INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

A Review on *Maytenus Emarginata* Herbal Ointment for Burn Treatment

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ARTICLE INFO

Published: 05 Sept. 2025
Keywords:
Maytenus emarginata, Burn skin, Wound healing, Herbal Ointment, Curcuma longa, Natural burn treatment
DOI:
10.5281/zenodo.17062549

ABSTRACT

Burn skin are one of the most prevalent forms of skin trauma, and they frequently result in discomfort, infection, inflammation, and a delayed rate of wound healing. Herbal formulations have drawn a lot of attention for the treatment of burns as contemporary medicine looks for safer and more accessible substitutes for synthetic medications. The creation and possible therapeutic benefits of a herbal ointment utilizing Maytenus emarginata and Curcuma longa for the treatment of burn injuries are the main topics of this review. Rich in bioactive components like flavonoids, tannins, alkaloids, and triterpenoids, Maytenus emarginata is a plant that is frequently used in traditional medicine. These elements help the plant's anti-inflammatory, antibacterial, and wound-healing qualities. Known for its curcumin concentration, curcuma longa (turmeric) has additional regenerative and antioxidant properties that make it a useful ingredient in skin healing products. The possible advantages of mixing Maytenus emarginata and Curcuma longa in a topical ointment for burn therapy are highlighted in this review. It offers a thorough rundown of their phytochemical characteristics, plant profiles, and formulation procedure. A promising natural method for improving burn wound healing is provided by the complementary effects of both plants.

INTRODUCTION

One of the most prevalent types of trauma is burn injury, which frequently causes excruciating pain, infection, scarring, and in extreme situations, permanent impairment or even death. Although they are successful at reducing infection, conventional treatments like silver sulfadiazine and synthetic dressings frequently have drawbacks such delayed wound healing, allergic responses, and antibiotic resistance. Because of their accessibility, reduced adverse impact profile, and the presence of bioactive chemicals that encourage tissue regeneration, there has been an increase in

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

interest in investigating plant-based options for burn management. A medicinal plant that has long been utilized in many folk medical systems, *Maytenus emarginata* has recently drawn interest due to its possible anti-inflammatory and wound-healing qualities. *M. emarginata,* which is abundant in flavonoids, tannins, and triterpenoids, has cytoprotective, antibacterial, and antioxidant qualities that are very important for treating burn injuries. With an emphasis on pharmacological mechanisms, formulation methods, and the most recent scientific data pertaining to its use, this review attempts to assess the effectiveness and therapeutic potential of herbal ointments derived from *Maytenus emarginata* in the treatment of burns.

Burn Skin:

The biggest organ in the body, the skin serves many essential purposes. It preserves the body's structure, serves as an internal organ barrier, stops fluid loss, controls body temperature, enhances sensory awareness, absorbs certain substances, and is essential for immune defense. Burns are particularly prevalent across all age groups among the numerous injuries that can affect the skin, underscoring their significance as a significant worldwide health issue. Burns happen when the skin and, in more extreme situations, the underlying tissues are damaged by thermal, chemical, electrical, or radiation causes. The thickness of the many layers that make up the skin varies depending on the area of the body. For example, the whole epidermis is around 0.1 mm thick on the forearm, whereas the stratum corneum, the outermost layer of the epidermis, is about 0.05 mm thick. The dermis, which normally has a thickness of 0.5 to 0.7 mm, is located beneath it. The thickness of the subcutaneous fat layer, which lies beneath the dermis, varies depending on a person's nutritional state. Often extending deep into the dermis and even into subcutaneous fat, structures lined with epidermal cells include sweat glands and hair follicles. These cells are essential for wound healing because they produce healthy epithelial cells that migrate to cover injured areas. The two main blood vessel layers that the skin's vascular system uses to promote this healing process are located close to the epidermis and the interface between the dermis and subcutaneous tissue. In addition to delivering nutrition, these arteries aid in controlling body temperature. Burns are often categorized based on how severe the burn appears, though depth can also be used.

Types of Burns:

Based on the extent and depth of the skin's surface penetration, burns are categorized as first, second, third, or fourth degree.

1. First degree (superficial burns): Burns of this type only harm the epidermis, the outermost layer of the skin. The burn site is blister-free, red, and painful. One example might be a minor sunburn. Usually appearing as a change in skin tone, long-term tissue damage is rare.

2. Second degree (partial thickness burns): A second degree burn involves some of the epidermis and the dermis. The burn site may be excruciatingly swollen, blistering, and red.

3. Third-degree (full thickness) burns: Third-degree burns destroy the dermis and epidermis. They may reach the deepest layer of the skin, the subcutaneous tissue. The burned region may appear white or charred and blackened.

4. Fourth degree burns: Fourth degree burns pierce deeper tissue, which may include bone and muscle, as well as the epidermis and underlying tissue. There is no feeling in that place since the nerve endings have been destroyed. Burn wound

healing is a multi-phase biological process. It starts with inflammation, which is brought on by damage to blood vessels and cell and plasma leaks. The creation of granulation tissue, which is fueled by fibroblasts and macrophages that rebuild the extracellular matrix, and re-epithelialization, in which epithelial cells start to fill the wound, come next. The formation of a healthy wound bed also depends on neovascularization, the process by which endothelial cells produce new blood vessels. Cells, cytokines, and matrix proteins work together in concert to promote wound contraction and, eventually, tissue regeneration. Because of nerve endings in the epidermis, first-degree burns can still be quite painful even though they are usually regarded as moderate and heal rapidly. They are characterized by moderate edema, dryness, and redness.

Ointment:

When exposed to shear stress, semi-solid compositions known as ointments exhibit viscoelastic behavior. These preparations are mostly meant for topical application on the skin or mucosal surfaces and typically contain active pharmacological substances. Non-medicated forms, often known as ointment bases, have lubricating and moisturizing properties and can also transport pharmaceutical ingredients. Emollient compositions with certain properties are frequently classified as creams, pastes, or cerates in prescription nomenclature. Ointments, creams, salves, and pastes are examples of semisolid forms that are frequently applied to mucous membranes and both healthy and damaged skin. Their main function is to protect and moisturize the skin. Modern formulations aim to improve drug penetration into the systemic circulation, whereas older ointments were purely defensive. Topical application of these semisolid dose forms to the skin, eyes, nasal cavities, vagina, and rectum is common. Applying ointments to the skin or mucous membranes can have medicinal, preventative, or aesthetic effects. At the site of application, these formulations produce localized effects by allowing the active ingredient to permeate the surface. Ointments, which act as the target location for medicine delivery, are mostly used to treat skin-related disorders. They are usually water-in-oil (W/O) or oil-in-water (O/W) emulsions, which are made up of both water and oil. Water droplets are scattered throughout a continuous oil phase in W/O emulsions, whereas oil droplets are scattered throughout a continuous water phase in O/W emulsions. Emulsions that contain both water and oil are generally easier to remove, feel less greasy, and work better in cosmetic formulations. Ointments are semisolid formulations that are applied externally to the skin or mucous membranes. Usually, they serve as cosmetic, medicinal, or defensive measures. Based on the kind of base and intended use, ointments can be categorized.

Classification of Ointments:

Table 1. Classification of Ointments.

Classification on the Type of Base	1.Oleaginous (Hydrocarbon) Bases	2.Absorption Bases:		3.Water-Removable Bases	4.Water-Soluble Bases
		Anhydrous Absorption Bases (Absorb water)	Emulsion Absorption Bases (Contain Water)		
Example	1.Petrolatum. 2.White ointment.	1.Hydrophilic petrolatum.	1.Lanolin. 2.Cold cream Base.	1.Hydrophilic ointment.	1.Polyethylene glycol ointment. 2.Glycerin.

Characteristics	1.Greasy. 2.Water-repellent. 3.Non-washable.	1.Water absorbing capacity. 2.Stable. 3.Non-reactive.	1.Moderate occlusion. 2.Non-greasy.	1.Oil-in-water emulsions. 2.Non-greasy. 3.Easily washable.	1.Non greasy. 2.completely water-washable.
Uses	1.Protective. 2.Emollient effects.	1.Bases for Creams. 2.Bases for Ointment.	1.Topical preparations. 2.Moisturizing products.	1.Often used for drug delivery. 2.Anti-aging products.	1.Useful for Incorporating Water-soluble drugs.

Table 2. Classification of Ointments on purpose or use.

Classification on purpose or use	**1.Medicated Ointments**	**2.Non-Medicated Ointments**
Example	1.Antifungal ointments. 2.Antibiotic ointments.	1. Moisturizing ointments. 2. Skin creams for dry skin.
Characteristics	1. Moisturizing. 2. Protective. 3. Emollient. 4. Non-therapeutic. 5. Cosmetic use.	1. Therapeutic effect. 2. Topical application. 3. Localized effect. 4. Specific formulation.
Uses	1. Handling infections of the skin . 2. Reducing inflammation of the skin. 3. Taking care of skin disorders. 4. Avoiding infections. 5. Calming and soothing skin rashes.	1.Hydrating parched skin. 2. Calming and soothing inflamed skin. 3. Guarding against stressors in the environment. 4. Softening and hydrating skin. 5. Preserving the appearance and health of skin.

Advantages of Ointments:

1.Extended release: Ointments have the ability to release the active ingredient gradually, resulting in effects that last longer.

2. Moisturizing: Ointments are good for dry or irritated skin conditions since they can aid to hydrate and moisturize the skin.

3. Protective barrier: Ointments can form a barrier that protects the skin from irritants and environmental stressors.

4.Easy to apply: Ointments can be gently rubbed into the skin and are generally easy to apply.

5. Targeted treatment: By applying ointments directly to the afflicted location, systemic adverse effects can be minimized and targeted treatment can be achieved.

6.Calming and soothing: Ointments can lessen discomfort and inflammation by soothing and calming sensitive skin.

Disadvantages of Ointments:

1. Greasy texture: Ointments may leave the skin feeling oily.

2. Hard to wash off: It can be difficult to get ointments off the skin.

3.The spreadability of ointments might be limited due to their thickness

4. May not be appropriate for all skin types: Some skin types may find particular ointments excessively thick or rich.

5.Adverse reaction risk: Certain ointment ingredients may irritate skin or trigger allergic

responses. 6. May cause skin irritation: Ointments containing specific substances or preservatives may cause skin irritation.

2.Plant Profile:

1) *Maytenus emarginata* (Drug):

Figure 1. *Maytenus emarginata* plant.

- **Botanical Name:** *Maytenus emarginata* (Wild) Ding Hou.
- **Family:** Celastraceae.
- **Chemical composition:** Contains compounds like alkaloids, flavonoids, terpenoids, and phenolic compounds.
- **Geographical Source:** Native to tropical and subtropical regions, including India, Sri Lanka, and parts of Southeast Asia.
- **Kingdom:** Plantae.
- **Phylum:** Magnoliophyta.
- **Class:** Magnoliopsida.
- **Order:** Celastrales.
- **Genus:** Maytenus.
- **Synonyms:**

✓ Celastrus emarginatus Willd.

✓ Gymnosporia emarginata (Willd.) Thw.

✓ Gymnosporia Montana (Roth) Benth.

- **Plant Part use: Leaves**

Usually longer than 40 mm, thick, leathery (coriaceous), and rounded at the tips. Younger branches have alternating leaves, whereas older branches have fascicled leaves.

Pharmaceutical Application: *Maytenus emarginata* (Wild) Ding Hou.

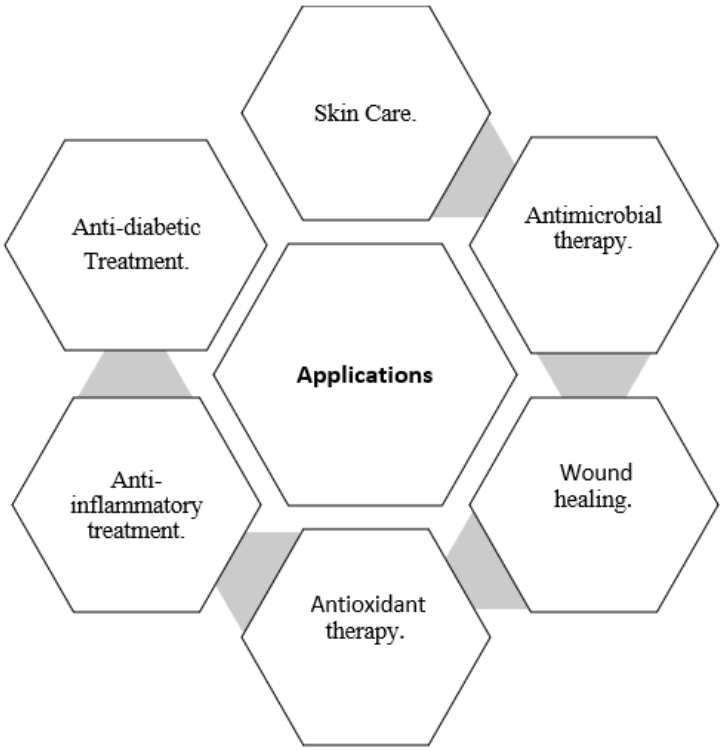

Figure 2. Pharmaceutical Applications of *Maytenus emarginata.*

2) Curcuma Longa:

Figure 3. *Curcuma Longa* (Turmeric)

Figure 4. *Curcuma Longa* Plant.

- **Botanical Name:** *Curcuma longa L.*
- **Chemical Constituents:**

Curcuminoids: A class of polyphenolic chemicals that give the plant its yellow hue and therapeutic qualities.

These substances include,

- ✓ Curcumin, also called diferuloylmethane, is the primary natural polyphenol in turmeric and makes up 60% of its curcuminoids.
- ✓ Demethoxycurcumin and Bisdemethoxycurcumin are two other noteworthy curcuminoids that may have health advantages.

Essential Oils: These include:

- ✓ One sesquiterpene that may have neuroprotective and anti-inflammatory properties is turmerone.
- ✓ The sesquiterpene zingiberene has a spicy, toasty aroma.
- ✓ α-Phellandrene, Sabinene, Ar-turmerone, Borneol, and Cineole are other essential oils that contribute to the aroma and characteristics of turmeric.

Additional Compounds:

- ✓ Carbohydrates: 60–70% powdered turmeric.
- ✓ Protein: 6-8% powdered turmeric.
- ✓ Fat: 5–10% powdered turmeric.
- ✓ Dietary Fiber: Turmeric powder, 2–7%.
- ✓ Vitamins and Minerals: These include calcium, magnesium, potassium, iron, vitamin B1, vitamin B2, and vitamin B3.

- **Family:** Zingiberaceae.
- **Kingdom:** Plantae.
- **Subkingdom:** Tracheobionta.
- **Superdivision:** Spermatophyta.
- **Division:** Magnoliophyta.
- **Subclass:** Zingiberidae.
- **Order:** Zingiberales.
- **Genus:** Curcuma.
- **Species:** longa.
- **Scientific name:** *Curcuma longa.*

Preparation of the Extract:

- ✓ Preparing the Extract Rhizomes of *Curcuma longa* were collected, allowed to dry in the sun, and then cut into small pieces.
- ✓ The small piece of dried rhizome was then pulverized into a fine powder and ready for use.

3.MATERIALS AND METHODS:

Collection of Plant:

The leaves were thoroughly cleaned with running tap water two or three times to get rid of any debris, then they were burned in an oven and ground into a fine powder using a mechanical grinder before being stored in an airtight container. The plant's leaves were gathered, thoroughly cleaned with distilled water, burned, and ground into a fine powder. After being incubated for three hours with 350 milliliters of 90% ethanol, 100 grams of powder was moved to a conical flask and macerated for seven days with periodic stirring. Ultimately, a blackish green residue was obtained by collecting and condensing the ethanolic extract. The extract was kept in a cool, dark location in an airtight container.

Method of Extraction:

Steps involved in Extraction of *Maytenus emarginata*:

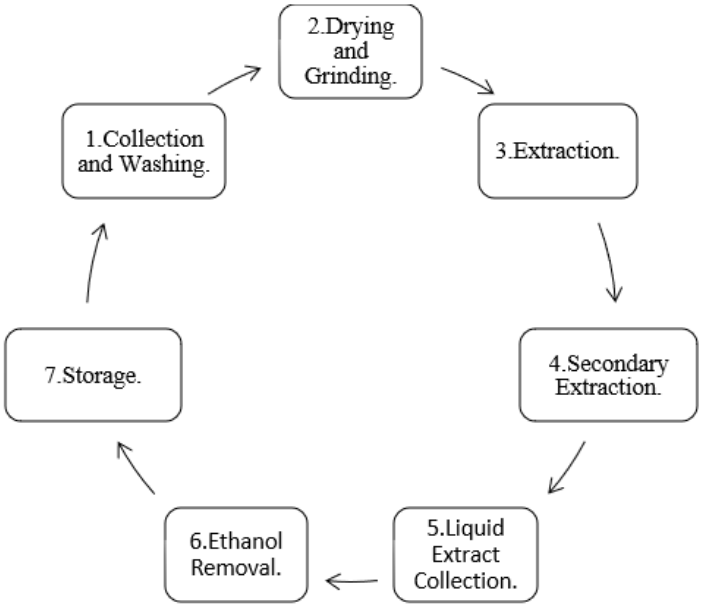

Figure 5. Steps involved in Extraction of *Maytenus emarginata.*

Extraction Preparation:

1. Collection and Washing: Gather the leaves of *Maytenus emarginata* and rinse them with clean water to get rid of any dirt or contaminants.

2. Drying and Grinding: To enhance the surface area available for extraction, burn the leaves (probably to dry them out) and then crush them into a fine powder.

3.Extraction: For three hours, combine 100 grams of powder with 350 milliliters of 90% ethanol, allowing the solvent to draw out the bioactive ingredients.

4. Secondary Extraction: To extract more chemicals, move the mixture to a conical flask, add 150 ml of 90% ethanol, and leave it for seven days, stirring occasionally.

5. Liquid Extract Collection: Seven days later, gather the liquid extract.

6. Ethanol Removal: Heat or evaporate the ethanol to remove it from the liquid extract, leaving behind a dark green residue.

7. Storage: To maintain the purity and bioactive components of the extract, keep it in a cold, dark location.

Herbal Ointment Preparation:

Fusion Method:

Steps for Herbal Ointment Preparation:

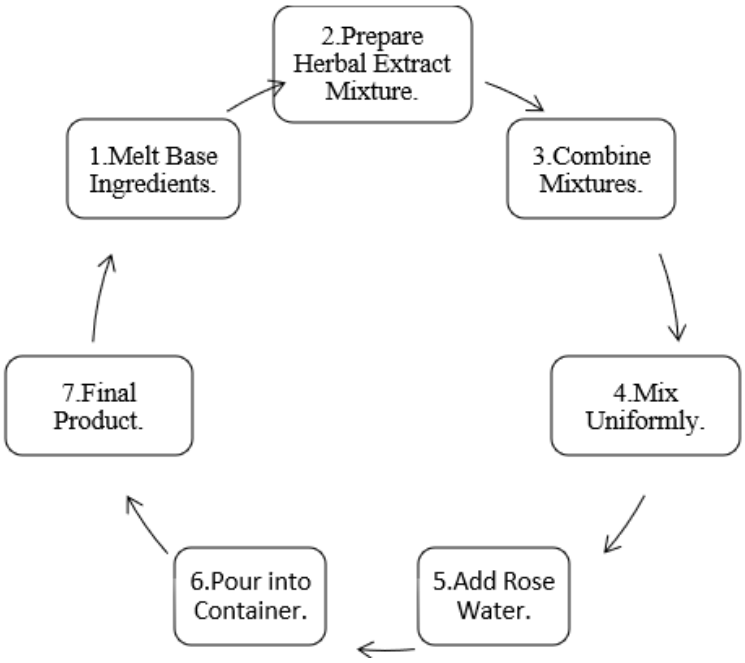

Figure 6. Steps for Herbal ointment Preparation.

Formulation of Ointment:

- **Thickening Agent:** A thickening agent is a chemical that is added to ointments to improve their consistency and viscosity, which makes them more apply able and efficient.

The following are typical thickening examples found in ointments:

1.Beeswax: A natural wax that thickens ointments and acts as a protective barrier.

2.Stearyl alcohol: A fatty alcohol that helps ointments stay thick and stable.

3.Carbomer: An artificial polymer that can be added to ointments to thicken them.

Thickening agents aid in giving ointments a uniform texture, increasing their spreadability, and improving their overall effectiveness.

- **Skin Regeneration:** Using topical application of ointments containing particular substances to promote the renewal and restoration of damaged or wounded skin cells, tissues, and structures is known as skin regeneration.

Some examples of these substances are:

1. Vitamins, including C and E.

2. Organic extracts. (such as honey and aloe vera)

3. Agents that improve collagen.

4. Wool fat: Lanolin, another name for wool fat, can promote skin regeneration by:

✓ Hydrating and moisturizing the skin.

✓ Establishing a barrier of protection.

✓ Calming and soothing damaged skin.

- **Base ingredients:** Base components, sometimes referred to as excipients or carriers, provide ointments their base.

They assist:

1. Provide the active components.

2. Hydrate and moisturize the skin.

3. Establish a layer of defense.

Typical base ingredients consist of:

1. Vaseline (Petrolatum).

2. Liquid paraffin.

3. Glycerin.

4. Emulsifying agents (e.g. cetyl alcohol).

These components aid in the production of a stable and potent ointment that promotes the health of the skin.

- **Moisturizing Agent:** An element that aids is a moisturizing agent:

1. Hydrate the skin: Draw in and hold on to moisture.

2. Soothe dryness: lessen irritation, flakiness, and dryness.

3. Increase skin elasticity: Maintain smooth, supple skin.

Moisturizing agents include, for example:

1. Glycerin.

2. Acid hyaluronic.

3. Ceramides.

4. Natural oils, such as olive and coconut oils.

5. Humectants. (sorbitol, honey, etc.)

These substances support healthy skin, lessen dryness, and preserve skin hydration.

- **Fragrant:** The term "fragrant" describes a pleasing or sweet scent that is frequently connected to essential oils, perfumes, or scented goods.

Fragrant are components used in ointments that are applied to:

1. Offer a pleasing fragrance.

2. Cover offensive smells.

Fragrant Examples in Ointments:

1. Essential Oils:

- ✓ Lavender oil.
- ✓ Peppermint oil.
- ✓ Eucalyptus oil.
- ✓ Tea tree oil.

2. Fragrance chemicals:

- ✓ Synthetic fragrances (e.g., vanillin, citrus fragrances).

3. Natural extracts:

- ✓ Rose extract.
- ✓ Chamomile extract.
- ✓ Lemon extract.

- **Preservatives:** Burn skin ointments contain preservatives to help stop bacteria from growing and getting contaminated.

Preservatives that are frequently used include:

- ✓ Methylparaben: An antibacterial that works against a variety of microbes.
- ✓ Benzyl alcohol: A preservative that aids in stopping the growth of microorganisms in bases that contain water.

✓ Grapefruit seed extract.

- **Extracts of Plants:**

1. *Maytenus emarginata* (Wild) Ding Hou.

Properties:

✓ Anti-inflammatory properties: *Maytenus emarginata* extract has demonstrated strong anti-inflammatory qualities, which can aid in lowering burn-related pain and inflammation.

✓ Antinociceptive qualities: The plant's antinociceptive qualities may lessen burn pain.

✓ Antibacterial properties: The antibacterial qualities of *Maytenus emarginata* can aid in preventing burn skin infections.

✓ Wound healing properties: According to certain research, *Maytenus emarginata's* antibacterial and anti-inflammatory qualities may help promote wound healing.

2. *Curcuma Longa*

Properties:

✓ Antioxidant: Prevents sun damage from free radicals.

✓ Antimicrobial: Assists in avoiding infections.

4.Evaluation Tests:

Evaluation Parameters of Ointment:

Table 4. Evaluation Parameters of Ointment.

Sr. No.	Tests
1.	Physical determination ✓ Colour. ✓ Homogeneity. ✓ Consistency.
2.	Viscosity.
3.	Spreadability.
4.	Determination of pH.
5.	Skin irritation studies.
6.	Washability.

Phytochemical Evaluation Tests:

Table 5. Phytochemical Evaluation Tests.

Maytenus emarginata.	***Curcuma longa.***
1. Test for Tannins.	1.Test for Tannins.
2.Test for Saponins.	2.Test for Coumarin.
3.Test for Cardiac Glycosides.	3.Test For Saponin.
4.Test for Flavonoids.	4.Test for Diterpenes.
5.Test for Steroid.	5.Test For Pholbatannis.
6.Test for Triterpenes.	6.Test for Glycosides.
7.Test for Alkaloid. ✓ Mayer's test. ✓ Dragendoff's test. ✓ Wagner's test.	7.Test for Alkaloid ✓ Dragendoff's test. ✓ Wagner's test.

5.CONCLUSION:

The review concludes that *Maytenus emarginata* is a valuable medicinal plant that effectively treats burn skin because of its potent anti-inflammatory and wound-healing qualities. It creates a durable and effective natural burn skin ointment when mixed with *Curcuma longa* and made utilizing the fusion process. This herbal remedy provides a promising, safe, and easily accessible burn wound treatment option.

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HOW TO CITE: Ajinkya Shinde*, Dipika Patil, Darshan Shirude, Darshan Sonawane, Avijita Surve, Jagruti Suryawanshi, A Review on Maytenus Emarginata Herbal Ointment for Burn Treatment, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 9, 625-636 https://doi.org/10.5281/zenodo.17062549