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Review Article

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A REVIEW ON THE COMPARTIVE STUDY OF ANTI DANDRUFF PROPERTIES OF COSMECEUTICALS: NEEM, LEMON

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ABSTRACT

This review provides insight into dandruff, a scalp condition that affects over 50% of the population. Dandruff is a common disease of the scalp, characterized by the presence of corneocytes, which are so tightly bound that they form clusters in the form of itchy, scaly white to yellowish scales. Malassezia furfur is considered the main cause of dandruff, intended to investigate other causes of dandruff, including microbial causes there are also non microbial cause such as cold weather, dry indoor heating, infrequent shampooing of the hair or inadequate rising of scalp, Allergic hypersensitive, Lack of rest and fatigue, stress, anxiety and tension etc. According to the World Health Organization (WHO, 2001), traditional medicine serves as the primary

source of care for 80% of the world's population. According to 2001 research by the WHO, there are 21,000 plant species have the potential to be used as therapeutic plants. Neem, a member of the Meliaceae family of plants, is one of the traditional medicines used to cure a variety of illnesses, including bacterial, viral, and fungal infections, diabetes, helminthes, and bacterial and fungal infections. Numerous individuals experienced increased dandruff severity, including hair loss and skin inflammation. Despite the fact that some the majority of anti-dandruff medications that have been created are ineffective, and some fungi also acquire resistance to antifungal medications. In order to identify neem's phytochemical composition against dandruff, the current study will do so. A key member of the Rutaceae family of

therapeutic plants is the lemon. Lemon is grown primarily for its alkaloids, which have anticancer properties. Crude extracts of Lemon's leaves, stem, root, and flower have also been shown to have antibacterial potential against clinically significant bacterial strains. About 5% to 6% of citric acid is present in lemon juice. It is also regarded as having anti-microbial properties against bacterial and fungal illnesses. The juice's acidic action has a significant potential to prevent the growth of fungi. An effective treatment for Malassezia is being developed using lemon.

INTRODUCTION

Cosmeceuticals-Cosmeceuticals can be defined as it exert a "pharmaceutical therapeutic benefit" but it is not necessarily "biological therapeutic benefit".

Cosmetic is defined as the "any article intended to be rubbed, poured, sprinkled or sprayed on or introduced into or otherwise applied to the human body or any part there for cleansing beautifying, promoting attractiveness or altering the appreance, and includes any articles intended for use as a component of cosmetics.

The hair is an integral part of the way to feel about the self-appreance, and when the hairs are lost, it can be damaging to self-esteem and self-confidence. One common reason is dandruff. A word dandruff is of Anglo- Saxon origin, a combination of tan mean tetter and drof meaning dirty, thus the dandruff is the itch dirt. It is a common scalp disorder that involves the exuviation of dead skin cells from the scalp. As skin cells die, a small amount of flaking is normal; about 5,00,000 cells/cm² get released normally after surfactant treatment. Some people, however, experience an unusually large amount of scrapping to 8,00,000 cells/cm², either chronically or as a result of certain triggers, which can also be accompanied by redness, and itching. Many reports suggest a clear link between the two clinical entities – the mildest form of the clinical presentation of seborrhoeic dermatitis as dandruff, where the inflammation is minimal and remain subclinical. Conceptually, dandruff is the dander and represents nothing more than physiologic scaling. Hence it is believed that the physiological scaling process requires more cosmetic management. The response to treatment is commonly swift, but transient. On the contrary, seborrhoeic dermatitis is more inflammatory extending outside the limit of the scalp surface. a very common scalp disorder with prevalence in population is caused of numerous host factor in conjuction with Malassezia furfur. As the scalp is one of the most absorbent parts of the body, product applied to the scalp go directly to the blood, without being filtered in any way.

Dandruff is a common scalp condition associated with abnormal scalp flacking, maximum adult of the population is affected by the condition at same times of their life.

On the basis of symptoms dandruff are 2 type

- 1. Dry
- 2. Oily

1) Dry dandruff - It is also known as Pityriasis simplex in which forms minute scales of white and greyish or ash colour accumulated on the scalp area and the spread towards parietal, frontal and occipital areas in such dandruff no excessive hair loss is observed.

2) Oily dandruff – It is also known Pityriasis steatosis. It is arise on the scalp skin due to high production of sebum which is high intensity produce inflammation in scalp skin and appear dirty yellow colour in it hair fall is common, it may also exacerbate androgenetic alopecia. the most affected site is scalp, but is can also occurs between the eyebrows along the side of nose, behind the ears over the breast bone and some times in the armpits.

CAUSE OF DANDRUFF

External cause of dandruff

- Frequent use of hair sprays and gel.
- Cold weather.
- Dry indoor heating.
- Infrequent shampooing of the hair or inadequate rising of scalp.
- Extreme weather, oily skin and use of lotions that contain alcohol may increase the chances of dandruff.
- Use of mousse, hairspray and instruments such as heated hair straighteners.

Internal causes of dandruff

- Allergic hypersensitive
- Lack of rest and fatigue
- Stress, anxiety and tension
- Hormonal imbalance
- Improper nutrition and intake of fired foods and aerated drinks, fats, sugars, salts, chocolates, sea food, peanuts and lastly dairy products.

Microbes responsible for dandruff

- 1. Malassezia furfur
- 2. Malassezia globose
- 3. Staphylococcus aureus

1) Malassezia furfur – It is a fungus which is also known as pityrosporum, which belongs to the Malassezia species. This species is responsible for skin diseases including hair dandruff.

This pathogens causes various disease such as

- **1. Dandruff** The dandruff causes irritation in scalp and becomes the skin oily and some times it cause dry skin due to feeding oils from scalps by the Malassezia fungi.
- 2. Pityriasis Versicolar- it cause by the Malassezia furfur which is superficial fungal infection of skin that cause rashes of well demarcated, thin, scaly plaques that can be hypopigmented and hyperpigmented.
- **3.** Seborrheic dermatitis -Seborrhoeic dermatitis is more inflammatory extending outside the limit of the scalp surface a very common scalp disorder with prevalence in population is caused of numerous host factor in conjunction with Malassezia furfur. As the scalp is one of the most absorbent parts of the body, product applied to the scalp go directly to the blood, without being filtered in any way.

2) Malassezia globose -- This species is responsible for skin diseases including hair dandruff. The root cause of dandruff is Malassezia globose, a yeast-like fungus that lives on the scalp and feeds on sebum. This happens because the Malassezia fungus uses an enzyme called lipase to metabolize the oil. Penetrates the top layers of the scalp to cause and increase inflammation to make a by product called oleic acid penetrated into top layer of scalp and causes inflammation and increased skin cell flaking in susceptible people.

To prevent from mild dandruff, we should try regular cleansing with a gentle shampoo to reduced oily from the surface and skin cell build up when regular shampoo is not effective then anti dandruff are used. Anti-dandruff shampoos with antifungal activity and antibacterial activity used in the treatment of dandruff. It reduce hair reduction in the population of androgenetic alopecia and supports possible involvement of Malassezia.

AZADIRACHTA INDICA (NEEM)

Azadirachta indica commonly known as Neem which belong meliaceae family. It generally grew in tropical regions such as India, Pakistan, Bangladesh, Nepal, Sri Lanka etc. All part of neem tree from leaf to root, fruit to stem everything are used in traditional Indian medicine which was being used in medical treatment was about 45000 years which indicate that Indian Harappa culture. Neem trees are get fastest grew and in few may grow 20 feet in height from seed planting.

According to WHO 80% of the population living in developing countries relies exclusively on traditional medicine for their primary health care. Generally, Neem is used in cleaning teeth with help of their twig. Skin disorder is treated with the help of their juice. Its tea is used as tonic and it leaves are placed in bookshelves, grain storage and clothes to keep away bug which can damage it. in neem have lots of medicinal properties such as antibacterial activity, antiviral activity, anti-inflammatory, anti-oxidant, anti-carcinogenic, anti-snake venom and also helps in treatment of parasitic disease, digestive disorder, skin disorder, boost immune, tumour and sexually transmitted disease.



Fig1: Neem leaves.

Serial no.	Problems	Part of plant used		
1.	Body heat	leaves		
2.	Fever	bark		
3.	Infections	leaves		
4.	Painful periods	leaves		
5.	Vaginal problems	bark/leaves		
6.	Worms	leaves		
7.	Fever	leaves		
8.	Haemorrhage	leaves		
9.	Piles	seeds		
10.	Wounds	leaves		
11.	Eye diseases	fruit juice		
12.	Jaundice	leaves		
13.	Poisoning	seeds		
14.	Fumigation	all parts		
15.	Teeth diseases	root bark		
16.	Heart diseases	neem decoction		
17.	Vaginal problems	neem decoction		
18.	Grey hairs	neem decoction		

Table 1: Part of neem plant use in treatment of disease.



Fig 2: Major components present in neem.

By using methanolic extracts from A. indica leaves showed that they stopped Bacillus from working, and oils from seeds, bark, and leaves might stop Gram-negative and Gram-positive bacteria from growing or staying alive. We focus on the Gram-positive strains of M. pyogenes, Streptococcus mutans, and Staphylococcus aureus, which are frequently found on the surface of the skin as staphylococcus aureus is responsible for the cause of dandruff.

Additionally, it is well-known that -sitosterol can be used to treat a wide range of skin conditions. A. indica also contained nimbolide and nimbidin, which were found to have antibacterial properties against the following bacteria: Coagulase of Staphylococcus aureus Due to its components, A. indica was considered the most effective medicinal plant for dermatophytosis in traditional treatment. The minimum fungicidal concentration (MFC) and minimum inhibitory concentration (MIC) of A. indica leaf and seed extracts against a variety of dermatophytes, including Trichophyton mentagrophytes, T. rubrum, and Microsporum nanum, were discovered in a study. When compared to the dermatophytes that were left untreated, the effect of A. indica extracts on these dermatophytes' growth curves was unexpected. In addition, the inhibition of dermatophytes was cited as the cause of the antifungal properties of A. indica leaf extracts.



Fig 3: Health benefits of Neem oil.

CITRUS LIMON (LEMON)

Lemon is an important medicinal plant of the family Rutaceace with botanical name Citrus Limon. Which is cultivated mainly for its alkaloids which have anticancer activities and the anti-bacterial properties in their extract which is obtained from different part of their plant such as leaves, stem, root, flower and fruit.

In lemon flavonoids have a large spectrum of biological activity which are antibacterial, antifungal, antidiabetics, anticancer and antiviral also help in boost the Immune system of human body and prevent to disease like fever. Sometimes it is used in minimize or treatment of CNS disorder.

Nutritional Value

Lemon contains many vitamins and nutrient such as niacin, riboflavin, thiomine choline, pantothenic acid, foliate, vitamin C, vitamin B_6 and mineral such as calcium, copper, iron, manganese, magnesium, phosphorus, potassium zinc which are needed for human body it should be stored at their specific temperature.



Fig 4: Citrus fruit.

S NO.	NAME	Nutritional	
1.	Carbohydrates	9.32 g	
2.	Sugars	2.50 g	
3.	Dietary fibre	2.8 g	
4.	Fat	0.30 g	
5.	Protein	1.10 g	
6.	Thiamine (Vit. B1)	0.040 mg (3%)	
7.	Riboflavin (Vit. B2)	0.020 mg (1%)	
8.	Niacin (Vit. B3)	0.100 mg (1%)	
9.	Pantothenic acid (B5)	0.190 mg (4%)	
10.	Vitamin B6	0.080 mg (6%)	
11.	Folate (Vit. B9)	11 μg (3%)	
12.	Vitamin C	53.0 mg (88%)	
13.	Calcium	26 mg (3%)	
14.	Iron	0.60 mg (5%)	
15.	Magnesium	8 mg (2%)	
16.	Phosphorus	16 mg (2%)	
17.	Potassium	138 mg (3%)	
18.	Zinc	0.06 mg (1%)	
19.	Energy	121 kJ(29 kcal)	

Table 2: Following is the nutritional value of 100 grams of raw lemon without peel.

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Basic use of Lemon

Lemon are highly used in baking and cooking in whole country such as sorbents, beverages, refreshing drink, pickles, jams, jellies, snacks, candies, sugar boiled cooking.

From its peels extracted oil which are used in soft drink concentration body oil, cosmetic, hair oil, tooth paste, toilet and body soap, disinfectant, mouth washes, deodorant and many other product for colour, odour, perfuming etc.

Basic medicinal use

- 1. Eye care: For the treatment eyes against aging and macular degeneration lemon has anti oxidant properties which is present in vitamin C. Lemon also contains flavonoids which help in protect from infection.
- Gout: Due to accumulation of free radicals and toxins primarily uric acid in the body causes the gout. limes help treatment of gout because it is reservoir of anti-oxidant (vitamin c) and detoxifiers(flavonoids). Its free radicals and detoxify the body.
- **3. Piles: It** treat the piles from the root and also removes the causes of piles. It help in heals up the wound and ulcers which presents in digestive and excretory system. It also gives relief from the constipation too.
- **4. Fight infection**: It protects the body from against various bacteria including salmonella bacteria and Helicobacter pylori.
- **5. Fat burner**: As the lemon contains citric acid which is excellent fat burner. A lukewarm water with the lemon drops, it is excellent weight reducer.
- **6. Maintain glucose level**: It reduce the serious risk to people which have diabetes may regulating the body's absorption of sugar in the blood stream. This effect due the presence of high levels of soluble fibre found in the lemon.
- 7. In digestion: As in the research we have found that the lemon has irresistible aroma. due to this our mouth became watery due to secretion of saliva before eating it this only occur sue to taking smell of it this help in primary digestion. As it also contains the flavonoids which increases the secretion of digestive juices, Biles and acids and it directly stimulates the digestion of food.

Lemon juice extract was effective in controlling the fungus in the short term, but the results were found to be erratic over the long term. Adopts a polyherbal formula containing citrus lemon extract to treat dandruff. Citrus fruits synthesize and accumulate in cells many phytochemicals, including low molecular weight phenols such as hydroxybenzoic and hydroxycinnamic acids, acetophenones, terpenoids, flavonoids and stilbenes, concentrated tannins.

Mainly lemon has Flavonoid and Vitamin C which used in the treatment of dandruff.

Flavonoids- They could alter the body's response to allergens, viruses, and carcinogens It also exhibits anti-allergic, anti-inflammatory, anti-bacterial and anti-cancer properties. Flavonoids are known for their ability to enhance the effects of ascorbic acid Citrus fruits have been studied for their antibacterial activity and extracts can help treat viruses, bacteria, and fungi. As above discussed that dandruff is occur due to the fungus such as Malassezia furfur, Malassezia globosa etc. So flavonoids of lemon plant used to treat dandruff.

Vitamin C - Citrus fruits are rich in vitamin C, which helps maintain the pH of the scalp and prevents itchiness and dandruff. It also reduces dullness and makes hair thicker and shinier. The combination of citric acid, AgNPs, and CIFLOX into the PVA matrix supplies a powerful antibacterial activity against Staphylococcus aureus (S. aureus). Staphylococcus aureus is also responsible for the dandruff as the citric acid is responsible for the treatment of the dandruff.

Remedy	Technique	Result observed	Inhibitory rate (with days)	Stability (Rate/days)	Percentile of effectiveness/ inference	
Neem	Pour plate	Slow /medium control of Malassezia growth	Medium control over initial 2 days, reduced action over next 3 days	Low	55-60% eff <i>ec</i> tive Although the effects of the neem leaf	
	Spread plate	Slow /medium control of Malassezia growth	Medium control over initial 2 days, reduced action over next 3 days	Low	extract were prompt and successful in stopping the growth of Malassezia fungus, they did not last for a longer period of time.	
	Disc diffusion	Small inhibitory zone around the disc	Small inhibitory zone first 2 days, vague/less resistance over next 3 days	Low		
Lemon	Pour plate	Effective inhibition of Malassezia growth	Fastest inhibition rate over 1 day, reduced over next 2- 3 days, least on day 5.	Medium	70-75% Effective Though the results did not hold over a longer period of time, lemon juice extract was most	
	Spread plate	Effective inhibition of Malassezia growth	Fastest inhibition rate over 1 day, reduced over next 2- 3 days, least on day 5.	Medium		
	Disc diffusion	Clear inhibitory zone around the disc, lesser time frame	Clear/ effective inhibitory zone day 1, vague over 2- 3, least resistance over 4-5 days	Medium	effective in suppressing the fungus within a shorter timeframe.	

Table 3: Which one is better for the treatment of dandruff just take the help of antifungal tests.

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CONCLUSION

The effects of citric acid were both temporary and of average durability, whereas the effects of lemon juice extract were most efficient against the fungi for a brief period of time. The least amount was present in Neem extract stabilities and inhibiting effects of the tested natural treatments. Previous studies have also demonstrated the effectiveness of herbal medications, for instance, in preventing or lowering dandruff.

Lemon: 70-75% effective though the results did not hold over a longer period of time, lemon juice extract was most effective in suppressing the fungus within a shorter timeframe.

Neem: 55-60% effective although the effects of the neem leaf extract were prompt and successful in stopping the growth of Malassezia fungus, they did not last for a longer period of time.

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