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Original Article

"Unveiling the Efficacy of Anti-Hair Fall activity of *Lavender* Oil and *Argan* Oil: A Review"

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ABSTRACT:
The increasing prevalence of hair fall has led to a growing interest in natural remedies for its prevention and treatment. Among these, lavender oil and argan oil have emerged as popular options due to their purported benefits for hair health. This review aims to critically examine the efficacy of lavender and argan oils in combating hair fall. The analysis includes an overview of the chemical constituents of both oils, their biological activities, and mechanisms of action relevant to hair growth. Lavender oil is known for its anti-inflammatory and antimicrobial properties, which may contribute to a healthy scalp environment conducive to hair retention. Argan oil, rich in essential fatty acids and vitamin E, is believed to nourish hair and reduce oxidative stress, potentially mitigating hair fall. The review synthesizes existing scientific studies, highlighting both the strengths and limitations of current evidence. While preliminary findings are promising, further research is needed to fully establish the therapeutic potential of these oils in anti-hair fall applications.

KEYWORDS: Hair Fall, *Lavender* Oil, *Argan* Oil, Essential Oils, Natural Remedies, Scalp Health

INTRODUCTION:

Hair fall, also known as hair loss or alopecia, is a common condition that can affect individuals of all ages and genders. It can be caused by various factors, including genetics, hormonal changes, nutritional deficiencies, stress, and medical conditions.[1]The condition can manifest as thinning hair, bald patches, or complete hair loss, depending on the underlying cause. Treatments for hair fall range from lifestyle changes and nutritional supplements to medical interventions like topical treatments, medications, and in some cases, surgical procedures such as hair transplantation. Early diagnosis and treatment are crucial in managing hair fall effectively and preventing further progression.[2]

SYMPTOMS:

Hair fall can manifest in various ways, depending on the underlying cause. Here are some common symptoms:

• Visible Signs:

- Increased shedding: Noticeably more hair falling out daily.
- Thinning hair: A decrease in hair density, especially on the scalp.
- Bald patches: Circular or patchy areas of hair loss.
- Receding hairline: A retreating hairline, often seen in men.
- Smaller ponytails: Difficulty tying your hair up in ponytails or buns due to reduced volume.

• Other Symptoms:

- Itching or soreness: Scalp discomfort or irritation.
- Hair breakage: Fragile hair that easily breaks.
- Scaly patches: Flaky or dry patches on the scalp.

If you're experiencing any of these symptoms, it's advisable to consult with a healthcare professional or dermatologist. They can help determine the underlying cause and recommend appropriate treatment options.[3]

CAUSES:

Common acquired causes of hair loss

1. Telogen effluvium:

Telogen effluvium is one of the common causes of hair loss. This condition is characterized by a diffuse hair shedding due to a disturbance in the hair cycle. The patient may complain of increased hair loss while shampooing or brushing. The daily hair loss can be up to 1000 hairs. The pull text is usually positive, if the hair is not shampooed for more than one day. This can be caused by several factors, which necessitate a good history taking from the patient. Telogen effluvium can be due to iron deficiency, hypoalbuminemia, thyroid dysfunction, postpartum, fever, prolonged operation or anaesthesia, and less commonly due to chronic diseases such as chronic renal failure , Usually, this condition affects females and children. It is important to identify the underlying causes, in order to correct them and thus to reverse the hair loss.

Telogen effluvium can occur in patient without anaemia and associated with serum ferritin below 40 ng/dl. If thyroid dysfunction is detected then patient need to be referred to an endocrinologist. The presence of hypoalbuminemia may indicate that patient is following a low protein diet and needs to he corrected by dietary supplements and appropriate diet.[4, 5]

2. Androgenetic alopecia:

This is known as common balding. This condition characterized by shedding and thinning of certain areas on scalp. This can affect males and females. It is due to progressive miniaturization of hair which means a progressive transformation of the terminal (coarse) hair into vellus (fine) hair follicle.

Historically, androgentic alopecia (AGA) was considered a natural aging condition and there was no effective treatment available. Recently, a great advancement has been made in understanding the pathophysiology of this complex problem and many treatment options including medical and surgical have evolved. This has led to a change in the outcome of this disorder in view of the treating physicians and patients.[5]

LAVENDER:

Lavender is a popular aromatic herb belonging to the ‘Lamiaceae' family, known for its fragrant purple flowers and a variety of uses in culinary, medicinal, and decorative applications. Native to the Mediterranean region, it thrives in sunny, well-drained soils and is commonly grown in gardens and fields worldwide.[6] Lavender is also appreciated for its culinary uses, where its slightly sweet and floral flavor enhances dishes like desserts, beverages, and even savory recipes. Beyond its practical applications, lavender is cherished for its aesthetic appeal, often used in floral arrangements and as an ornamental plant.[7]

Fig: *Lavender* Plant [8]

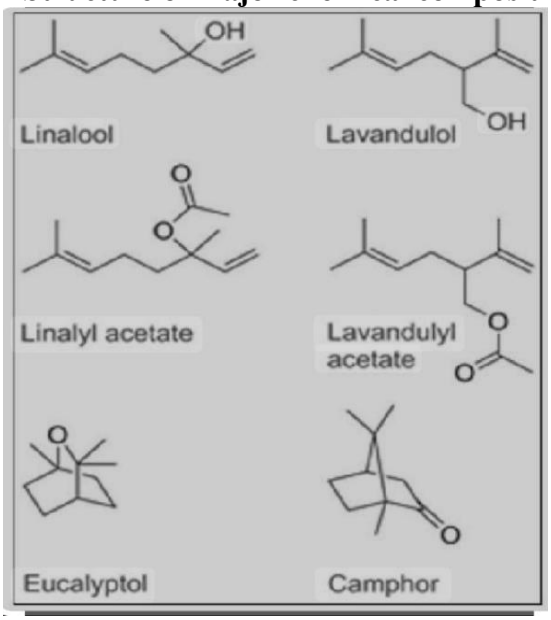
Lavenders Larum species belonging the Lamiaceae, includes 39 species, numerous hybnds and nearly 400 registered cultivars. [8,9] Luva species have high essential oil (EXO) productivity with an

interesting economic value in the fragrance, flavor, and pharmaceutical industries . Their FOs are produced in and the many countries and the most economically important species are gemine lavender , spike lavender . Lavender Eos are widely used in the fragrance manufacturing (eg.Soaps, colognes, perfumes, skin lotion and other cosmetics) due to their high content of linalyl acetate . They have also been employed in the food mdustry as moural lavoring for beverages, ice cream, candy, halted goods and chewing gum.[10]Recently, they have been used in ceramics, in paint coatings, in prevelam and other technical goods production. [11]

CHEMICAL COMPOUNS :

Lavender, particularly the Lavandula angustifolia species, is known for its distinctive aroma and therapeutic properties. This is largely due to the presence of a complex mixture of chemical compounds, primarily essential oils.

• Structure of major chemical composition of Lavender Oil:[12]



• Chemical composition of Lavender Oil:[13,14]

Constituent	%	Constituent	%
Monoterpene alcohols	47.52 %	Monoterpene hydrocarbons	5.09 %
linalool	43.00 %	trans-β-ocimene	1.92 %
borneol	1.80 %	cis-β-ocimene	1.47 %
α- terpineol	1.02 %	camphene	0.28 %
terpinen-4-ol	0.91 %	limonene	0.25 %
geraniol	0.59 %	others	
others			
Esters	34.81 %	Sesquiterpene hydrocarbons	4.58 %
linalyl acetate	32.09 %	β-caryophyllene	2.80 %
lavandulyl acetate	1.29 %	β-farnesene	1.46 %
1-octen-3-yl acetate	0.59 %	germacrene D	0.15 %
hexyl acetate	0.40 %	others	
others		Ketones	2.05 %
		3-octanone	1.22 %
		Camphor	0.83 %
		others	

BENEFITS OF LAVENDER OIL:

Lavender, known for its calming aroma and beautiful purple flowers, has been used for centuries for its therapeutic properties. Both its essential oil and its flowers can offer a range of benefits for your health and hair.

• Benefits of Lavender for Health:

1.Stress and Anxiety Reduction: Lavender's calming scent can help reduce stress and anxiety, promoting relaxation and improving sleep quality.[15]

2.Pain Relief: Lavender oil can be used topically to alleviate headaches, muscle pain, and joint discomfort.[16]

3.Anti-inflammatory Properties: Lavender contains compounds with anti-inflammatory properties, which may help reduce inflammation in the body.[17, 18]

4.Antibacterial and Antifungal Properties: Lavender oil has shown antibacterial and antifungal activity, making it useful for treating skin infections and promoting wound healing. [19]

5.Insect Repellent: Lavender can repel insects, such as mosquitoes and moths.[20]

• Benefits of Lavender Oil for Hair:

1.Scalp Health: Lavender oil can help soothe an irritated scalp, reduce dandruff, and promote hair growth.

2.Hair Strengthening: Lavender can strengthen hair follicles, reducing breakage and promoting thicker, healthier hair.

3.Hair Loss Reduction: Some studies suggest that lavender oil may help reduce hair loss.

4.Enhanced Hair Shine: Lavender can add natural shine and luster to your hair.[21]

➢ **How to Use Lavender for Hair:**

1. Lavender Oil: You can add a few drops of lavender oil to your shampoo or conditioner. Alternatively, you can massage it directly into your scalp.[22]

2.Lavender-Infused Water: Rinse your hair with lavender-infused water after shampooing.[23]

Remember: While lavender is generally safe, it's always a good idea to do a patch test before using it on your skin or hair, especially if you have sensitive skin. If you're pregnant, breastfeeding, or taking medications, consult with a healthcare professional before using lavender.[24]

EXTRACTION METHOD OF LAVENDER OIL:

Lavender oil is primarily extracted through steam distillation. This is a traditional method that has been used for centuries to extract essential oils from various plants.

• STEAM DISTILLATION:

Here's a brief about the steam distillation process:

- ❖ Harvesting: Lavender flowers are harvested at their peak bloom, typically during the early morning hours.
- ❖ Preparation: The harvested flowers are placed in a still, a large container with a condenser.
- ❖ Distillation: Steam is passed through the lavender flowers, causing the essential oils to vaporize.
- ❖ Condensation: The vapor rises and is cooled by the condenser, causing it to condense back into a liquid.[25]

• Solvent Extraction:

- ❖ Process: Lavender flowers are soaked in a solvent like hexane. The solvent dissolves the essential oils, which are then separated.
- ❖ Pros: Can extract oils from delicate flowers and leaves.
- ❖ Cons: Solvent residue can remain in the final product, requiring additional purification steps.

• Enfleurage:

- ❖ Process: Lavender flowers are placed on a fatty substance like lard or pomade. The fragrance is absorbed by the fat, which is then extracted with alcohol.
- ❖ Pros: Highly selective for delicate fragrances.

❖ Cons: Labor-intensive and expensive.

• Supercritical Fluid Extraction (SFE):

❖ Process: Uses a supercritical fluid (like carbon dioxide) to extract oils.

❖ Pros: Environmentally friendly, efficient, and can produce high-quality oils.

❖ Cons: Requires specialized equipment and can be more expensive than traditional methods. [26]

ARGAN:

The argan tree (Argania spinosa L.), the only rep resentative of the Sapotaceae family, is a crucial endemic and medicinal species of significant ecological, socioeconomic, and cultural relevance in southwestern Morocco . This tree is renowned for its resilience in severe environments and for its role in sustaining local communities. [27] It covers an area of 830,000 hectares, starting from Safi in the north and moving south to the edge of the Sahara, with the main zone lying southeast of Essaouira on the Souas plain. The argan ecological range has extended well beyond its primary native habitat in southwest Morocco, covering relict sites in the northeast and west . This noteworthy adaptive capacity emphasizes its resistance and resilience, thereby ensuring its Advances in Pharmacological and Pharmaceutical Sciences ability to thrive in diverse environments and cope with changing climatic conditions . For Essaouira province,the argan tree occupies 136,750 hectares, accounting for 20% of the national argan grove acreage and 7% of the national forest area. The Haha tribe holda 84% of this area, while the remaining 16% belongs to the Chiadma tribe . The argan orchards in the province of Essaouira generate an annual average of 450 kg of fresh fruit per hectare. resulting in an oil output of approximately 1,138 tons. This pro duction meets 36% of the global needs of the provincial population. [28] Besides its recognized role in maintaining ecological equilibrium and its economic value in providing a crucial source of income and sustenance for the local. population, the argan has long been revered for its extensive contributions to various facets of human life, covering health, medicine, food, and cosmetics . Its importance particularly noteworthy in the province of Essaouira (Morocco), making it a subject of great interest for ethanopharmacological and hinchemistry studies.[29]

Fig: ***Argan Oil*** *[30]*

During the last few years, increasing interest has been inflammatory, antidiabetic, anticancer, hydrating, and regenerative actions. [31] World-renowned for their exceptional properties, argan trees have increasingly. been explored tor scientific and commercial purposes. Indeed, among the most appreciated attributes of the argan free is its impressive antioxidant potential, which remains of great relevance in terms of its therapeutic and protective effects.[36] Antioxidants are involved in neutralizing harmful free radicals, thereby reducing oxidative stress and exposure to chronic diseases notably cardio- vascular disorders, cancer, and neurodegenerative dis orders. [32] Several studies have investigated the phytochemical composition and antioxidant capacity of various parts of the argan tree and found a variety of bioactive metabolites, such as phenolic compounds, tocopherols, carotenoids,

and ponina. [33, 34] Argan fruits, rich in antioxidants, contain substances that protect cells from damage, prevent in Advertisement in health.[35]

CHEMICAL CONSTITUENTS OF ARGAN OIL:

Argan oil is a precious liquid extracted from the kernels of the argan tree, native to Morocco. Its unique composition is responsible for its numerous health and beauty benefits.

• Chemical composition of Argan Oil :[37, 38]

Compounds	VAO	EVO
Fatty acids (%)		
C16:0	13.4	10.4
C18:0	5.1	2.8
C18:1 n-9	44.8	71.0
C18:2 n-6	33.7	12.9
C18:3 n-3	0.1	1.0
Sterols (mg/100 g)		
Schottenol	142	0
Spinasterol	115	0
Stigmasta-8,22-dien-3β-ol	9	0
β-Sitosterol	0	156
Campesterol	0	12
Other	29	151
Total	295	319
Tocopherols (mg/kg)		
α	35	190
β	122	42
γ	480	26
Total	636	257
Phenolic compounds (µg/kg)		
Vanillic acid	67	359
Syringic acid	37	0
Ferulic acid	3 147	51
Tyrosol	12	19 573
Other	0	773 000
Total	3 263	795 983

BENEFITS OF ARGAN OIL:

Argan oil's unique chemical composition offers a variety of benefits for both skin and hair. Here are some of the key advantages:

• Benefits of Argan Oil for Skin :

1.Moisturizes: Argan oil's fatty acids deeply hydrate the skin, leaving it soft and supple.

2.Reduces Wrinkles: The antioxidants in argan oil help combat free radicals, which can contribute to premature aging and wrinkles.[39]

3.Improves Skin Tone: Regular use can help even out skin tone and reduce the appearance of dark spots.

4.Treats Acne: Argan oil's anti-inflammatory properties can help soothe acne-prone skin and reduce redness.

5.Soothes Eczema: Its nourishing properties can help alleviate the symptoms of eczema, such as dryness and itching.[40]

• Benefits of Argan Oil for Hair:

1.Conditions: Argan oil can penetrate hair strands, providing deep conditioning and moisture.

2.Reduces Frizz: It helps smooth the hair cuticle, reducing frizz and flyaways.

3.Promotes Hair Growth: Some studies suggest that argan oil can stimulate hair follicles and promote hair growth.[41, 42]

4.Adds Shine: Argan oil can give hair a healthy shine and luster.

5.Protects Against Heat Damage: It can act as a heat protectant, shielding hair from the damaging effects of styling tools.[43]

EXTRACTION METHOD OF ARGAN OIL:

Argan oil extraction is a labor-intensive process that has been practiced for centuries in Morocco. The traditional method involves the following steps:

• LABOR-INTENSIVE PROCESS:

- ❖ Harvesting: Ripe argan fruits are collected from the trees.
- ❖ Pulping: The fruits are crushed or pounded to separate the pulp from the kernel.
- ❖ Roasting: The kernels are roasted to enhance their flavor and make the oil easier to extract.
- ❖ Grinding: The roasted kernels are ground into a paste using a traditional stone mill.
- ❖ Extraction: Water is added to the paste and the mixture is kneaded to release the oil.
- ❖ Separation: The oil floats to the surface and is skimmed off.
- ❖ Filtering: The oil is filtered to remove any impurities.

This traditional method is still widely used in Morocco, but in recent years, modern extraction techniques have also been introduced.[44] These methods, such as mechanical pressing and solvent extraction, can be more efficient and produce larger quantities of oil. However, many consumers prefer argan oil extracted using the traditional method, as it is believed to retain more of the oil's natural properties.[45]

MODERN TECHNIQUE:

Modern Techniques for Argan Oil Extraction

While the traditional method of argan oil extraction remains popular, modern techniques have been developed to increase efficiency and production. Here are two common modern methods:

1. Mechanical Pressing:

- ❖ Process: The roasted argan kernels are pressed between rollers to extract the oil.
- ❖ Advantages: This method is relatively simple and does not involve the use of chemicals.
- ❖ Disadvantages: It may not extract all the oil from the kernels , resulting in lower yields. [46]

2. Solvent Extraction:

- ❖ Process: The roasted kernels are soaked in a solvent, such as hexane, to dissolve the oil. The solvent is then evaporated, leaving behind the pure oil.
- ❖ Advantages: This method can extract a higher yield of oil and is more efficient.
- ❖ Disadvantages: The use of solvents can pose environmental concerns and may leave residues in the final product, although modern techniques minimize this risk.[47]

CONCLUSION:

Based on the available evidence reviewed, lavender and argan oils appear to have promising potential as natural agents for combating hair loss. Both oils have been shown to exhibit properties that may contribute to hair growth and reduce shedding. In conclusion, lavender and argan oils offer a potential natural approach for addressing hair loss concerns. However, it is essential to consult with a healthcare professional or dermatologist for a personalized assessment and to determine the most appropriate treatment options.

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