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A Review on Moringa (Moringa oleifera) as Anti-Acne Agent

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Abstract: *Moringa oleifera, commonly known as the "Miracle Tree," possesses rich phytoconstituents with multiple therapeutic and cosmetic benefits. Its leaves are a potent source of flavonoids, phenolic acids, vitamins, and minerals that exhibit antibacterial, anti-inflammatory, antioxidant, and wound-healing activities. These properties make Moringa oleifera leaves a valuable ingredient in the formulation of polyherbal anti-acne creams. When combined with other botanicals such as papaya, neem, or aloe vera, it enhances overall efficacy by targeting various pathogenic and inflammatory mechanisms involved in acne. This review highlights the pharmacognosy, phytochemistry, pharmacological activities, and potential application of Moringa oleifera leaves in polyherbal anti-acne formulations.*

Keywords: Moringa oleifera, Polyherbal anti-acne cream, Antibacterial, Anti-inflammatory, Phytochemicals, Herbal cosmetics

I. INTRODUCTION

Acne vulgaris is one of the most common dermatological conditions caused by inflammation of the pilosebaceous unit, usually due to Cutibacterium acnes infection, sebum overproduction, and hormonal imbalance. Chemical anti-acne agents like benzoyl peroxide and retinoids often produce irritation, dryness, and other adverse effects. Hence, herbal alternatives have gained importance because they are safer, biocompatible, and multifunctional.

Moringa oleifera (Family: Moringaceae) has been used traditionally for its wide pharmacological potential, including antimicrobial, antioxidant, anti-inflammatory, and wound-healing effects. Moringa leaves are rich in bioactive compounds such as quercetin, kaempferol, chlorogenic acid, and vitamin C, which contribute to its therapeutic benefits in acne treatment. Thus, it serves as a promising herbal component for the development of polyherbal anti-acne creams. [1,2]

Pharmacognosy of Moringa oleifera Leaves:
Scientific Name: Moringa oleifera Lam.
Family: Moringaceae
Common Names: Drumstick tree, Horseradish tree, Sahijan, Shigru
Part Used: Leaves
Macroscopic Characters: Leaves are compound, tripinnate, green in colour, and have a characteristic odour and bitter taste.
Microscopic Characters: Presence of paracytic stomata, xylem vessels, calcium oxalate crystals, and abundant chloroplasts.
Chemical Constituents: Flavonoids (quercetin, kaempferol), phenolic acids, alkaloids, tannins, vitamins, and minerals.
Uses: Used in traditional medicine as antimicrobial, anti-inflammatory, antioxidant and wound healing agent. [3,4]

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Properties of Moringa oleifera Leaves:

Sr. No.	Property	Description
1.	Antibacterial	Inhibits C. acnes, S. aureus and E. coli [5]
2.	Anti-inflammatory	Reduces prostaglandin and cytokine activity [6]
3.	Antioxidant	Scavenges reactive oxygen species and prevents lipid peroxidation [7]
4.	Wound healing	Stimulates collagen synthesis and tissue regeneration [8]
5.	Moisterizing	Retains skin hydration and improves elasticity [9]

Benefits of Moringa oleifera Leaves in Anti-Acne Cream:

Sr. No.	Benefit	Mechanism
1.	Antibacterial protection	Inhibitss acne-causing bacteria such as C. acnes and S. aureus [5]
2.	Reduces inflammation	Flavonoids and phenolic compounds suppress inflammatory mediators [6]
3.	Promote wound healing	Enhances collagen formation reduce free radicals [8]
4.	Prevents oxidative stress	Vitamin C and flavonoids reduce free radicals responsible for acne aggravation [7]
5.	Improves formulation aesthetics	Provides natural fragrance and smooth texture to the cream [9]

Botanical Profile of Moringa oleifera:

Sr. No.	Parameter	Description
1.	Kingdom	Plantae
2.	Division	Magnoliophyta
3.	Class	Magnoliopsida
4.	Order	Brassicales
5.	Family	Moringaceae
6.	Genus	Moringa
7.	Species	Moringa oleifera Lam.
8.	Habitat Native to India	Cultivated in tropical and subtropical regions
9.	Part Used	Leaves, seeds, pods, and roots.

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Phytochemical Constituents of Moringa oleifera Leaves:

Sr. No.	Class of Compound	Examples	Activity Relevant to Acne
1.	Flavonoids	Quercetin, Kaempferol	Anti-inflammatory, antioxidant [6,7]
2.	Phenolic acids	Gallic acid, Chlorogenic acid	Antibacterial, antioxidant [5]
3.	Alkaloids	Moringinine	Antimicrobial [5]
4.	Vitamins	Vitamin C, E, A	Skin regeneration, free-radical scavenging [7,9]
5.	Tannins & Saponins	-	Astringent and cleansing properties [4]

Mechanism of Action in Acne:

Moringa oleifera leaves help in acne management through the following mechanisms:

1. Antibacterial action: Flavonoids and phenolic acids inhibit C. acnes growth and prevent secondary infection. [5]

2. Anti-inflammatory effect: Suppresses cytokines and prostaglandin synthesis, reducing redness and swelling. [6]

3. Antioxidant effect: Quercetin and vitamin C neutralize ROS that damage skin and aggravate acne. [7]

4. Sebum regulation: Saponins balance sebum secretion, maintaining non-oily skin texture. [9]

5. Wound-healing: Promotes epithelial regeneration and reduces post-acne scarring. [8]

Pharmacological Actions of Moringa oleifera Leaves:

Sr. No	Action	Mechanism
1.	Antibacterial	Inhibits C. acnes and S. aureus [5]
2.	Anti-inflammatory	Suppresses prostaglandin synthesis [6]
3.	Antioxidant	Scavenges free radicals [7]
4.	Wound-healing	Promotes collagen synthesis [8]
5.	Sebum control	Balances sebaceous secretion [9]

Extraction Method:

Plant Material: Fresh or shade-dried Moringa oleifera leaves.

Solvent Used: Ethanol or hydro-alcoholic mixture (70% ethanol).

Method:

Leaves are washed, dried, and powdered.

The powder is subjected to Soxhlet extraction with ethanol for 6–8 hours.

The extract is filtered and concentrated using a rotary evaporator.

Dried extract is stored in airtight containers for formulation use.[10]

II. CONCLUSION

Moringa oleifera leaves possess a wide range of pharmacological activities—antibacterial, anti-inflammatory, antioxidant, and wound-healing—that directly address the multifactorial causes of acne. Their natural bioactive compounds such as quercetin, kaempferol, and vitamin C make them suitable for inclusion in polyherbal anti-acne creams. Formulations incorporating moringa with other herbal agents such as papaya, neem, and aloe vera can provide a synergistic effect, enhancing therapeutic efficacy while maintaining skin health and aesthetics. [11]

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