simple-based ointment made up of one continuous phase of ointment and compound-based ointment made up of two-phase system like emulsions.

3. Rectal Ointment –

Rectal Ointment is a medicine used for relieving the pain associated with anal fissures (tear in the lining of the anus). It improves blood flow and reduces the pressure in anal tissues. This promotes healing of fissures and relieves pain. This medication is used to treat minor pain, itching, swelling, and discomfort caused by hemorrhoids and other problems of the anal area (such as anal fissures, itching). Hydrocortisone is a corticosteroid that reduces redness, itching, and swelling.

4. Vaginal Ointment –

Vaginal creams are medicines inserted into the vagina to treat a bacterial or fungal infection or to deliver estrogen to people with vaginal atrophy (thinning). It is important to apply the cream as directed to get the optimal result. If you have signs of a severe vaginal infection, see a healthcare provider.

5. Nasal Ointment –

This are used in the topical treatment of Nasal mucosa drugs get absorbed into the general circulation, through the rich blood supply of Nasal lining. Nasal Cream is a combination of two.

1.2 Advantages of Ointment -

- Handling of Ointment is easier than bulky liquid dosage forms
- They are chemically more stable than liquid dosage forms
- They facilitate application of the directly to the effected body parts and avoid exposure of other parts of the drug
- They are suitable for the patient who find it difficult to take the drug by parental and oral routes
- They prolonged the contact time between the drug effected area
- The bioavailability of drug administered as Ointment is more since it prevents passage liver
- They have site specific application of drug on affected area, which avoids unnecessary
- non target exposure of drug thereby avoiding side effect i.e. site specific action with less
- side effect.
- They avoid first pass metabolism of drug.

- Convenient for unconscious patients having difficulty in oral administration.
- Comparatively they are chemically more stable and easy to handle than liquid dosage forms.
- They are suitable dosage forms for bitter taste drugs

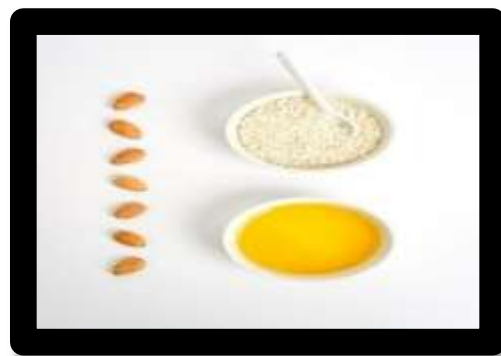
1.3 Disadvantages Of Ointment –

- They are bulkier than solid dosage forms
- When application of an exact quantity of Ointment to the affected area is required it is difficult to ascertain the same
- They are less stable than dosage forms
- These oily semisolid preparations are staining and cosmetically less aesthetic.
- Application with finger tip may contaminate the formulation or cause irritation when applied.
- As compared to solid dosage forms, semisolid preparations are more bulky to handle.
- Though semisolid allow more flexibility in dose, dose accuracy is determined by uniformity in the quantity to be applied.
- Physico-chemically less stable than solid dosage form.
- There is no dosage accuracy in semi solid dosage forms.
- The base which is used in the semisolid dosage form can be easily oxidized
- May cause staining
- They are bulky to handle
- Application with finger may cause contamination
- Physico - chemically less stable than solid dosage form
- May cause irritation or allergy to some patient.

1.4 Ingredients -



CALENDULA



ALMOND OIL



APRICOT OIL



LAVENDER OIL



BESS WAX

1 Calendula –

Common Name – Pot Marigold Family -Asteraceae

Calendula officinalis (Calendula), a member of the Asteraceae family, is often known as English Marigold or Pot Marigold. Marigold is a fragrant herb that has been used in traditional medicine for centuries. Calendula species have been highlighted in order to better understand their diverse biological activities and modes of action. Carotenoids, flavonoids, glycosides, steroids and sterols, quinines, volatile oil, and amino acids are all found in abundance in this plant. Calendula oil is still used as an antitumour agent in medicine, which is also a wound healing agent. Among herbal medicines[5]

2 Almond Oil

Common Name- Prunus Armeniaca kernel Family-Rosaceae

Almond is a product of popular medicinal plant *Purunus amygdalus* L. which has been used to cure and prevent ailments from Millennia. Almond trees are native to Asian countries. Almond is a valuable health benefiting food, as it is rich in antioxidants. It Contains flavonoids, fatty acids, vitamins, proteins, and essential minerals. Cholesterol lowering effects of almonds are due to the Presence of phytosterols. Almond has been used traditionally for curing wounds, anaemia, insomnia, headache, sore throat, brain Infections, kidney disorders, urinary infections, uteralgia, pityriasis, hysteria. Major pharmacological properties of almond include Hepatoprotective, anti-depressant, antioxidant, memory enhancing, and anti-aging effects.[6]

3 Apricot Oil –

Common Name – Prunus Amygdalus Dulcis Family – Rosaceae

Apricot kernel oil possesses anti-inflammatory properties, making it highly beneficial for those with sensitive or irritated. It can help alleviate common conditions like psoriasis and eczema by reducing redness, itching, and irritation. The oil's gentle nature makes it suitable for even the most sensitive skin types, promoting a calm and balanced complexion [7]

4 Lavender Oil –

Common Name – Lavandula Angustifolio Family-Lamiaceae

The oil is traditionally believed to have sedative, carminative, anti-depressive and anti- inflammatory properties, in addition to its recognised antimicrobial effect.[8]Lavender essential oil is well-known as a complementary therapy on its own and is often added to various over-the counter complementary health and cosmetic products. For centuries, therapeutic products made from the widely-used garden herb Lavender (*Lavandula* spp.) have been utilized, with the more recent introduction of its essential oils being notably used as an antibacterial during World War traditionally the oil is thought to possess sedation,carminative,Anti-depressant,and anti -inflamentary Properties along with its established antimicrobial benefits .

5 . Bees Wax -

Common Name - Cera Alba

Family – Apidae

Beeswax is a natural substance produced by worker bees that has many applications today. In skincare, it serves multiple purposes: it acts as an occlusive, forming a semi- occlusive barrier to reduce transepidermal water loss; as a humectant, it retains moisture; and as an emollient, it softens and calms the skin. Its natural properties have also been found to relieve symptoms linked to common skin conditions such as dermatitis, psoriasis, and the excessive growth of normal skin bacteria.Beeswax plays a crucial role in creams, ointments, and lotions due to its distinctive properties, which provide stability to emulsified mixtures and enhance the moisture retention of creams and ointments.

2. Material :

Sr.No	Ingredients	Chemical Constituents	Category
1	Calendula	Flavonoids, Triterpenoids, glycoside	Antioxidant, Antibacterial, Antifungal
2	Almond Oil	Oleic acid, linoleic acid	Anti-aging, Anti-inflammatory
3	Apricot Oil	Stearic Acid, Palmitic acid	Antiseptic, Antibacterial, Antioxidant, Anti-aging
4	Lavender Oil	Linalool, 1-8 Cineol	Anti-inflammatory, Anti-aging, Antibacterial
5	Bee Wax	Alkanes, Fatty Acids, Monoester	Anti-inflammatory

2.1.1 Extraction Method For Calendula

Weigh accurately Calendula Officinalis petals

Then measure the Almond oil and apricot oil

Add calendula officinalis in glass container

Infusion For 2 to 4 hours

Add that Almond oil and Apricot Oil Filter it and use

2.1.2 Formulation Table :

Ingredient	Amount
Sweet Almond Oil	12.5g
Apricot Kernel Oil	12.5g
Calendula Extract	10g
Beeswax	13.5g
Lavender Essential Oil	1.5g
Total	50g

2.1.3 Pcess :

Collect all the ingredients and glassware and clean the glassware

In one beaker add a calendula officinalis extract

Add The bees into that caledula extract and the mixture

Cool that mixture and add the lavender oil

Pour into the container and label it



Fig: 1 Herbal Ointment

3. Chemical Identification Test –

Sr. No	Test Name	Observation	Inference	Image
1	Lead acetate Test -Take extra 2-3 Ml -Add few drop of lead acetate solution	Formation yellow or white precipitate	Apperance yellow or white precipitate indicates presence of flavonoids	
2	Alkaline Reagents Test -Take the extra - add sodium hydroxide solution -Observe the colour change - add dilute hydrochloric acid	Observe the yellow Colour	Apperas yellow Colour disappers with acid indicates the presence of flavonoids	
3	Ferric Chloride Test -Take the extract - Dissolve in ethanol - Add 1-2 drop ferric chloride solution -Mix gently observed colour changes	Formation of red , blackish colouration	Presence of flavonoids	

4	Foam Test -2 ml plant extract -5ml distilled water - Shake for 30 second	If a stable froth or foam layer of at least 1 cm height persists for more than 10 minutes, it indicates the presence of saponins.	Foam persist Saponin is present	
5	Keller-Killani Test -plant extra 2 ml -add the glacial acetic acid -add the ferric Chloride solution -add the sulfuric acid	Reddish brown ring appear the junction two layer upper layer turn bluish green	Reddish brown ring and bluish green layer indicates presence of glycoside	
6	Borntagers Test -Boil 2 ml plant extract with 2 ml sulfuric acid cool& filter - Shake the filter equal volume of chloroform -Separate organic layer add 1 ml ammonia solution	A pink to red coloration in the ammoniacal (alkaline) layer indicates the presence of free anthraquinones, hence a positive test for anthraquinone glycosides.	Red,coloratio n in the ammoniacal layer indicates the presence of anthraquinon e glycosides	

7	Salkowski Test -plant extra - Add chloroform and conc sulphuric acid - extract Dissolve in chloroform add sulfuric acid	A reddish-brown coloration at the interface between the chloroform layer and the sulfuric acid layer	Formation of a reddish-brown ring at the interface confirms the presence of triterpenoids.	
8	Lieberman -Burchard Test -Dissolve the extract in chloroform - Add the acetic anhydride - Add sulfuric acid	A color change occurs at the junction of the two layers: The solution may show red, blue, green, or violet coloration depending on the type and structure of the triterpenoid or steroid present.	The development of red green these colors indicates the presence of triterpenoids.	
9	Solubility Test -The plant extract add the petroleum ether and acetone.	A yellow orange colour indicates	The indicates that yellow orange colour present the cartonoids	

4. Evaluation Test :

4.1 Organoleptic Evaluation :

1. **Colour** : pale yellow Colour
2. **Odour** : Characteristic
3. **Texture** : Smooth Consistency

4.2 Physical evaluation :

In this test, the cream was observed for colour, odour, texture, state.

4.3 Phase separation : An appropriate wide-mouth container was used to transport the produced cream. After being set aside for storage, the separation of the oil and aqueous phases became visible after 24 hour

4.4 Non irritancy test : The herbal ointment was placed on human skin, and its impacts were monitored. This included effects such as irritation and a burning sensation.

4.5 Stability studies : Stability test of a herbal ointment that has been prepared The formulation was investigated at room temperature.

4.6 Washability : The formulation was applied to the skin and then relaxed. The extent of washing with water was examined.

5. Results and Discussion :-

Sr no	Physical Chemical Characteristics	Observation
1	Colour	Pale Yellow
2	Odour	Characteristics
3	Phase separation	No Phase separation
4	Non irritancy Test	No Irritant
5	Stability Study	Stable
6	Washability	Good
7	Appearance	Good

6. Conclusion:-

The use of herbal ointment for wound healing demonstrates promising therapeutic potential due to its natural bioactive compounds with anti-inflammatory, antimicrobial, and antioxidant properties. These properties support faster tissue regeneration, reduced infection risk, and improved overall healing outcomes. Herbal formulations offer a safer alternative to synthetic medications with fewer side effects, making them an effective and accessible option in wound care. However, further clinical studies and standardization of herbal preparations are essential to validate efficacy, ensure consistency, and support wider medical use. Herbal products are increasingly being used in wound treatment due to their ability to enhance the skin's natural healing processes. These natural remedies show promise in promoting the body's own repair capabilities and are increasingly popular in therapeutic applications for wound treatment. We have seen an increase in the use of scientific methods to study plants and their extracts for their healing properties. This has led to an increasing number of herbal products being developed for wound treatment. The study of the seven therapeutic effects of herbal products has led researchers to discover many other plants for their healing and preventive properties. Future research should focus on separating and identifying individual active compounds present in plant extracts. This may lead to the discovery of compounds with greater therapeutic effects.

7. Future Prospective :

The future prospects of herbal ointments for wound healing are highly promising due to the growing global interest in natural and plant-based therapies. Herbal ointments, derived from medicinal plants such as , Calendula officinalis, and Almond oil Apricot oil lavender oil beeswax , offer a rich source of bioactive compounds with anti-inflammatory, antimicrobial, antioxidant, and tissue-regenerating properties. As consumers increasingly seek alternatives to synthetic drugs, herbal remedies are gaining popularity for their perceived safety and holistic healing benefits. Advances in biotechnology and nanotechnology are also enhancing the effectiveness of herbal ointments by improving the stability, bioavailability, and targeted delivery of active ingredients. Furthermore, ongoing scientific research is helping to validate traditional knowledge, encouraging the integration of herbal products into modern wound care practices. However, to fully realize their potential, challenges related to standardization, regulatory approval, and clinical validation must be addressed. With continued investment in research and development, herbal ointments are poised to become a valuable component of future wound management strategies.

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