THE COMPARATIVE STUDY ON HERBAL AND SYNTHETIC SHAMPOOS AGAINST DANDRUFF SPECIES

Dinesh Bhandari

ABSTRACT

Hair is the most fundamental part of the body that protects the skin in an effective manner. Henceforth, people use some synthetic and herbal products for the protection of hair and skin. The alternative plan people have is like shampoos for protection of dandruff, hair loss and relevant treatment against dandruff, hair etc. Shampoos are the modern cosmetic products for the protection, moisture and conditioning of hair. On the other hand, the purpose of using shampoos for washing hair, remove dandruff, oils, dirt and avoid some diseases on the scalp. Amongst different species of Malassezia, Malassezia furfur is the main culprit of dandruff. The primary objective of this paper is comparative analysis of different brands of synthetic and herbal shampoos by using laboratory work. Synthetic shampoos also showed the ZOI against dandruff but the herbal shampoos showed the highest ZOI against dandruff. Synthetic products are chemical based products which might have some risky chemicals. Herbal shampoos are plant extract shampoos which have not any side effects, are less risky and naturally friendly. I compared the ZOI of herbal shampoos to a higher diameter than the ZOI of synthetic shampoos. The Zone of Inhibition of herbal shampoo found to be Patanjali is higher than Gel shampoos followed by Himalaya compared to the ZOI of synthetic shampoos found as TRESMME is higher than Sunsilk followed by Dove. This study has proved that the herbal shampoos could be more effective to fight against dandruff and have a high number of efficiencies. The plant extracts or herbal shampoos are concluded to be the best treatment rather than the synthetic shampoos.

Keywords: Dandruff, Herbal shampoos, Malassezia furfur, synthetic shampoos, ZOI.

1. INTRODUCTION

In 21st century, the various scientific and technological diversity bring to light different challenge that could human life easier and convenient. In this context dandruff should be needed to studied. Dandruff, is an irritating common scalp disorder occurred nearly about 50% in the world population **[1]**. It is dry, white or greyish flakes on the scalp. It is not contagious or serious but it can be awkward person to person. It is found in any ethnicity and both gender but mostly in the male at any age groups. It has been widely studied for decades but the fully treatment is not well understood. Dandruff flakes are dead skin cells primarily when one should have dandruff scalp may look scary or red. Generally, there are two types of dandruff occur on the basis of symptoms showing dandruff **[2].** They are:

a) Dry and flake type: It is also called *pityriasis simplex,* having small, white flakes form of dandruff occurs in the middle of scalp and then scattered into the different area on the scalp like frontal, occipital, parietal and frontal. There is no observance of hair loss in this type of dandruff.

b) Oily type: It is also called *seborrheic dermatitis,* which is caused by the sebaceous gland secretes excessive oil for the growth of Malassezia. In this type of dandruff there is high chance of hair loss and most probably found on the other parts like behind the ears, behind the nose, eyebrows, over the breastbone and armpits **[3].**

The advancement of new sequencing technology bring clarity that M. Restricta, M. on scalps are also the causes of dandruff. Malassezia produces and synthesis various enzymes are: aspartyl, protease, fatty acids are used as energy sources and also incorporated directly into cellular lipids. The most favourable enzymes for the growth of *Malassezia* species are lipids whereas the carbohydrates, vitamins are not required for the growth of dandruff. On the other hand, Malassezia species are normally growth in any conditions like aerobic, anaerobic as well as micro-aerobic.

In the scalp sebaceous gland produces and secrete sebum which is complex of cholesterol, oils, wax. The enzyme lipase is responsible for the production of unsaturated fatty acid for the development, growth of dandruff and it hydrolyses sebum triglycerides and helps yeast cells take up saturated fatty acids to generate energy. The accumulation of excess unsaturated fatty acids, such as oleic acid, on the skin causes skin irritation in patients suffering from dandruff **[4].**

1.1 Causes of dandruff

The different genus of Malassezia is considered as the major culprit causing dandruff. It is mainly found on the human skin and animals. There are different species of Malassezia (M. globosa, M. japonica, M. furfur, M. sympodialis, M. carprae, M.yamatoensis, M. restricta, M. nana, M. pachydermatis, M. carprae, M. equine) [5]. This different Malassezia is causing a various skin related disease in human beings, such as Pityriasis, Versicolor, dandruff, folliculitis atopic dermatitis, psoriasis, as well as it causes fungal infections in human and animals [6]. Among them Malassezia furfur (Pytirosporum ovale) is a major culprit causing dandruff. It is a monophyletic, unipolar yeast like basidiomycetes fungus which is present in the human hair and skin. The other causes might be the hormonal changes in adults, diseases, oily skin, nail scratching, excessive sebaceous secretion, chemicals used, dirty water, photosensitivity etc.

2. REVIEW OF LITERATURE

2.1 Literature survey for the treatment of Malassezia Species

There are various drugs on the market for the treatment and controlled of dandruff species. The drugs for the treatment of dandruff are ketoconazole (KTZ), coal tar, imidazole derivatives, salicylic acid, zinc pyrithione, piroctone olamine, triclosan, selenium, sulphide and lipase inhibitors. However, these agents have a huge limitation, either poor clinical efficiency or bad impacts on the human health. Furthermore, these drugs unable to control reoccurrence of dandruff [7]. Most of the people are frequently used synthetic and herbal shampoos, which is the highest market in the world. But the maximum people are unaware about the different brand of cosmetic and herbal shampoos.

2.2 Literature survey for Synthetic shampoos

The different brands of synthetic shampoos available on the market have a huge impact for cleaning hair, irritation in hair, preventing hair falls and act as anti-dandruff properties. There are altogether different brands minimum two dozen synthetic shampoos are available on market. They are: Sunsilk, Head and shoulders, TRESMME, clear anti-dandruff, kesh king, mama earth onion shampoo, L'Oreal shampoo, Indulekha, Hairobics, Pantene, Revlon, Estetica, Henry Hargu, Wig shampoo and so on. Different brands of shampoos probably have pros and cons. Most of the chemical loaded shampoos that are perilous, unsafe can cause severe diseases. Most people are unaware about diseases caused by synthetic shampoo. The synthetic based shampoos are primarily based on the chemical like surfactant which has the c A medical

college of Georgia has been reported that SLS label at a bottle surface is a severe detergent when it reacts with the shampoo can causes problem in heart, liver, lungs and brain [9]. SLS can cause flake and substantial dryness on the skin, which has ability to hair fall or different implication on hair health. Formaldehyde are preservative agent for many shampoos but it is not labelled on the product but rather mentioned Quaternium-15 which is carcinogenic effect **[10].**

The synthetic shampoos I used in my experiment were found to have a very small zone of inhibition as comparative to the herbal shampoos. The three different shampoos that have to be taken for experiment are: Dove, Sunsilk, and TREsmme. Dove is made from the synthetic surfactant and some vegetable oils based which has an implication to the human discussed earlier. The different ingredient used in dove shampoos are: Water (Aqua), Sodium Laureth
Sulfate, Glycol Distearate, Cocamidopropyl Betaine, Sodium Chloride, Fragrance (Parfum), Glycerin, Dimethicone, Dimethiconol, Acrylates/Beheneth-25 Methacrylate Copolymer, Styrene/Acrylates Copolymer, Guar Hydroxypropyltrimonium Chloride, Citric Acid, Tetrasodium Edta, Amodimethicone and so on has the ability to wash away sebum present in the scalp **[8].**

2.3 Literature survey for Herbal shampoos:

Herbal shampoos are the plant extract shampoos which have a huge impact on the market. There are altogether two dozen different herbal shampoos available on the market. The methodology of herbal shampoos is opposite to the synthetic shampoos. From the past few decades, the utilisation of herbal shampoos has increased in an effective manner. The truth of herbal shampoos consists of different active substances like vitamins, hormones, enzymes, fruit acid, phyto-hormones, bioflavonoids, amino acids, sugars, essential oils, tannic acids and so on. They believe in people that the herbal products are safe for use and not having side effects **[11].**

The different plants used for the production of herbal shampoos are: Nelumbium speciosum, Eugenia Jambos, Azadirachta indica, Cinnamomun camphora, Thymus vulgaris, Sesamum indicum, Phyllanthus emblica, Sapindus indica, Juglanas nigra, Berberis Vulgaris, Citrus limon and so on. The functions that provide herbal shampoo include good hair conditioner, antidandruff agent, hair growth promoter, good for itchy scalp scalp or dandruff. It is difficult to make herbal shampoo safer than synthetic ones, in the meantime it would be noted that the detergency, forming of herbal shampoos **[11].** The different products of herbal shampoos in the market are: Satthwa Argan Oil shampoo, Patanjali coconut hair wash, Khadi Herbal Shikakai Shampoo, Himalaya anti-fall hair, lotus herbal etc.

The Shampoo extract from Ocimum sanctum (tulsi) and Azadirachta indica (Neem) leaves are found to be antimicrobial due to the presence of flavonoids **[12].** The herbal plants have medicinal advantages, provide safety, no side effects, environmentally friendly and renewable supply **[13].** The different plants Withania somnifera, Nelumbium speciosum, Euglenia jambos, Pyrus malus are used as improve blood circulation of the scalp, provides nourishment to the hair, structure to the hair and act as anti-dandruff properties [8]. Castor derivatives are also a good other source option for the protection of hair, it has high viscosity and lubricating, moisture the hair by developing clear shampoos and conditioner **[14].**

MATERIALS AND METHODS

3.1 Isolating *Malassezia* species

Malassezia species was isolated by using streaking dandruff with help of sterile loops in five different plates on SDA and olive oil. It was done by incubating the streaking 24 hrs and observed different colonies of Malassezia species.

3.2 . Sample collection

The sample was collected from the high suffering dandruff person. We sat on a bit of a dark surface to avoid sunlight by using a sterile comb and scrabbling in a paper collecting dandruff. The sample collected took to the diluted, dandruff growth with the help of SDA and olive oil. The samples were incorporated with chloramphenicol to avoid the growth of bacterial contamination. The samples incubated into the petri dishes containing media by using forceps. The petri dishes were labelled and incubated at 37 °C for 3-5 days for observation.

3.3 Culture Media Preparation:

The Culture media was cultured by the following reagents:

a. SDA
b. Olive oil
c. Distilled water

The media was taken to the sterilization by using Autoclave for 121°C at 15psi for 15mins.

3.4 Sample analysis

3.4.1 Catalases Tests:

It was done by adding 3% of hydrogen peroxide solution was poured in to test tube. The observance of gas bubbles is responsible for breakdown hydrogen peroxide into oxygen and water by help of enzyme catalase. It is positive for all *Malassezia* species except *M. restricta* which is negative **[15].**

3.4.2 Esculin Hydrolysis Tests:

The Esculin was doing by using the medium esculin agar. It was done in the slant tube. An inoculum of pure culture was transferred into a sterile tube in bile esculin agar and incubated in 30 °C for 24 hrs and the result was observed and recorded.

3.4.3 Gram's staining:

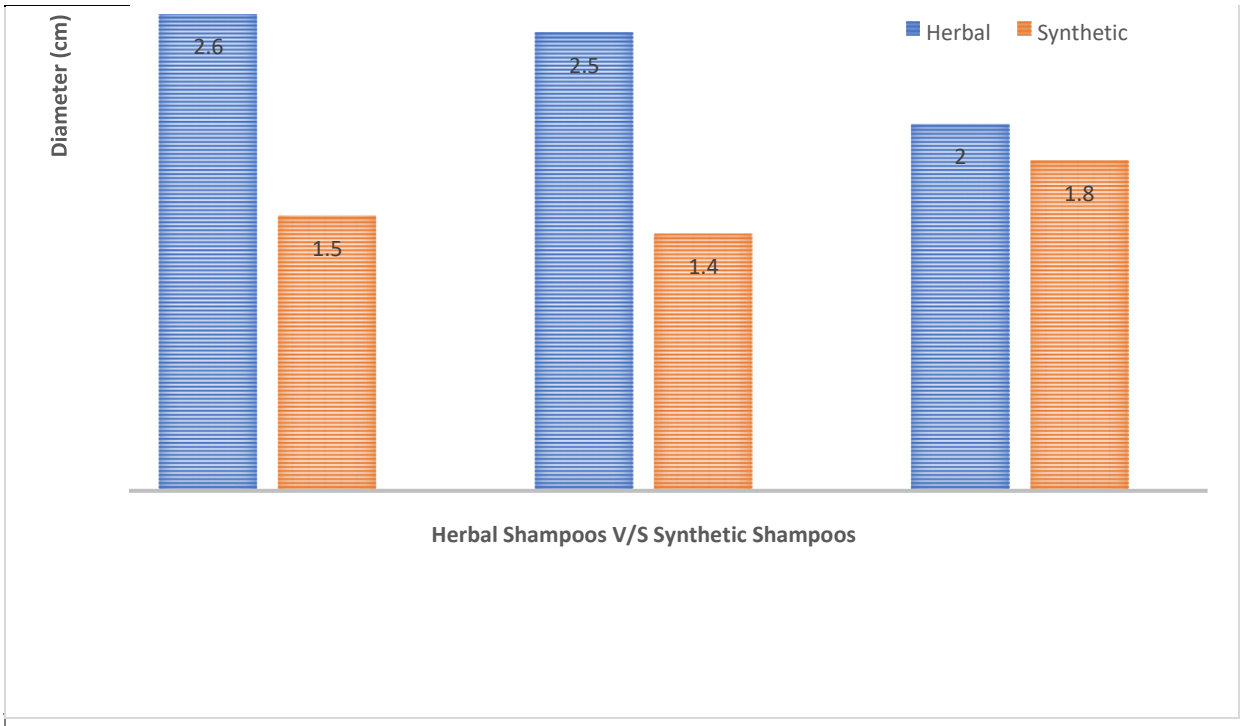
A smear of pure culture was prepared and Gram's staining is carried out to study microscopic views, morphology and characteristics as shown in the figure 3.

Table 1: Comparative Zone of Inhibition Analysis of Synthetic Shampoos

S.N.	Synthetic Shampoos	Diameter (cm)
1.	Sunsilk	1.5
2.	Dove	1.4
3.	TRESMME	1.8

Table 2: Comparative Zone of Inhibition Analysis of Herbal Shampoos

S.N.	Herbal Shampoos	Diameter (cm)
1.	Patanjali	2.6
2.	Gel Shampoo Tea tree	2.5
3.	Himalaya	2



Graph 1: Comparative analysis herbal versus synthetic shampoos.

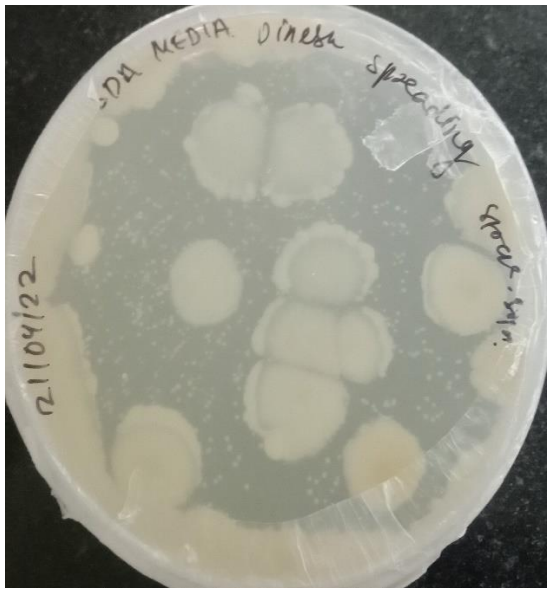


Fig 1: Spreading dandruff species in SDA and olive oil media.

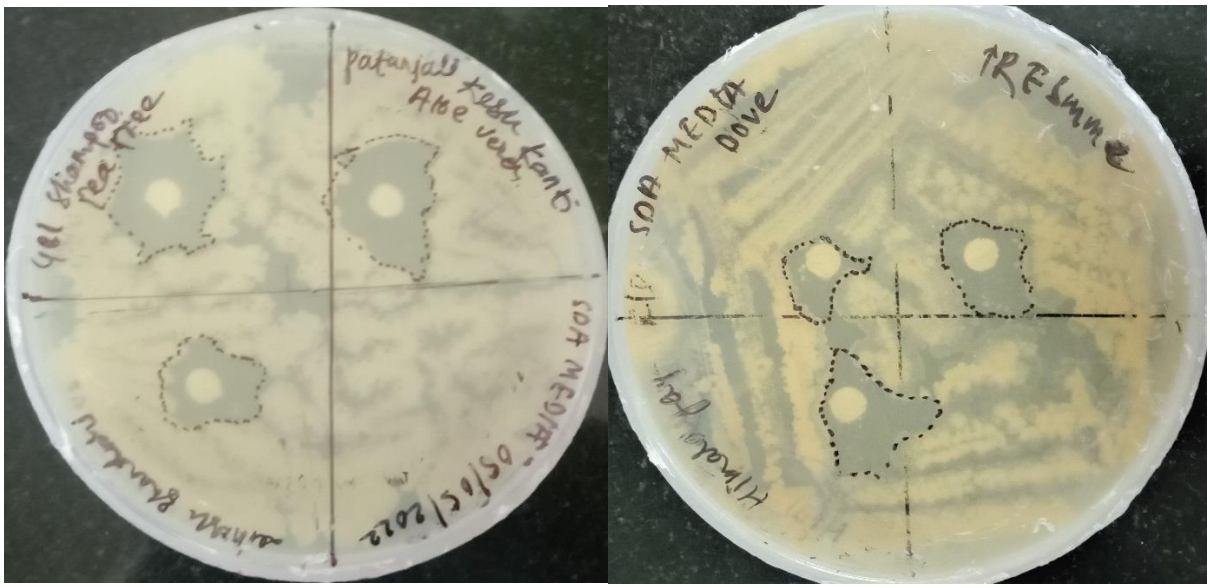


Fig 2: Growth showing dandruff and anti-fungal activity against dandruff.

Zone of inhibition (ZOI):

ZOI was observed on SDA plates after 72-96 hrs of incubation. The active culture was spread throughout the plates using sterile loops over SDA. All the shampoos were dissolved in sterile distilled water followed by dissolved in shampoos with disc on it. After incubation the ZOI was measured by the scale and results were recorded accordingly.

MICROSCOPIC VIEWS OF DANDRUFF

The morphological characteristics and observation of dandruff are as follow [16].

Table 3: The characteristics and observation of Dandruff.

S.N.	Characteristics	Observation
1.	Size	1-3 mm
2.	Shape	Circular
3.	Colour	Whitish
4.	Margin	Entire
5.	Elevation	Convex

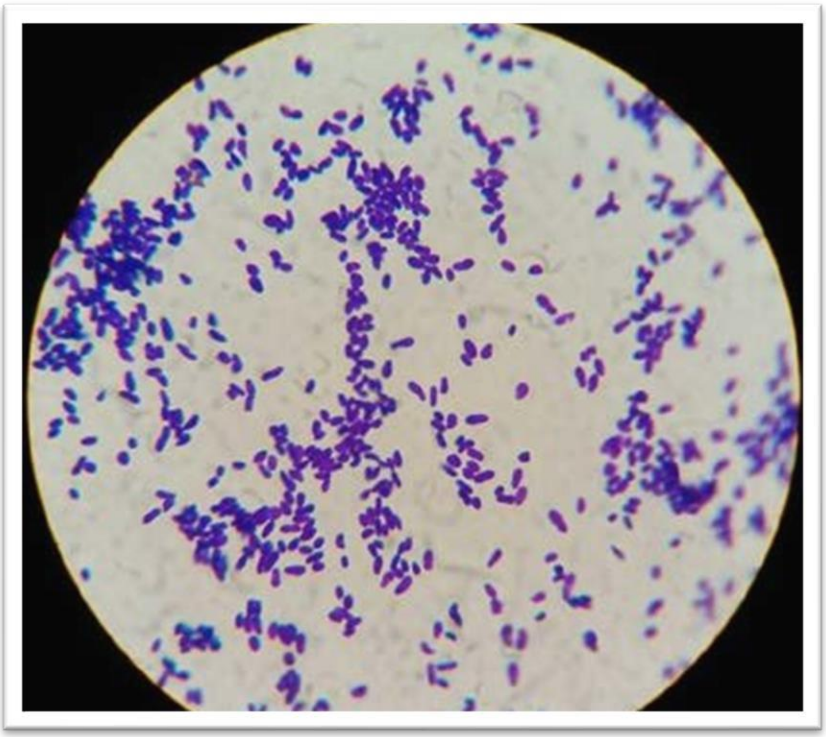


Fig 3: Compound Microscopic view of dandruff

RESULTS

As the data suggested that the zone of Inhibition of Patanjali is 2.6 cm, Gel shampoo tea tree is 2.5, followed by Himalaya is 2cm and the data suggested of the synthetic shampoos like Sunsilk is 1.5 cm, Dove is 1.4 cm, followed by TRESMME is 1.8 cm. The higher the ZOI is possibly the higher the anti-dandruff activity. The result suggested that the highest zone of inhibition found in herbal shampoos is more reliable than the lowest zone of inhibition found in synthetic shampoos.

DISCUSSION AND CONCLUSION

The number of different Malassezia species are increasing in a rapid manner from the past few decades. Henceforth, it is very mandatory for scientists, researchers, chemists to find the root causes for the treatment of dandruff species. As we discussed earlier, researchers concluded that the Malassezia species are the main causes for the deterioration of hair, dandruff and other related diseases, so at that point of time, it is very urgent to study the root causes of it. Meanwhile, different herbal medicine or related drugs are the main requirements in the market for the better protection from such diseases.

From my experiment, shown in table number two the ZOI of herbal shampoos are quite significant rather than table number one synthetic one. So, we should prescribe people to use herbal shampoos rather than synthetic shampoos. As three different herbal and synthetic shampoos are discussed in experimental work, would suggest people to use herbal shampoos for the protection and prevention of dandruff.

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