

## Review Article

### A REVIEW ON PREPARATION AND EVALUATION OF POLYHERBAL WOUND HEALING CREAM

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Polyherbal wound healing creams are formulations that combine multiple herbal extracts to enhance wound recovery. These creams have shown promise in promoting wound healing due to the synergistic action of their plant-based ingredients.

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#### Introduction:

##### Herbal Medicine:

Herbal medicine, also known as phytotherapy or botanical medicine, encompasses the use of medicinal plants and their extracts to prevent, alleviate, or cure diseases and promote overall health and wellbeing. Dating back to ancient civilizations, herbal medicine has been an integral part of traditional healing systems

worldwide, offering holistic and natural approaches to healthcare.

##### Wounds:

Wounds are disruptions or injuries to the skin or underlying tissues that require healing to restore normal function and integrity. They can be classified based on various factors, including cause, depth, location, and

associated complications. Proper wound management is essential to facilitate optimal healing outcomes and prevent infection, scarring, or chronic complications.

### Classification of Wounds:

Wounds can be classified into different categories based on their etiology, severity, and healing characteristics. Common classifications include acute wounds (such as cuts, abrasions, and surgical incisions) and chronic wounds (such as ulcers, pressure sores, and diabetic wounds). Understanding the type and characteristics of wounds is crucial for selecting appropriate treatment modalities and interventions.

### Treatment of Wounds:

The treatment of wounds involves a multidisciplinary approach aimed at promoting healing, preventing complications, and restoring tissue integrity. Conventional treatments may include cleaning and debridement, wound dressings, topical medications, and surgical interventions. Herbal wound healing creams offer a natural and complementary option for wound care, providing additional benefits such as anti-inflammatory, antimicrobial, and antioxidant effects.

### Skin:

The skin is the largest organ of the human body, serving as a protective barrier between the internal organs and the external environment. It consists of multiple layers of tissue that work together to perform various functions essential for overall health and well-being.

### Structure:

**The skin is composed of three main layers**

**1. Epidermis:** The outermost layer of the skin, primarily consisting of epithelial cells called keratinocytes. The epidermis acts as a protective barrier against physical, chemical, and microbial threats.

**2. Dermis:** The middle layer of the skin, composed of connective tissue containing collagen and elastin fibers, blood vessels, nerves, and appendages such as hair follicles and sweat glands. The dermis provides structural support, elasticity, and nourishment to the skin.

**3. Hypodermis (Subcutaneous Tissue):** The innermost layer of the skin, consisting of adipose tissue (fat cells) and loose connective tissue. The hypodermis serves as insulation, energy storage, and cushioning for the body.

### Introduction to the Epidermis:

The epidermis is the outermost layer of the skin, serving as a protective barrier against external factors such as pathogens, UV radiation, and chemical irritants. Composed mainly of specialized cells called

keratinocytes, the epidermis undergoes constant renewal and regeneration to maintain skin health and integrity.

### Key Characteristics of the Epidermis:

**1. Stratified Structure:** The epidermis is organized into layers or strata, each with unique characteristics and functions. These layers include the stratum corneum, stratum granulosum, stratum spinosum, and stratum basale.

**2. Keratinocytes:** Keratinocytes are the predominant cells in the epidermis responsible for producing the protein keratin. As keratinocytes migrate from the basal layer to the outer layers of the epidermis, they undergo a process of differentiation, ultimately forming the protective barrier of the skin.

**3. Melanocytes:** Melanocytes are specialized cells found in the basal layer of the epidermis that produce melanin, the pigment responsible for skin color. Melanin helps to protect the skin from the harmful effects of UV radiation by absorbing and dissipating ultraviolet light.

**4. Langerhans Cells:** Langerhans cells are immune cells located in the epidermis that play a key role in the skin's immune response. They help to detect and eliminate pathogens, toxins, and foreign substances that come into contact with the skin.

**5. Desquamation:** Desquamation, or shedding of dead skin cells, is a natural process that occurs in the epidermis to maintain skin health and renewal. As new cells are formed in the basal layer, older cells are gradually pushed to the surface and sloughed off.

**6. Barrier Function:** One of the primary functions of the epidermis is to serve as a barrier, preventing water loss and protecting the body from environmental hazards. The stratum corneum, the outermost layer of the epidermis, is particularly important for maintaining this barrier function.

### Introduction to the Dermis:

The dermis is the thick, middle layer of the skin located beneath the epidermis. It is composed mainly of connective tissue and contains a complex network of structures that provide support, nourishment, and sensory perception to the skin. Understanding the dermis is crucial for comprehending the skin's resilience, elasticity, and ability to respond to external stimuli.

### Key Characteristics of the Dermis:

**1. Connective Tissue Matrix:** The dermis is primarily made up of connective tissue, including collagen, elastin, and reticular fibers. Collagen provides strength and structural support to the skin, while elastin allows it to stretch and recoil. Reticular fibers form a mesh-like

network that supports blood vessels and other structures

**2. Blood Vessels:** The dermis contains a network of blood vessels that supply oxygen, nutrients, and immune cells to the skin cells. These blood vessels also play a role in thermoregulation, helping to regulate body temperature by constricting or dilating in response to changes in environmental temperature.

**3. Nerve Endings:** The dermis is richly supplied with nerve endings that transmit sensory information such as touch, pressure, pain, and temperature to the brain. These nerve endings allow us to perceive sensations and respond to stimuli from the external environment.

**4. Hair Follicles:** Hair follicles are structures embedded in the dermis that produce hair. Each hair follicle contains specialized cells responsible for hair growth and maintenance. The dermis also contains sebaceous glands, which secrete sebum, an oily substance that lubricates the hair and skin.

**5. Sweat Glands:** Eccrine sweat glands, responsible for producing sweat, are located in the dermis. Sweat helps to regulate body temperature by evaporative cooling and plays a role in excreting metabolic waste products from the body.

**6. Immune Cells:** The dermis contains various immune cells, including mast cells, macrophages, and lymphocytes, which help to detect and eliminate pathogens, toxins, and foreign substances that enter the skin.

**7. Papillary and Reticular Layers:** The dermis is divided into two main layers: the papillary dermis and the reticular dermis. The papillary dermis, located closest to the epidermis, contains finger-like projections called dermal papillae that interlock with the epidermis. The reticular dermis, located deeper in the skin, is denser and contains larger blood vessels and nerve endings. Overall, the dermis plays a critical role in supporting and maintaining the health and function of the skin. Its complex network of structures and cells allows the skin to respond to a wide range of physiological and environmental challenges, ensuring the body's overall well-being.

### Introduction to the Hypodermis :

The hypodermis, also known as the subcutaneous tissue or superficial fascia, is the deepest layer of the skin located beneath the dermis. While technically not part of the skin itself, the hypodermis plays a crucial role in supporting and connecting the skin to the underlying muscles and bones. Understanding the hypodermis is essential for comprehending the body's overall structure

and function.

### Key Characteristics of the Hypodermis:

**1. Adipose Tissue:** The hypodermis consists primarily of adipose tissue, also known as fat tissue. Adipose tissue serves as a storage depot for energy in the form of triglycerides and provides insulation and cushioning to the body.

**2. Connective Tissue:** In addition to adipose tissue, the hypodermis contains connective tissue, including collagen and elastin fibers, which provide support and elasticity to the skin and underlying structures.

**3. Blood Vessels and Nerves:** The hypodermis contains a network of blood vessels and nerve endings that supply oxygen, nutrients, and sensory information to the skin and underlying tissues. Blood vessels in the hypodermis also play a role in thermoregulation, helping to regulate body temperature.

**4. Attachment to Muscles and Bones:** The hypodermis serves as a connective tissue layer that attaches the skin to the underlying muscles and bones. This connection provides structural support and stability to the body and allows for movement and flexibility.

**5. Insulation and Thermoregulation:** Adipose tissue in the hypodermis acts as insulation, helping to maintain body temperature by reducing heat loss. It also serves as a source of energy during times of fasting or increased energy expenditure.

**6. Protection:** While the hypodermis itself does not have a protective function like the epidermis or dermis, its cushioning and insulation properties help protect underlying structures from external trauma and mechanical stress.

### Function:

The skin performs several vital functions, including:

**1. Protection:** The skin acts as a physical barrier, protecting the body from mechanical trauma, pathogens, UV radiation, and chemical exposure.

**2. Sensation:** The skin contains sensory receptors that detect touch, pressure, temperature, and pain, allowing us to perceive and respond to stimuli from the environment.

**3. Thermoregulation:** The skin helps regulate body temperature by producing sweat to cool the body

through evaporation and by dilating or constricting blood vessels to release or retain heat.

4. **Excretion:** The skin excretes small amounts of metabolic waste products, salts, and water through sweat glands, contributing to the body's detoxification process.

5. **Synthesis of Vitamin D:** The skin produces vitamin D in response to UV radiation from sunlight, which is essential for calcium absorption and bone health.

6. **Immune Defense:** The skin is part of the body's immune system and contains specialized immune cells that help protect against infections and foreign invaders.

Overall, the skin plays a crucial role in maintaining homeostasis, protecting the body from external threats, and supporting overall health and well-being.

### Topical Drug Delivery System:

Topical drug delivery systems are formulations designed to deliver medications directly to the skin surface or to specific sites on or within the skin for localized therapeutic effects. These systems can include various types of formulations such as creams, face wash, ointments, gels, lotions, patches, foams, and sprays. They are commonly used for dermatological conditions, pain management, and transdermal drug delivery.

1. **Localized Treatment:** They allow targeted delivery of medication to the affected area, minimizing systemic side effects.

2. **Convenience:** Many topical formulations are easy to apply and can be self-administered by patients.

3. **Reduced Side Effects:** By bypassing the gastrointestinal tract and liver metabolism, topical delivery can reduce the risk of systemic side effects.

4. **Improved Patient Compliance:** Topical formulations are often preferred by patients due to their ease of use and reduced systemic side effects.

### Components of topical drug delivery systems include:

1. **Active Pharmaceutical Ingredient (API):** This is the medication that provides the therapeutic effect.

2. **Base or Vehicle:** The base or vehicle of the formulation provides a suitable medium for the API and helps in its delivery to the skin. Common bases include creams, ointments, gels, and patches.

3. **Penetration Enhancers:** These are substances that help the drug penetrate the skin barrier and reach the target site more effectively.

4. **Preservatives and Stabilizers:** These components help maintain the stability and shelf-life of the formulation.

5. **Permeation Enhancers:** These agents improve drug permeation through the skin by altering its barrier properties.

6. **Excipients:** Excipients are non-active ingredients added to the formulation to improve stability, consistency, and other properties.

### Herbal Wound Healing Cream:

Herbal wound healing cream represents a natural and holistic approach to wound management, harnessing the therapeutic properties of medicinal plants to promote tissue repair, reduce inflammation, and prevent infection. These creams are formulated with botanical extracts, essential oils, and other plant-derived ingredients, offering gentle yet effective alternatives to conventional wound care products.

### Herbal Wound Healing Cream in Modern Society:

In modern society, there is a growing recognition of the potential benefits of herbal medicine in wound care. With increasing concerns about the side effects and limitations of synthetic drugs, herbal wound healing creams have gained popularity among consumers seeking safer, sustainable, and ecofriendly alternatives. These formulations are embraced for their efficacy, safety, and compatibility with the body's natural healing processes.

### History of Herbal Wound Healing Cream:

The history of herbal wound healing cream is deeply intertwined with the evolution of human civilization and the utilization of natural remedies for treating injuries and ailments. The concept of using plants and plant-derived substances for wound care dates back to ancient times, where various cultures around the world developed their own traditional healing practices based on indigenous flora.

### Ancient Civilizations:

In ancient civilizations such as Egypt, Mesopotamia, China, and India, medicinal plants played a crucial role in wound care. Historical records from ancient Egypt, dating back to around 3000 BCE, mention the use of herbal preparations, including substances like honey, aloe vera, and myrrh, for treating wounds and skin conditions. Similarly, ancient Indian texts like the

Ayurveda and traditional Chinese medicine (TCM) scriptures document the use of botanical remedies for wound healing.

### 1. Medieval Europe:

During the middle Ages in Europe, herbal medicine continued to flourish, with monastic gardens serving as centers for cultivating medicinal plants. Herbalists and healers developed various ointments, salves, and poultices using plants such as comfrey, plantain, chamomile, and yarrow for treating wounds, cuts, and burns.

### 2. Renaissance and Early Modern Period:

The Renaissance period witnessed a resurgence of interest in herbal medicine and botanical studies. Physicians and herbalists like Nicholas Culpeper in England and Paracelsus in Europe advocated for the use of herbal remedies in wound care. Herbal formulations were commonly used both topically and internally to promote wound healing and alleviate inflammation and pain.

### 1. 19<sup>th</sup> and 20<sup>th</sup> Centuries:

With the advent of modern medicine in the 19<sup>th</sup> and 20<sup>th</sup> centuries, there was a shift towards synthetic drugs and pharmaceutical preparations. However, traditional herbal remedies persisted in folk medicine practices and alternative healing modalities. In the early 20<sup>th</sup> century, advancements in pharmacology led to the isolation and identification of active compounds in medicinal plants, further validating their therapeutic potential.

### 2. Contemporary Era:

In recent decades, there has been a resurgence of interest in natural and herbal remedies, fueled by growing consumer demand for alternative healthcare options and concerns about the safety and side effects of synthetic drugs. Herbal wound healing creams, formulated with botanical extracts, essential oils, and other plant-derived ingredients, have gained popularity for their purported efficacy and minimal adverse effects.

Throughout history, the development of herbal wound healing creams has been shaped by a combination of empirical observation, traditional knowledge, and scientific inquiry. While modern research continues to explore the pharmacological properties and mechanisms of action of medicinal plants, traditional herbal remedies remain a cornerstone of holistic healthcare approaches, offering a natural and time-tested alternative for promoting wound healing and skin health.

### Types of wound healing cream:

Wound healing creams can be categorized into several types based on their composition and intended use. Here are some common types:

**1. Antibacterial Wound Healing Creams:** These creams contain antibacterial agents such as silver sulfadiazine or iodine to prevent or treat infections in wounds. They are often used for burns, cuts, and other wounds at risk of bacterial contamination.

**2. Moisturizing Wound Healing Creams:** These creams are designed to keep the wound bed moist, which is essential for optimal wound healing. They often contain ingredients like petrolatum, glycerin, or hyaluronic acid to hydrate the skin and promote healing.

**3. Antifungal Wound Healing Creams:** These creams contain antifungal agents such as clotrimazole or miconazole to treat fungal infections in wounds, such as athlete's foot or fungal nail infections.

**4. Antiinflammatory Wound Healing Creams:** These creams contain antiinflammatory agents like corticosteroids or nonsteroidal antiinflammatory drugs (NSAIDs) to reduce inflammation and pain in wounds, such as insect bites or rashes.

**5. ScarReducing Wound Healing Creams:** These creams contain ingredients like silicone or onion extract to minimize the appearance of scars and promote smoother healing of wounds, particularly surgical scars or keloids.

**6. Herbal Wound Healing Creams:** These creams contain natural ingredients derived from plants, such as calendula, comfrey, or aloe vera, which have been traditionally used for wound healing purposes. They may have antibacterial, antiinflammatory, and skinsoothing properties.

**7. Advanced Wound Healing Creams:** These creams contain bioactive compounds or growth factors that promote the proliferation of new skin cells and accelerate wound healing. They are often used for chronic or difficulttoheal wounds, such as diabetic ulcers or pressure sores.

**8. Hemostatic Wound Healing Creams:** These creams contain hemostatic agents such as kaolin or calcium alginate to promote blood clotting and control bleeding in wounds, particularly traumatic injuries or surgical wounds. The choice of cream depends on the type and severity of the wound, as well as any underlying medical conditions.

### PLANT PROFILE

#### A) Aloe vera:

Botanical name – Aloe Barbadensis miller

Kingdom – plantae  
 Family – asphodeloideae  
 Odour – aspragales  
 Genus – aloe



Fig. Aloe vera

#### A) Rose

**Synonyms:** None

**Vernacular Name:** Rose

**Botanical Name:** Rosa spp. (There are numerous species and cultivars within the Rosa genus)

**Biological Source:** Roses are flowering plants belonging to the genus Rosa in the Rosaceae family.

**Family:** Rosaceae

**Geographical Source:** Roses are native to various regions worldwide, including Europe, Asia, North America, and Africa. They are cultivated in gardens, parks, and landscapes globally.

**Morphology:** Roses are woody shrubs or climbers with prickly stems and compound leaves. They produce fragrant flowers in various colors, including red, pink, white, and yellow. The flowers typically have five petals and are arranged in clusters called inflorescences.

**Microscopy:** Microscopic examination of rose tissues may reveal epidermal cells, stomata, glandular trichomes, vascular bundles, and other anatomical features characteristic of flowering plants.

**Chemical Constituents:** Roses contain various chemical constituents, including: Essential oils (citronellol, geraniol, nerol) Phenolic compounds (flavonoids, phenolic acids) Carotenoids (betacarotene, lycopene) Vitamins (vitamin C) Mucilage

**Structure:** Provide information about the chemical structure of key constituents if needed.

**Uses:** Roses have been used for various purposes, including: Ornamental: Roses are cultivated for their beauty, fragrance, and ornamental value in gardens, parks, and landscapes.

**Aromatherapy:** Rose essential oil is used in aromatherapy for its calming, uplifting, and moodenhancing properties.

**Skincare:** Rosewater, rose oil, and rose extracts are used in cosmetics, lotions, and skincare products for their moisturizing, soothing, and rejuvenating effects on the skin.

**Culinary:** Rose petals are used in culinary applications to add flavor and aroma to dishes, desserts, teas, and beverages.

**Medicinal:** Roses have been used in traditional medicine for various health conditions, including digestive disorders, menstrual irregularities, and respiratory ailments.

#### Vitamin E capsule Role:-

- Vitamin E capsule in controlling hyperpigmentation
- It is essential for preventing skin damage
- It requires for restore skins natural health
- Reduces skin itching
- Prevents blemishes & acne
- Minimizes the appearance of scars



Fig. Vitamin E capsule

#### Paraffin Wax:

Paraffin wax is a colorless, soft wax that can provide therapeutic heat therapy for the hands and feet. It also has softening and moisturizing effects on the skin



Fig. Paraffin Wax

#### OLIVE OIL:

Olive oil is seen as the premier oil of choice for many reasons, though the health benefits are a big one! Where vegetable and canola oil, for example, are very processed and high in saturated fats, olive oil's nutritional makeup features beneficial, healthy fats and acids. However, it is important to note that different variations of olive oil have different health benefits. For the most nutrients, stick with extra virgin or virgin.



Fig. Olive Oil

**SANDALWOOD OIL:**

Sandalwood essential oil is found in many perfumes and air fresheners. It's a classic scent from a valuable tree. But the value of sandalwood oil may go beyond smell. Sandalwood may offer some health benefits as well. Sandalwood essential oil comes from Trusted Source the wood and roots of *Santalum album*, or the East Indian sandalwood tree. This is one of the most valuable trees in the world. Its products are used across the globe. West Indian and African sandalwood oils have also been produced in the past, but they're no longer widely available.



Sandalwood Oil:

**MATERIAL AND METHODS**

**MATERIALS:**

Sr. No.	Ingredients	Quantity	Use
01	Alovera oil	15	Wound Healing Property
02	Rose Infused Oil	10	Antioxident
03	Paraffin Wax	10	Thickner
04	Olive Oil	15	Vehicle
05	Vitamin E	1	Preservative
06	Sandal Wood Oil (Essential Oil)	1	Essence

**EQUIPMENTS:**

Sr. No.	Equipment Name	Company/Use
01	Beaker	To Formulate
02	Measuring Cylinder	To Measure The Quantity
03	Sturrer	To Mix
04	Stand	To Hold Doublr Boillier
05	Water Bath	Double Boillier
06	Wire Guaze	To Hold Double Boillier
07	Glass Jar	As a Storage

**METHODOLOGY:**

Formulation Table: To formulate 50ml of Herbal Wound Healing Cream

Sr. No.	Ingred ients	F1(ml/gm )	F2(ml/g m)	F3(ml/g m)
01	Alovera Oil	10	10	15
02	Rose Infused Oil	10	10	10
03	Paraffin Wax	10	10	10
04	Olive Oil	20	20	15
05	Vitamin E	1	1	1
06	Sandal Wood Oil (Essential Oil)	-	1	1

**Process:**

To formulate a herbal wound healing cream using the listed ingredients, you can follow these general steps:

**1. Prepare Calendula Infused Oils:**

Alovera mucilage in carrier oil (olive oil) using the maceration method. Allow the herb to steep in the oil for several weeks in a warm, dark place, shaking the jar regularly to ensure thorough extraction.



Fig.Prepare Calendula Infused Oils

**2. Prepare Rose Infused Oil:**

Infuse dried Rose petals in carrier oil (olive oil) using the maceration method. Allow the herb to steep in the oil for several weeks in a warm, dark place, shaking the jar regularly to ensure thorough extraction.

Once infused, strain the oil to remove the plant material/rose petals, resulting in Rose-infused oil.



**Fig. Prepare Rose Infused Oil**

### 3. Melt Paraffin Wax:

Heat the paraffin wax in a double boiler until it melts completely. Paraffin wax helps stabilize the cream and provides a thickening agent.

### 4. Combine Ingredients:

In a mixing bowl, combine the Calendula-infused oil, Rose-infused oil, melted paraffin wax, olive oil, and a few drops of vitamin E oil. Vitamin E oil acts as a natural preservative and antioxidant, helping to extend the shelf life of the cream. Stir the mixture thoroughly to ensure all ingredients are well incorporated.

### 5. Add Essential Oil:

Once the mixture has cooled slightly but is still liquid, add a drop of Sandalwood essential oil for its antimicrobial and soothing properties. Be cautious not to add too much essential oil, as it can be irritating to sensitive skin.

### Conclusion:

In conclusion, the formulation and evaluation of a herbal wound healing cream incorporating Alovera and Rose infused oils represent a significant advancement in natural skincare and wound care research. Through pharmacognostic studies and phytochemical analysis, Alovera and Rose were characterized for their botanical features and bioactive constituents, confirming their traditional medicinal properties and antioxidant activity. The antioxidant potential of alovera and Rose extracts was demonstrated through DPPH and FRAP assays, highlighting their ability to neutralize free radicals and protect against oxidative stress. These findings underscore the therapeutic benefits of Alovera and Rose in promoting skin health and wound healing, making them valuable ingredients for herbal formulations. By formulating a herbal wound healing cream with Alovera and Rose infused oils, this research offers a natural, safe, and effective alternative to conventional wound care products. The synergistic effects of Calendula and Rose on tissue repair, inflammation reduction, and antioxidant

protection hold promise for enhancing wound healing outcomes and improving patient wellbeing. Overall, the formulation and evaluation of the herbal wound healing cream represent a convergence of traditional wisdom and modern science, harnessing the therapeutic power of nature to address the complex challenges of wound care. Further studies are warranted to optimize the formulation, assess its efficacy in clinical settings, and explore its potential applications in skincare and dermatology. Through continued research and innovation, herbal formulations like Alovera and Rose-infused wound healing cream have the potential to revolutionize wound management and contribute to a more sustainable and holistic approach to healthcare.

In modern society, there is a growing recognition of the potential benefits of herbal medicine in wound care. With increasing concerns about the side effects and limitations of synthetic drugs, herbal wound healing creams have gained popularity among consumers seeking safer, sustainable, and ecofriendly alternatives. These formulations are embraced for their efficacy, safety, and compatibility with the body's natural healing processes.

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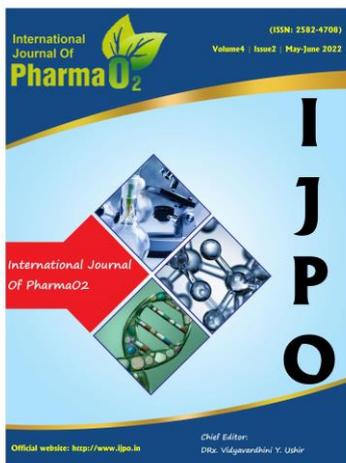
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