



## **Comparative study between naturally formulated herbal shampoo and commercially available shampoo**

**Dhwani Mehta<sup>1</sup>, Anjali Thakur<sup>2</sup>, Dhwani Upadhyay<sup>2</sup>, Prasad Andhare<sup>3</sup>, Indrani Bhattacharya<sup>2</sup>**

Parul University, P.O Limda, Waghodiya, Vadodra -391760 Gujarat- India

1: Student, M. Sc. Biotechnology, Parul Institute of Applied Sciences, Parul University, Post Limda, Waghodia, Gujarat, 391760

2: Assistant Professor, Parul Institute of Applied Sciences, Parul University, Post Limda, Waghodia, Gujarat, 391760

3: Assistant Professor, Biological Sciences, PDPIAS, Charotar University of Science and Technology,

\*Corresponding Author: Dr.Indrani Bhattacharya;

E Mail: [indrani.bhattacharya82083@paruluniversity.ac.in](mailto:indrani.bhattacharya82083@paruluniversity.ac.in)

### **ABSTRACT**

*Hair is believed to be one of the most important factors in physical appeal of the beauty. Hair care has been an important part of the human civilization since ancient times. Shampoos play a huge role in serving this purpose. Hair care has become much more than just cleaning of hair but it now also have properties like good conditioning, maintenance of scalp health, smoothing etc. various advancement have been observed over the time period in the formulation and assessment of the shampoo and other hair care related products which till some extent have been able to serve all the necessary expectations. The present study aimed to formulate and assess a pure Herbal Shampoo and to compare its properties with commercial synthetic or herbal shampoo. This natural herbal shampoo was formed using regular ingredients that are present in the nature and are proven to be very effective for hair care. The extracts of plants like Acacia Concinna, Zizipus spina-christi, Phyllanthus emblica, citrus aurantifolia are known to be very effective for hair growth and maintenance and hence were used for formulation of herbal shampoo and other market available shampoo like dove and herbal essence bio renew shampoo were taken and observed to study their different Physio chemical properties and compare them on the basis of it. Both herbal shampoo and commercial shampoo were tested on diff parameters like colour, ph, %solid content, wetting time, foaming ability etc. and were compared on the basis of that. Key words:- Physio chemical properties, herbal shampoo, hair care, commercial shampoo.*

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### **INTRODUCTION**

Cosmetic products constitute a huge part in our day to day life and are thus expected to have less chemical content in them and more natural properties. Cosmetic products that are marketed commercially since time immemorial contains more amount of chemicals than expected and hence are sometimes causative agents for a lot of disease in long time. Hair care products are one of the widely used cosmetic items. Shampoos are one of those hair care cosmetics only. Initially the main purpose of using a shampoo was cleaning of scalp [1]. But over the period of time with the advancement in technology they were able to help in cleaning, conditioning and smoothing of hair. Since it is believed over the ages that natural plants and its extracts serve best for the overall health of the body and hair, herbal and natural shampoos are in high demand as it contains more amount of natural products and less chemical properties that are known to be harmful to hair and body in long run. Shampoos are generally produced by using detergent and additives that promotes the task of hair conditioning, cleaning, maintenance etc. As the appearance of hair is taken into high constitution it is very important to protect it from any kind of damage that happens due to pollution, diet that sticks in the hair and leads to sebum formation making the appearance of hair greasy and sticky. Hence to treat all this damage while keeping the negative effect of the health caused by chemicals most of consumers are demanding more and more natural additives especially in the commercial shampoos instead of using synthetic shampoos. Use of natural shampoo not only promotes good hair health but also promotes environmental safety, because formation of any synthetic shampoo cause a lot of pollution in the environment due to its chemical waste that is released into the environment [1]. Synthetic shampoos also constitute various chemicals like sulphate, parabens

etc. which leads to weakening of hair roots causing immense amount of hair fall which leads to baldness. Formation of any herbal shampoo is done by checking its effectiveness, performance, and quality. It is also imp to check its sensitivity to skin. Herbal shampoos are the natural alternate for the cleansing of hair over synthetically formulated shampoo.

The study was formulated to understand the effect of naturally homemade shampoo and commercial shampoo and shown a comparative difference between the two [1].

### **Hair**

Hair is a **protein filament that grows from follicles found in the dermis**. Hair is one of the defining characteristics of mammals.

Mostly in hair the main focus is on based on hair care, its growth and its type but apart from that hair is also considered to have a notably important biomaterial present in it which is known as alpha-keratin (primarily protein)

The naizets believe that hair is usually made up of three parts that constitutes:-the bulb, the root and the stem (present in the pilosebaceous gland)[1].

The root is believed to be present in the hair follicles where it is firmly fixed. It the part of the hair that is situated between the bulb and the epidermis of where hair is converted into the stem. The formation of root and stem is usually believed to be same having three main components: - the cortex, the medulla and the outside cuticle [1].

Hair is considered as the protective appandages on the body and structures of integument with the sebaceous glands, sweat glands and nails.

This all originate from epidermis at the time of embryological development and hence are also known as epidermal derivatives [2].

The cuticle:- It is a chemically resistant region that surrounds the cortex in the hair fibres of animals. Its properties of chemical resistance were widely described with the help of an experiment that was performed by Geiger [3].

Flat overlapping cells are present in the cuticle region of the hair. The cells of cuticle are attached to each other at the proximal end and are pointed towards the distal end. These cells also contain unbroken and smooth edges near the scalp in the end part of the root region. The cuticle cells that are present in the human hair are 10-5 scales thick while that of wool fibres have 1-2 scale thickness only. The cuticle cell size is believed to be ranging between 0.5-1.0 microns while its thickness ranges upto 45 micron [4].

The cuticle mainly has three layers b-layer, a-layer and epicuticle [5].

**The medulla:** - It is present in the central core.

The study of medulla of hair is not done often as it has no such contribution to the development of fibre properties of the hair.

Using SEM and TEM technologies inner fibre of the hair were studied which allowed to have a deeper observation of the hair medulla.

Three subunits of medulla were found using TEM and two subunits of medulla were observed using SEM (thick and thin) [6].

**The cortex:** -This is located between the cuticle and medulla in the hair shaft and is thickest layer of the hair.

This is made up of cortical cells which are made up of micro fibrils.

They contain about 65-95% of the proteins and around 32% of water(depends on the humidity) they also contain liquid pigments and hence alpha keratin is believed to dominate the chemical properties of the human hair [7].

There has been a representation that describes that the tensile properties of hair are mostly dominated by the cortex and not cuticle[8].

### **Hair care**

Hair is one the most important part of the body, as it enhances the beauty appeal and reflect personality of a person. Many hair care products are available in market.Over a long period of time medicinal plants are used in the formulation of different types of hair care products.Various types of plant oils, essential oils etc. are used in cosmetic and herbal forms to take good care of hair [9]. It is believed that hair integrity depends on the cortex of the hair while its shine and texture are more related to hair surface properties. Hence the products that improve the structural integrity and tensile strength of the hair along with increasing the hair volume, manageability of the hair, stimulation of hair growth and reduction in frizzy hair are available in the market [10]. Many herbal and natural products are also used in taking good care of the hair. This products are generally benefits by improving the hair growth and imparting shine to the hair. This products mostly consists of various plant extracts like *Lawsonia inermis* (Henna), *Acacia concinna* (Shikakais), Bacopamonnieri (Brahmi) etc.This products are easy to formulate and are budget friendly with greater safety compared to synthetic products [11].

## **Types of shampoo**

Every individual has a unique type of hair. Due to differences in the hair types the problems caused in the hair also differs. It is very hard to treat all the problems using one remedy. Different problems need different solutions similarly different hair types require different shampoo modulated or atleast appropriate for their hair type. Depending upon the hair type the cause of problem can be determined. Sometimes not taking proper care, eating unhealthy food, heredity reasons, and side effects of some medicine or treatment can also cause hair fall or damage to the hair. But keeping all this factors aside if only type of hair is considered the shampoo are classified into following. (Table 1) [11].

### **Commercial shampoo**

There are a wide range of commercially available shampoo brands. Over the period of time a lot of people have felt various discomfort like irritation or itching in scalp, roughness in hair, damage and breakage of hair follicle etc. after the use of many commercially available shampoo. The most common ingredient in most of this commercially available synthetic shampoos is surfactant, which is known to have very adverse effect on skin and health. A lot of people that use this synthetic shampoo have no clue of the adverse effect caused to their health due to the chemicals present in them [12]. One of the very harmful detergent that is present in synthetic shampoo is sodium lauryl sulphate. As per some study at medical college of Georgie it is believed that this detergent is capable of causing cataract in adults moreover it caused corrosion of the hair follicle that cause retention to its ability to grow. SLS is widely used in industrial hair care products. Various tests are regularly carried out to study its constant effect on the skin [13]. Many other harmful detergent like formaldehyde (known for its carcinogenic effect), selenium sulphide that is concluded to be as a carcinogen according to a bioassay study carried out on the rat and mice. N-nitrosodiethanolamine which is a known carcinogen. Apart from this other harmful surfactant like diaethanolamine, cocamidopropyl betain etc. are present in mostly all of the commercially available synthetic shampoo [12].

### **Herbal shampoo**

Herbal shampoo as the name suggests is formed using herbal and natural products. This shampoo are formulated using plant based products that are naturally very beneficial for the hair care. This can be used a very good alternative source to synthetic shampoo. This shampoos can be formulated using the plants in there crude form or by extracting them and making them more appropriate as per the need of the product.

Herbal plants shampoos are formulated with the help of large range of actives like bioflavonoids, enzymes, amino acids, fruit acids, vitamins, essential oils, sugars, glycosides etc. There are large no. Of plants that have shown promising results when it comes to hair care.

As discussed in [14], about the formation of 100% natural herbal shampoo and its comparison and evaluation with that of commercial shampoo. It explains a brief understanding for formulation of natural shampoo and its effectiveness in a lot of manners in comparison to that of commercial shampoos is shown. According to [10], the evolution of the herbal shampoo is presented which gives a descriptive idea of what all necessary criteria are there for the formulation of natural herbal shampoo that differs it from industrial shampoo.

The study on herbal anti dandruff shampoo efficiency and safety was done [14]. In this study for the formulation of antidandruff shampoo mixture of herbal plant extracts like *Vetiver lazizanioides*, *Ficus bengalensis*, *Nigella sativa*, *Citrus limon* and oil of *Melaleuca leucadendron*, *Rosmarinus officinalis* and *Santalum album* is used. According to this study the results show promising, more effective and better cure for dandruff management. [13] (Table 2)

### **Few plants that can be used for formation of herbal shampoo:-**

#### **Shikakai**

It is a form of plant shrub that has spines. It is small in size around 4ft tall that is found mainly in china and Asian continents. It has pale yellowish colour of leaves and it produces flowers having purple coloured buds. It has an appearance of smooth, and thick when it is new but it tends to turn into wrinkly and hard black kind of texture when it is dried. This plant has been used as a substance of hair care since time immemorial. It has various hair care properties that are proven to be in benefit for human hair. It is mostly used for formation of natural shampoo or ayurvedic shampoo products. It doesn't work very well for providing much layering of product onto the hair but it gives good cleaning and protection. It contains anti dandruff properties. It works best for the detangling of hair, removal of frizz and dandruff, provides good nutrition to the hair and makes the hair root grow faster by providing strength.

#### **Amla**

It is very popular plant for hair care. It is mainly grown in Asia. It is round in shape with even light cuts on the whole structure. It is light greenish in colour. Its tree is of about medium height. This plant is grown on the branches which are light greenish in colour and are not very hard but long. When consumed it

gives kind of sour taste to the tongue. In ancient times of Buddha it was considered a gift of lord to have half of amla. It is also believed to be a symbol for achievement of glory. For hair care it has strong constituents that help in providing strength to the scalp. Consuming amlajuce every day is believed to induce hair growth and prevent hair from premature greying. It also cures the problem of hair fall.

#### Reetha

It is a very useful medicinal plant that is grown in the lower hills of the Himalayas. It is very good in consumption and has a delightful taste. Even plantation of the seeds in poorly qualified soil can also yield 20-30kgs of product. It is greenish in colour. The fruit of reetha tree is generally used for the commercial purpose mostly, which turns brownish on drying. It contains many beneficial properties that can help in growth and protection of the hair. It is constituted with saponin which possess the ability of cleaning. It is anti-bacterial which serves good to provide resistance from dandruff. It also helps in treatment of lice.

#### Cidr

It is very huge tree that contains lots of cones. It is mostly grown in the Himalayas of Asia. The branches are spread over a huge area dividing into upper top branches and lower level branches. They possess very catching bluish green colour. The Sanskrit meaning of cidr says that it known as “wood of god”. It is also found in Pakistan, china and various other parts of the world. It possess very durable wood which is why this plant is of great use in furnishing and wood construction businesses. It is very much of significance in herbal sciences. It has fungus resistant properties due to which it protects hair from any fungal activity. It also nourishes and provide growth to the hair. It also provide shine to the hair and tones the scalp. It also has aromatic properties which help when cidr is used in essential oils and it works great for relief of headache. Also induce smoothing of hair.

#### Evaluation of herbal and synthetic shampoo

To gain a better understanding of phytochemical and antimicrobial properties of herbal and synthetic shampoo various tests are designed that gives a details and descriptive review of understandings Both the shampoos are tested on different parameters like pH, dirt dispersion, physical appearance, conditioning, wetting time, foaming ability, %solid contents etc. [13].

**Table 1.Types of shampoo [11]**

<b>Voluminous shampoo</b>	<b>Gives volume and shine to the hair</b>
Dry shampoo	For dry hair
Hydrating shampoo	Works to make up for the lost hydration and help to heal the scalp
Moisturising shampoo	Provide moisture and promote hair growth
Curl defining shampoo	Specially manufactured for curly hair
Colour protectant shampoo	To keep the hair colour in place and doesn't let it ware off easily

**Table2. Showing various plants beneficial for hair [16]**

Sr no.	Scientific name	Common name	Beneficial properties
1.	<i>Aloe vera</i>	Aloe vera	Promote hair growth, anti dandruff
2.	<i>Eclipta alba</i>	Bhirngraj	Increase blood circulation to scalp
3.	<i>Azardirecta indica</i>	Neem	Reduce hair fall
4.	<i>Phyllanthus emblica</i>	Amla	Prevent premature hair greying
5	<i>Cedrus deodar</i>	Cidr	Reduce dandruff
6	<i>Sapindus mukorossi</i>	Reetha	Control hair fall
7	<i>Acacia concinna</i>	Shikakai	It makes hair look shiny

#### Future of natural plant based shampoo products in hair care.

It is very briefly understood that the plant based natural products are far more beneficial than the once produced in the recent times. The more the natural content present the less is the use of the harmful chemical substances.

All the herbal products contain phytochemicals that are organic molecules. They also mean green pigmented organisms. Since this phytochemicals have very complex structures they are grouped into various classes. They are also known as therapeutic constituents. Phytochemicals are used for various purposes because of its ability of having very less or no side effects at all [11].

Due to its ability to show almost no side effects or have very less side effects herbal shampoo are in very high demand right now and with more and more understanding its demand will keep escalating benefiting the economy and environment simultaneously.

They are very easy to manufacture and are produced at a very expense.

They are safer to use than that of other synthetic products.

Even the small quantity is enough to acquire the desired result and is also cheap hence easily affordable products [12].

This will help in reduction of the chemical incorporation in the synthetic shampoo due to which less pollution will occur which will even benefit to the environment.

## CONCLUSION

In recent years demand for natural hair care products have increased as the consumers are focusing on the long term benefits of it. In the current review various benefits of the natural shampoo is shown in comparison to that of the synthetic shampoo products. It gives a brief idea about few theories about the synthetic shampoo and herbal shampoo. This review focuses on the beneficial properties of the herbal shampoo and considers it to be a better and effective alternative for synthetic shampoo. It also gives a little information about the hair structure and lists out few parameters that shows herbal shampoo to be more effective and efficient alternative for the future.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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