

Formulation And Evaluation of Polyherbal Ointment

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ABSTRACT:

Ointments are semisolid dosage forms that frequently exhibit viscoelastic behaviour when subjected to shear stress. They contain medicinal ingredients and are frequently applied topically to the body for therapeutic purposes. Many medications that are applied topically to skin or mucous membranes, whether intact or injured, have a semisolid consistency and go by various names, including pastes, ointments, and creams. Usually, it is applied as a protective or emollient layer to the skin. Herbal formulations may contain active ingredients, herbal components, or both. Created herbal mixtures or a combination of numerous prepared herbal combinations containing herbal ingredients. Herbal medications are made using processes such as extraction, distillation, expression, fractionation, purification, concentration, or fermentation of herbal ingredients. In addition to various dosage forms, herbal drugs are commonly used as ointments.

I. INTRODUCTION:

Wound healing is a complex, highly regulated biological process involving a sequence of events, including hemostasis, inflammation, proliferation, and remodeling (Guo & Dipietro, 2010). Delayed wound healing can arise due to infection, oxidative stress, diabetes, aging, or poor vascularization. Conventional wound-healing agents such as antibiotics, antiseptics, and corticosteroids may cause side effects such as irritation, microbial resistance, allergic responses, or delayed tissue regeneration (Boateng & Catanzano,

2015). In contrast, herbal medicines, rich in phytochemicals, have been historically used for wound management due to their holistic activity and biocompatibility.

Herbal wound-healing ointments combine natural antimicrobial, anti-inflammatory, antioxidant, and tissue-repair properties, offering a multi-directional approach to wound care^[1-2]

TYPES OF WOUNDS:

1. ACUTE WOUNDS
2. CHRONIC WOUNDS
3. TRAUMATIC WOUNDS
4. SURGICAL WOUNDS
5. OPEN WOUNDS

PHASES OF WOUND HEALING:

Normal wound healing process comprises following four distinct overlapping phases:

1. Hemostasis
2. Inflammation
3. Proliferation
4. Maturation and Remodelling

1. Hemostasis:

At the time of surgical incision, vascular injury occurs on a macro- or microvascular scale. The immediate response of the body is to prevent exsanguination and promote hemostasis.

2. Inflammation:

The inflammatory phase is the immediate response to the trauma and sets about preparing the groundwork for the remaining two phases. The wound swells and there is the inevitable

bleeding which is a primary mechanism through which debris and toxins can be removed.

3. Proliferation:

This occurs over the course of four different processes:

- Epithelialization: This is the process of creating new skin tissue in the various layers of damaged skin.
- Angiogenesis: This is the creation of new blood vessels in the area of the wound healing.
- Collagen formation: This is the building up of strength in the tissue of the wound.
- Contraction: This is the reduction and eventual closing of the wound size and area.

4. Maturation and Remodelling:

This phase involves a balance between synthesis and degradation, as the collagen and other proteins deposited in the wound becomes increasingly well organized.^[3-4]

CLASSIFICATION OF OINTMENT BASE:

The base, which acts as an excipient for ointments and accounts for the vast majority of the ointment composition, confers a certain physicochemical profile to the ointment and plays an important role for both its quality and drug efficacy.

OINTMENT BASES:

1. Oily Bases
2. Emulsion-type Bases
3. Water-soluble Bases

1. Oily Bases:

- Oil-based ointment bases.
- Examples: Mineral oil, liquid paraffin, petrolatum, soft paraffin, etc.

2. Emulsion-type Bases:

Emulsion-type bases are further divided into 3 types based on the type of emulsion.

1. W/O (water in oil):

- Water droplets dispersed in oil phases.

2. O/W (oil in water):

- Oil droplets dispersed in water phase.

3. W/O/W (water in oil in water):

- Water droplets in oil, which are again dispersed in water.

4. Water-Soluble Bases:

- Include carbomer, Polyethylene glycol (PEG), etc.
- Emulsion type base can make drug easy transdermal absorption.
- Emulsion type base is further divided into w/o, o/w and w/o/w type.^[5-6]

ADVANTAGES OF OINTMENT:

- They offer a way to apply a medication site-specifically to the afflicted area, preventing needless non-target drug exposure and consequent unwanted effects.
- They steer clear of the drug's first pass metabolism.
- Convenient for individuals who are unconscious and have trouble taking medication orally.
- Compared to liquid dose forms, they are easier to handle and more chemically stable. They are appropriate dosage forms for medications with a bitter taste^[7-9].

DISADVANTAGES OF OINTMENT:

- Less stable physicochemically than solid dose forms.
- An aqueous solution can only be added up to 5% unless acetyl alcohol is added.

It is non greasy and washable if in o/w form.

- Broad compatibility.
- Avoid going rancid or encouraging the growth of microorganism.
- Nonirritating (to the same extent as lanolin, petrolatum, etc.)
- Stick firmly to the skin.
- Washes off easily.^[7-9]

IDEAL CHARACTERISTICS:

- **STABILITY:** It must remain physically and chemically and chemically stable across various storage conditions without separating, hardening, or liquefying.
- **SMOOTH TEXTURE:** The preparation must be completely free of roughness, grittiness, or large particles, ensuring the active ingredients are finely divided and evenly distributed.
- **INERT BASE:** The ointment base itself should be chemically inert and free of intrinsic pharmacological activity so it does not interfere with the active herbs.
- **SPREADABILITY:** It needs to spread easily and smoothly over the skin without feeling excessively sticky or greasy, ensuring high patient comfort.
- **RELEASE AND PENETRATION:** The vehicle should effectively release the active phytoconstituents and promote adequate penetration into the skin layers.
- **BIOCOMPATIBILITY:** It must be non-irritating, non-toxic, and safe for prolonged or

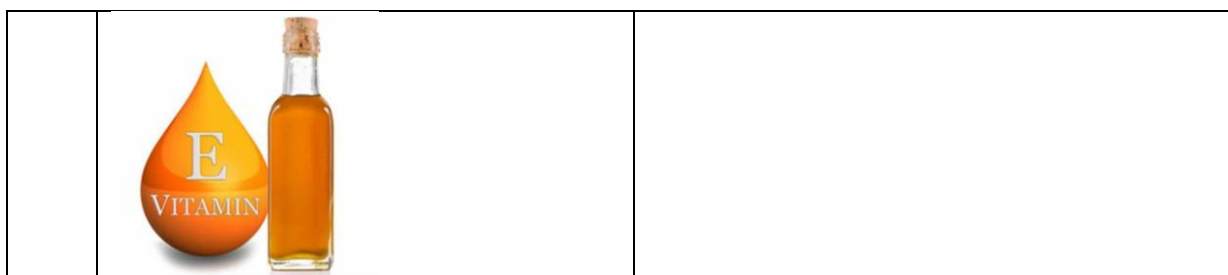
repeated contact with compromised or sensitive skin.

- TARGETED ACTION: It should provide localized therapeutic action- such as

antimicrobial, anti-inflammatory, antioxidant, or wound -healing effects without causing unwanted systemic exposure.^[10-11]

COMMON HERBS USED IN WOUND HEALING OINTMENT:^[12-18]

S.NO	HERB/INGREDIENT	ROLE
1.	Aloevera(<i>Aloe barbadensis</i>) 	Role in wound healing.
2.	Turmeric (<i>Curcuma longa</i>) 	Wound healing potential and anti-inflammatory activity.
3.	Honey (<i>Apis mellifera</i>) 	Role in wound healing and wound dressing.
4.	Neem (<i>Azadirachta indica</i>) 	Medicinal properties and role in wound healing.
5.	Coconut oil(<i>Cocos nucifera</i>) 	Antibacterial and skin-protective effects relevant to the wound healing.
6.	Beeswax(<i>Cera alba</i>) 	Characterization and potential pharmaceutical formulation applications.
7.	Vitamin E Oil(<i>Tocopherol</i>)	Antioxidant activity and role in skin health and wound healing.



EVALUATION PARAMETERS:^[19]

1. **PHYSICAL EXAMINATION:** The formulation were visually examined to assess their physical characteristics, including colour and scent.
2. **pH DETERMINATION:** The digital pH meter is use for measure the PH of the newly prepared formulation at room temperature. The results indicated that the formulations pH closely matches that of human skin, suggesting it is suitable for topical applications.
3. **STABILITY:** Stability evaluation of the drug product begins during the primary stages of drug development and continues until noticeable degradation of the active compound or final formulation occurs.
4. **HOMOGENESITY:**The uniformity of the herbal formulation was assessed through both visual inspection and tactile evaluation.
5. **VISCOSITY:** The thickness of the cream was measured using a Brookfield viscometer, operated at 2.5 RPM and maintained at a temperature of 25°C.
6. **WASHABILITY:** A minimal quantity of the cream was applied to the back bone of the hand , then rinsed off using warm water.
7. **CONSISTENCY:**A tiny portion of the cream was gently massaged between the thumb and forefinger to assess its texture. The formulation exhibited a smooth consistency.
8. **IRRITATION TEST:** No signs of redness, swelling, irritation, or inflammation were observed during the evaluation of the formulated cream. These findings indicate that the cream is safe for use.
9. **PHASE SEPARATION:**A sealed container is used for stored a formulation creams at ambient temperature, protected from direct sunlight, and monitored for 24 hours to check for any phase separation.

The combination of *Aloe vera*, *Curcuma longa*, *Ocimum sanctum* and *Azadirachta indica* provides a powerful synergetic wound healing formulation with anti-microbial, anti-inflammatory, anti-oxidant and tissue regenerative activities. Neumerous studies supports their individual and combined efficacy in accelerating wound contraction, increasing collagen deposition, and promoting epithelialization. Poly herbal ointments formulated from these botanicals represent a safe, cost effective and holistic alternative to synthetic wound care product. With proper standardization, stability enhancement and clinical validation, such formulations can play an important role in modern therapeutic wound management.

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II. CONCLUSION:^[20]

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