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Film-Forming Poly-herbal Scalp Serum for Hair and Scalp Care: A Review of Moringa oleifera Trigonella Foenum Graecum and Rosemary Oil

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Abstract: *Hair and scalp health is a function of follicular cycling, an intact epidermal barrier, appropriate sebum production, a balanced microbiome and protection of the hair fibre itself from environmental stress. The rise in interest in botanical cosmetics has led to a number of studies looking at plant-derived antioxidants, anti-inflammatories, antimicrobials and conditioning polysaccharides. This is a narrative review assessing the scientific basis for the use of Moringa oleifera, Trigonella foenum-graecum (fenugreek) and rosemary oil in hair and scalp care and looking at topical film-forming systems as a potential delivery vehicle. Moringa contains phenolics and flavonoids which have a range of well-documented biological activities but there is very little direct evidence of efficacy on the human scalp. Fenugreek contains saponins, polyphenols and mucilage with potential for soothing and conditioning of the hair fibre, again with the bulk of the evidence being mechanistic and in the topical domain. There is very limited direct clinical evidence for rosemary oil in androgenetic alopecia, although there is some evidence from studies of rosemary solvent extracts which indicate hair fibre protection from UV damage (the two preparations are chemically different). Film-forming topical systems may enhance local residence time and improve application convenience, but their performance on the hair-bearing scalp would need to be specifically tested. The existing literature supports further investigation of the three botanicals, with no claims of synergy or clinical efficacy for the untested combination. Key areas for research would be chemical standardisation, compatibility, safety, delivery, to the follicle and well-controlled human studies. [1, 2, 3, 4, 8, 22].*

Keywords: Film-forming system; poly-herbal scalp serum; Moringa oleifera; Trigonella foenum graecum; Rosemary essential oil; Hair care; Scalp barrier

I. INTRODUCTION

Hair has both protective and aesthetic roles, and changes in the density of the hair, the quality of the hair shaft, and comfort of the scalp can have important psychosocial consequences. The various causes of hair shedding, breakage, dandruff, itching and dryness mean that any cosmetic condition. Yet the fact that something is 'natural' does not mean that it is non-irritating or clinically effective. [7, 9, 18] The polyherbal approach is based on the hypothesis of complementary action rather than providing proof of pharmacological synergy. The plants have been chosen because moringa has a substantial body of literature relating to its phytochemicals and antioxidants, fenugreek contains conditioning polysaccharides and bioactive seed components, and rosemary has both experimental studies relating to the hair and a small comparative clinical trial. [1, 2, 3, 8, 22] A scalp serum is a topical product which is meant for easy application over the area of the head that has hair on it. Film-forming systems are those preparations that leave behind a coherent layer as the vehicle dries or sets. Although there is a well-established pharmaceutical reason for them relating to local retention and controlled delivery, when it comes to use in scalp cosmetics it is necessary to take into account hair adhesion, washability, appearance and comfort. This review carefully summarizes the ingredients and the overall concept without making any statements about the results of any formulation proposed. [4]

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II. HAIR AND SCALP BIOLOGY

Hair follicles are dynamic organs which are controlled by communication in between epithelial tissue mesenchymal tissues and by cycle phases of proliferation and regression; since this is the case, the study of hair biology must go beyond simple surface-conditioning results. [15,16] The stratum corneum carries out integrated functions relating to permeability; defence against micro-organisms and mechanical protection.

2.1 Structure of hair

The shaft that is visible is made up of a keratinized fibre; its cuticle consists of cells that overlap to provide protection, the cortex is responsible for the fibre's tensile strength, pigmentation and mechanical properties, and the medulla is sometimes present, particularly in thicker fibres. If the integrity of the cuticle is damaged then friction, roughness, tangling and breaking will increase. Conditioning claims must therefore be evaluated using tests that are specific to the fibre and not deduced from the results of follicular growth. [7, 9]

1. Hair Shaft: The visible part of the hair that protrudes above the skin [11].

2. Hair Root: The part of the hair embedded in the skin, surrounded by the hair follicle [11].

3. Hair follicle: A tubelike pocket of the epidermis that encloses a small section of the dermis at its base, where new hair cells are constantly being made.[11]

4. Hair Layers: Human hair consists of three main layers[11]

• **The Cuticle** - The outermost layer made up of tightly packed scales that protect the inner layers from damage and moisture loss.[11]

• **The Cortex** - The middle layer responsible for hair strength, elasticity, and pigment. It contains melanin, which determines hair colour.[11]

• **The Medulla** - The innermost layer, which is sometimes absent in fine or light-coloured hair. It provides structural support to the hair shaft.[11]

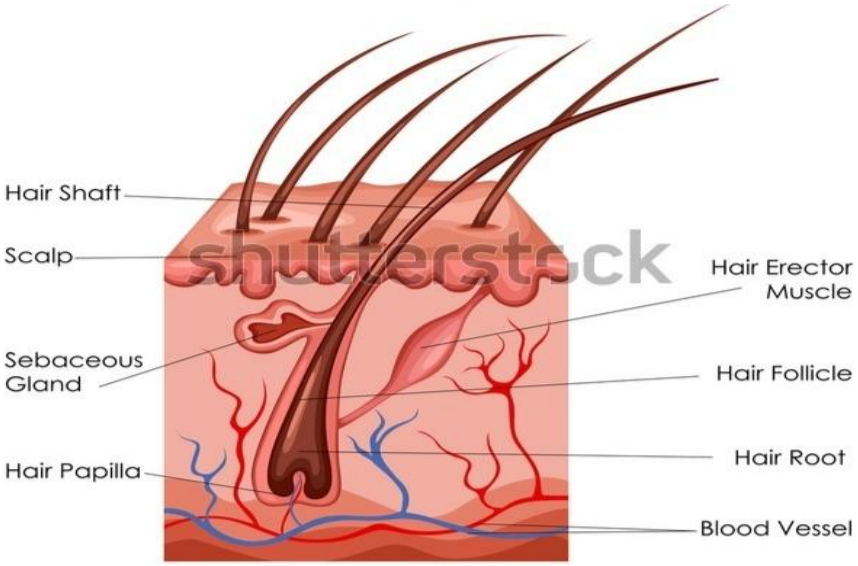


FIG. 1- STRUCTURE OF HAIR [33]

2.2 Hair follicle

It is a small organ that goes through the cycling process and reaches into the dermis; the matrix keratinocytes multiply around the dermal papilla, which in turn affects growth. Melanocytes live in the hair bulb. The follicular unit is linked

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to a gland and an arrector pili muscle. How the follicle reacts depends on signals, hormones, nutrition and immune activity. [9]

2.3 Hair growth cycle

Hair growth cycle has four parts. Anagen is the growth stage of hair. Catagen is the stage where the hair starts to shrink. Telogen is the resting stage of hair. Exogen is when the hair fibre is let go. The length of each part is different for each person. Also changes from one part of the body to another. A short-term drop, in hair breakage or a feeling of hair loss does not mean that the Anagen stage has gotten longer. It is smarter to use a photo-trichogram or hair-count measurements to check the status**.** [9]

2.4 Scalp physiology

Sebum lubricates the hair and contributes to the formation of the scalp's lipid environment. The stratum corneum keeps water inside. Protects against irritants. Many scalp organisms, including Malassezia yeasts and various bacterial groups live with the body's immune system. A change, in the makeup of these microbes has been linked to dandruff and seborrhoeic dermatitis. That link does not prove that a single species is the cause of the symptoms. [18]

III. COMMON HAIR AND SCALP PROBLEM

1. Dandruff:
Problem**:** Flaky scalp and itchy skin.
Causes: Overactive yeast on the scalp, dry skin and certain medical condition. [11]
2. Hair loss
Problem: Excessive shedding of hair, leading to thinning or baldness.
Causes: Genetics, hormonal imbalance, stress, poor nutrition and certain medical condition. [11]
3. Split Ends:
Problem: Damaged hair ends that split and fray.
Causes: Heat styling, chemical treatments and improper hair care. [11]
4. Dry hair:
Problem: Hair that lacks moisture, appears dull and is prone to breakage.
Causes: Over-shampooing, harsh chemicals, heat styling and poor nutrition. [11]
5. Oily hair:
Problem: Excess oil production on the scalp, making hair appear greasy and weighed down.
Causes: Overactive sebaceous glans, certain products and stress. [11]
6. Frizzy hair:
Problem: Unruly, dry and unmanageable hair.
Causes: dryness, humidity and improper hair care. [11]
7. Dull or Damaged Hair:
Problem: Hair that lacks shine and appears lifeless or brittle.
Causes: Heat styling, chemical treatments, and poor hair care.[11]

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[38]

Research comparing the microbiomes of the scalp has shown that there are differences between those associated with a healthy scalp and those linked with dandruff, indicating a complex interaction between the host's barrier function, sebum, and microorganisms rather than pointing to a single microbial cause [18]. Oxidative damage to the hair fibre and to the environment has also been studied in connection with hair aging [19]. Hair loss can happen naturally. It can be caused by telogen effluvium alopecia, a disease or a systemic condition. Hair thinning involves changes, in hair fibre diameter, follicular output or density. Brittle hair is usually a problem with the hair fibre itself often caused by chemical treatments or heat styling. The scalp can become dry because of a weakened barrier function or because of not cleansing. On the hand scaling and itching can occur with dandruff or seborrheic dermatitis. Environmental ultraviolet radiation can lead to oxidation of the hair proteins and pigments which affects the hairs. [3, 9, 18] The state of oxidative stress involves an imbalance between reactive species and the body's defensive mechanisms. Inflammation can have an impact on scalp comfort and on the signalling of the follicles; a disruption of the microbiome may occur together with changes in sebum and in the barrier function. Although these are biologically reasonable targets, the fact that a substance shows antioxidant activity in a test tube does not prove that it will promote hair growth in humans. [1, 3, 18]

IV. HERBAL APPROACHES IN HAIR AND SCALP CARE

In traditional herbal medicine, leaf extracts, seed preparations, oils and materials high in mucilage are used for cleansing, to give the hair a soft feel and to provide comfort to the scalp. The relevant groups of phytochemicals are phenolic acids and flavonoids (which are redox-active compounds), saponins and terpenoids (which have variable biological and surface-active properties), fatty acids (which have emollient effects) and polysaccharides (which are capable of binding water and forming a film). The concentration and activity of these compounds depend on the part of the plant, the conditions during harvesting, the solvent used for extraction, the processing and the method of storage. [1, 2, 8] The benefits consist of having several possible mechanisms and the possibility of producing cosmetic sensory effects. Drawbacks include differences from batch to batch, oxidation, contamination by microbes allergies to fragrance, uncertain effects in the body and not enough proof. Statements need to show the difference between results from lab tests, observations, studies on animals user opinions, about cosmetics and real effectiveness. [2, 4, 12]

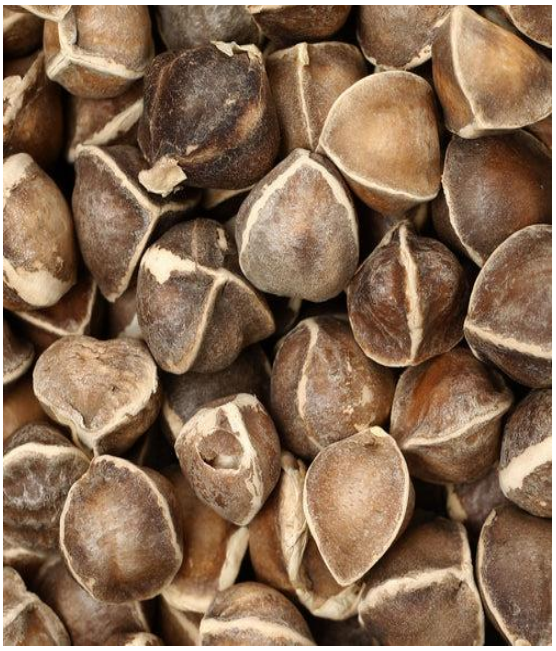
V. MORINGA OLEIFERA

A thorough review of the leaves of Moringa oleifera explains how the conditions of cultivation and plant chemistry affect the plant's phenolic, nutritional and pharmacological properties. The fact that there is variability is therefore a main reason for carrying out chemical fingerprinting prior to comparing the various studies [20].

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Moringa Leaf[34]



Moringa Seed[35]

5.1 Botanical profile and traditional uses

I have read that Moringa oleifera Lam. Is a plant that belongs to the family Moringaceae. It is grown widely in regions. The leaves and seeds of Moringa oleifera Lam. Are used as food and in medicine. The interest, in Moringa oleifera Lam. Comes from its nutrition and phytochemical content. The different parts of Moringa oleifera Lam. Are not the same. Its extracts should not be regarded as the same. [1]

5.2 Phytochemical constituents

Moringa contains compounds such as flavonoids, carotenoids, glucosinolates and many other metabolites. The mix of these compounds shifts depending on which part of the Moringa plant's used and, on the extraction method. I often read that leaf extracts are tested for their activity. However just because a compound is found in a plant does not mean that the compound stays stable or that the compound can be delivered through a scalp product. [1]

5.3 Antioxidant, anti-inflammatory and antimicrobial activity

Broad pharmacological reviews mention the antioxidant and anti-inflammatory properties of moringa preparations, and several studies note antimicrobial effects under laboratory conditions. However, these findings indicate mechanisms that are relevant to a stressed scalp environment and do not directly show an improvement in follicle density or dandruff control in humans. [1]

5.4 Potential role in hair and scalp care

Moringa leaf extracts could be looked into as scalp ingredients rich in antioxidants. In a rat study involving a moringa–pandan hair tonic, the length and mass of the hair were measured and it was found that the combined extracts did not result in a significant increase in hair length when compared with the individual extracts, even though there was a difference in hair weight. Another study on a moringa hair tonic found acceptable results with regard to organoleptic properties, pH, and homogeneity, but unsatisfactory viscosity, which shows that this presents a product-development problem rather than an issue of clinical efficacy. [5, 6]

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5.5 Safety considerations

You cannot use food as a substitute for dermal safety testing, since the botanical identity, the residue of solvents, the microbiological quality, irritation, sensitization and stability all have to be assessed when the substance is to be used topically. None of the uploaded sources provide a clinically effective concentration of moringa for the human scalp. [1, 6]

VI. TRIGONELLA FOENUM-GRAECUM (FENUGREEK)



Fenugreek Seeds [36]

A pharmacological review that is well-established examines the traditional and systemic therapeutic uses of fenugreek [21]. While such systematic literature may be used to provide a background on the plant's phytochemistry and safety, it cannot be regarded as evidence of the drug's effectiveness when applied to the scalp.

6.1 Botanical profile and traditional uses

Trigonella foenum-graecum L. is a plant belonging to the Fabaceae family and its seeds are used in food and in traditional topical hair remedies. The material obtained from the seeds can be available in the form of powders, hydroalcoholic extracts, aqueous mucilage or isolated polysaccharides, each of which has its own composition. [2]

6.2 Phytochemical constituents

Fenugreek seeds include a mucilage rich in galactomannan, as well as steroidal saponins and sapogenins such as diosgenin, alkaloids including trigonelline, and a number of phenolics and flavonoids. The various groups of compounds lend support to different hypotheses: the polysaccharides might help with hydration and fibre conditioning, while the extracts of the small molecules could have biological activities. [2]

6.3 Antioxidant, anti-inflammatory and antimicrobial properties

The cosmetic review presents experimental evidence regarding the antioxidant and anti-inflammatory effects and includes notes on antimicrobial properties. Although a great deal of this evidence is based on extracts that have been tested outside the scalp, the review does outline possible pathways involving the follicles; however, there is still a lack of direct confirmation of these pathways in human scalps that have been treated. [2]

6.4 Potential role in hair and scalp care

Fenugreek mucilage could form a lubricating surface layer, enhance combability and decrease frictional breakage. The fact that it has a water-binding property is related to dry or uncomfortable scalp skin. A recent review mentions an ongoing controlled trial of a topical fenugreek gel, but the main trial should be assessed independently before any

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strong claims regarding its efficacy can be made. Furthermore, the existing studies on herbal serums also list fenugreek as one of a number of ingredients; therefore, the results cannot be attributed solely to fenugreek. [2, 7, 10, 11]

6.5 Safety considerations

Possible worries might involve irritation, allergy (including cross-reactivity in those sensitive to legumes), impurities in the extract, the preservation of aqueous substances and variations in composition. Assessment is necessary for cosmetic safety and with regard to acceptable exposure levels. [2]

VII. ROSEMARY OIL

A survey of the chemistry of rosemary includes a look at the antimicrobial and antioxidant properties of various preparations of the plant [23]. The essential-oil composition and its antimicrobial activity as described by Jiang et al. [24] may be used as a source of information on the variation in essential oils and their antimicrobial properties. A study into the topical uses of rosemary was carried out [25]. Moreover, a comparative analysis of rosemary oil and extracts was carried out recently [26]. A investigation based on food applications of rosemary extracts and essential oil is also relevant [32], but it does not assess the effects of rosemary oil on the human scalp.



Rosemary Plant

7.1 Botanical source and traditional use

Rosemary is commonly referred to as Salvia rosmarinus Spenn. (synonym Rosmarinus officinalis L.), family Lamiaceae. Aromatic leaves have a history of use in fragrance and personal-care preparations. The volatile essential oil must be distinguished from hydroalcoholic or other rosemary extracts. [3]

7.2 Chemical composition and major constituents

Rosemary essential oil typically contains monoterpenes and oxygenated monoterpenes. These often include 1,8-cineole, camphor, α-pinene and borneol. The relative abundance of these compounds depends on the chemotype and processing. By contrast rosmarinic acid and carnosic acid which were studied in extracts are non-volatile or poorly volatile. These compounds should not be assumed present in amounts, in distilled rosemary essential oil.[3]

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7.3 Antioxidant, anti-inflammatory and antimicrobial activity

Rosemary preparations have shown antimicrobial effects in laboratory models. The results depend strongly on the type of extract used. Marsh and colleagues studied ten rosemary extracts. They linked differences in the amounts of acid and Carnosic acid to the antioxidant measurements. They also showed that some rosemary extracts protect hair proteins from damage caused by UV light in systems. This means that certain rosemary extracts can protect hair fibres. This is not necessarily true, for rosemary essential oil.[3]

7.4 Evidence related to hair/scalp application

In a comparative trial Panahi and colleagues assigned 100 people with androgenetic alopecia to rosemary oil or to 2% minoxidil for a period of six months. Both oil and 2% minoxidil groups saw hair counts that grew significantly from the starting point to the six-month mark and there was no statistically significant difference between the rosemary oil group and the 2% minoxidil group on the measured outcome. This result does not prove that rosemary oil and 2% minoxidil are equivalent and the study does not show that rosemary oil or 2% minoxidil works for dandruff for all causes of hair loss or, for any polyherbal serum. [22]

7.5 Safety and tolerability

Essential oils can cause skin irritation or allergic contact dermatitis. Issues such, as oxidation, fragrance sensitizers and lack of dilution can worsen the problem. The study also found that both groups had itching on the scalp. For each product it is necessary to confirm scalp compatibility, exposure levels, a patch-testing plan and stability. [22]

VIII. COMPARATIVE PHYTOCHEMICAL PROFILE OF THE SELECTED BOTANICALS

Botanical or material	Representative Constituents	Reported or Plausible activity	Interpretation for scalp or hair
M. Oleifera leaf extracts	It contain phenolics, flavonoids, carotenoids and glucosinolates.	These compounds show effects and studied for anti-inflammatory and antimicrobial activity.	There isn't much direct evidence from human hair studies yet [1 5, 6].
T. Foenum-graecum seeds	It contain Galactomannan, mucilage, saponins, diosgenin, trigonilin, phenolics	These seeds bind with water, condition the hair may act as an antioxidant and anti-inflammatory	It provide fibre lubrication and scalp comfort and clinical evidence is emerging .[2]
Rosemary essential oil	compounds like 1,8-cineole, camphor and α-pinene which're volatile terpenes.	It has been tested for anti-inflammatory effects but clinical studies on hair count are limited.	This oil is different from antioxidant- solvent extracts [3, 22].
Rosemary nonvolatile extracts	contain acid, carnosic acid and other phenolics.	These show activity and may protect hair fibers from UV damage	Do not confuse the data, from these extracts with the composition of oil [3].

IX. MECHANISM RELATED TO HAIR AND SCALP CARE

9.1 Antioxidant activity

Oxidative processes can hurt hair-fibre protein damage. May cause inflammatory scalp conditions. Phenolics from moringa, fenugreek and some rosemary extracts can stop radicals in tests. To be useful we must show that phenolics stay stable deposit properly and affect hair-fibre protein damage, at scalp doses that're realistic. [1, 2, 3]

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9.2 Anti-inflammatory activity

Scalp inflammation can change how comfortable the scalp feels. May alter the signals that hair follicles receive. Some plant-based substances have been shown in laboratory studies to affect markers of scalp inflammation. However just because these substances reduce cytokines in test-tube studies does not mean they will help hair regrow in people. [1, 2]

9.3 Antimicrobial activity

Malassezia-related ecology is implicated in dandruff and seborrhoeic dermatitis. An extract's activity against a laboratory microbe does not demonstrate restoration of a healthy scalp microbiome; microbial diversity, host response and barrier status matter. [18]

9.4 Conditioning and protecting activity

Mucilage from fenugreek products may help reduce friction by staying on the surface. Some rosemary extracts have been shown in experiments to protect proteins from damage caused by sunlight. Improvements in hair fibres need to be examined from changes in scalp protection and from the number of hairs. [2, 3]

The process involves chemistry that may lead to antioxidant effects, anti-inflammatory effects, antimicrobial effects or conditioning effects. These could result in scalp comfort or protection, for the hair. All of these steps are hypotheses that still need to be tested. The pathway has not been proven for the combination of the three ingredients.

X. FILM-FORMING SYSTEM IN TOPICAL AND SCALP APPLICATION

Frederiksen and colleagues reviewed design considerations for sustained delivery from topical polymeric films [27]. Kathe and Kathpalia summarized film-forming systems for topical and transdermal delivery, including polymer selection, film quality and release mechanisms [28]. These general systems offer useful principles, but neither paper establishes efficacy for the present untested polyherbal scalp concept.

10.1 concept and principle of film formation

A way to make a film is used as a liquid, a gel or a spray. It makes a layer after the liquid goes away the parts join together or other ways of setting happen. The film can keep things close, to where it was put and change how they come out. This depends on the mix the material used, the medicine or thing being used and the skin type. [4]

10.2 Types of film-forming materials

Published topical systems use polymers, such as cellulose or other polysaccharide materials, semi-synthetic cellulose derivatives and synthetic film-formers like polyvinyl alcohol or acrylate polymers. Which polymer is best depends on how well polymer dissolves how flexible polymer's how sticky polymer feels, how strong polymer stays intact how comfortable polymer is, on the skin and how easy polymer is to remove. In my view saying these examples exist does not mean that these polymers are chosen for the research you plan to do.[4]

10.3 Potential advantages and limitations

Possible advantages are keeping things in place reducing water flow, coverage on the surface and being easy to use. Possible problems, on the head include sticking to hair of skin leaving something visible coming off in flakes feeling stiff causing irritation reacting to sweat getting in the way of brushing or combing and being hard to wash away. Making a layer does not always help with getting into the hair roots or using medicine. [4]

10.4 Existing topical delivery application

The review by Umar and his team looks at film-forming sprays as a way to deliver medicine through the skin. It explains how the characteristics of the film, the type of polymer used and how the medicine is released are all connected. It's important to keep in mind that results from skin areas can't be used directly for the scalp without

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consideration. The scalp has a lot of hair. What works on skin might not work the way, on scalp. Tests that should be done include how fast the film dries how flexible it is, how well it sticks to the skin how easy it is to wash off how it feels cosmetically how long it stays in place and whether it causes any irritation. [4]

XI. POLYHERBAL APPROACH FOR HAIR AND SCALP CARE

Polyherbal preparations are made from, than one plant to see how they might work together. I think polyherbal preparations deserve study. In this case moringa contains antioxidants fenugreek contains compounds that help with conditioning and rosemary oil contains a unique mix of chemicals that could affect hair. However there is not proof yet. I think this is a reason to study preparations together not a sign that polyherbal preparations work better when mixed. [1, 2 ,3, 8, 22]

True synergy means testing the mix with each part at amounts and observing how they interact. I imagine that the mix might not work well or it might be unstable causing irritation or changing how the ingredients work. A sound statement is that the different plant chemicals and their reported effects are reasons to conduct studies but if the plants are prepared the same way and are safe.

XII. EXISTING EVIDENCE AND RESEARCH STATUS

Study / year	Material and design	Key finding	Principal limitation
Jikah & Edo, 2023 [1]	Moringa; broad review	Summarizes nutrients and pharmacological activities	Not direct scalp efficacy
Mulia et al., 2024 [5]	Moringa + pandan hair tonic; rat model	Combination did not significantly improve hair length vs singles; hair weight differed	Animal model; different botanical partner
Fildhawati et al., 2026 [6]	Moringa leaf hair tonic; physical testing	Acceptable pH/homogeneity; viscosity did not meet reported standard	No human efficacy outcome
Rebey et al., 2026 [2]	Fenugreek review	Phytochemicals, mucilage, mechanistic and emerging clinical evidence	Large amount of indirect evidence; primary trials must be evaluated.
Shirbhate et al., [7]	Fenugreek + Flaxseed + curry -leaf serum	Physiochemical properties found acceptible	Multi-ingredient; no attribution, to Fenugreek
Marsh et al., 2023 [3]	Rosemary extracts; chemistry and UV hair models	Extract phenolics associated with experimental UV protection	Not distilled essential oil; not clinical regrowth
Panahi et al., 2015 [22]	Rosemary oil vs 2% minoxidil; randomized comparative human trial	Both arms improved hair counts by month six	Limited single trial; no placebo arm
Umar et al., 2020 [4]	Review of film-forming topical sprays	Describes film formation and delivery principles	Not validation for this scalp combination
Shirbhate et al., 2026 [7]	Herbal hair serum; formulation/evaluation	Herbal hair serum reports Quality and hair-care testing	Herbal hair serum ingredient effectiveness not clear
Devi et al., 2026 [13]	Herbal serum; conditioning/anti-frizz study	Herbal serum reports better sensory and physical feel.	Herbal serum does not show follicular regrowth

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Evidence hierarchy shows that historical use is hypothesis-generating. I think evidence hierarchy helps us move from stories to science. Chemical tests and in-vitro tests establish mechanisms. Animal results provide biological evidence. Well-designed controlled human studies are needed for claims, about hair density, shedding and scalp symptoms. Multi-ingredient cosmetic trials cannot isolate the effect of a herb.

XIII. SAFETY AND TOXICOLOGICAL CONSIDERATIONS

I read reviews that talk about plant extracts and plant-derived antioxidants. They say that plant extracts and plant-derived antioxidants can be good for skin. They also say that plant extracts and plant-derived antioxidants can help skin health. Safety is very important. Those reviews also say that we must check the concentration of plant extracts and plant-derived antioxidants the chemical identity and how a topical botanical product is applied [29, 30]. In allergy studies I find that people can become sensitized to oils. Rosemary oil is one example. Rosemary oil needs a tolerability test that matches how Rosemary oil is produced than assuming Rosemary oil is safe because Rosemary oil is natural [31].

From my experience topical botanical products must verify the plant species and the part of the plant that is used. Topical botanical products also require screening limits on microbes, stability testing and reproducible chemical markers. If botanical products used on the skin cause issues botanical products can lead to irritant contact dermatitis, sensitization, reactions to fragrance changes in scalp comfort or eye irritation from product running off. Essential oils need attention. The strength of oils how they have oxidized and their chemotype can affect the way people are exposed to them. Just because one ingredient is safe, by itself does not mean the final product will be safe. The safety of each ingredient does not guarantee the safety of the product as a whole.[2, 4, 22]

Aqueous botanical materials can help growth if aqueous botanical materials are not preserved properly. The film-forming vehicle can also change how long the film-forming vehicle stays on the skin and how the film-forming vehicle is exposed. Therefore evaluation must look at skin compatibility, preservation, physical stability and long-term tolerability. Whenever needed evaluation should include testing that is properly approved.

XIV. RESEARCH GAP AND FUTURE PERSPECTIVE

The research does not show a standard and proven mix of M. Oleifera, T. foenum-graecum and rosemary oil for hair and scalp care. Most of the information is from reviews, experiments in labs tests on animals or different products with ingredients. Differences in the chemicals between essential oil and solvent extracts are a big problem when trying to apply the findings. Also there are rules for film-forming treatments but not enough direct proof for this exact mix on the scalp with hair. [1, 2, 3, 4, 5, 6, 8, 22]

Important studies should focus on checking the ingredients and their chemical make-up; making sure each batch is the same; seeing how the extracts and oils work together; testing how the mix works compared to each ingredient alone; checking for skin irritation and allergic reactions; looking at how long the product stays good and works; measuring real results on hair and scalp; and doing studies with people that have proper control groups are blinded and have proper follow-up. Studies, on how the product's delivered should check how much stays on the scalp and how people feel about using it without assuming that staying longer always gives better results.

XV. CONCLUSION

Hair and scalp health is affected by things like the hair follicles the skin barrier, the microbes on the scalp and the environment. Moringa, fenugreek and rosemary all have plant chemicals and some early signs that they might help with scalp comfort or protect hair. Fenugreek gel is especially useful, for conditioning. Some rosemary extracts have been shown to protect against the sun. Rosemary essential oil has some studies showing it might help with hair growth. Film-forming systems are a way to apply treatments to the scalp but the mix of these plants has not been tested yet. More research is needed to find out if this mix works, if it is safe if it stays stable and if people like using it. [1, 2, 3, 4, 8, 18, 22]

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