



A Review on Herbal Powdered Shampoo

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ABSTRACT

Hair is the fundamental element of human beauty. Herbs have been used for hair management, cleaning, and decoration since ancient times. Although the use of synthetic materials has grown over time, people are now more aware of the harm they may do to their skin, eyes, and hair. Shampoos and cleansers not only clean hair, but also provide a glossy finish and keep it manageable and oily. Shampoos come in several forms, such as lotion, liquid, powder, gel, and medicinal. caters to specific demands, whether hydrating, volumizing, or treating scalp issues. The market for natural and organic hair care products is expanding due to increased customer awareness of ingredients.

Introduction

Herbal medicine, also known as phytomedicine or phytotherapy, is the study and application of medicinal plants as a foundation for traditional medicine. Artemisinin, an anti-malarial drug derived from *Artemisia annua*, a herb traditionally used in Chinese medicine to treat fever, has been translated into modern remedies through global pharmacology research.^{[1][2][3]} Scientific evidence for the safety and efficacy of plants used in modern herbalism is limited, with no standards for purity or dosage.^{[1][4]} Herbal medicine can include fungi, bee products, minerals, shells, and animal parts.^[5]

Para herbalism refers to the use of unrefined plant or animal extracts for alternative or pseudoscientific purposes.

Herbal Preparations

There are many forms in which herbs can be administered, the most common of which is a liquid consumed as an herbal tea or a (possibly diluted) plant extract.^[6] Herbal teas, or tisanes, are the resultant liquid of extracting herbs into water, though they are made in a few different ways. Infusions are hot water extracts of herbs, such as chamomile or mint, through steeping. Decoctions are the long-term boiled extracts, usually of harder substances like roots or bark. Maceration is the cold infusion of plants with high mucilage-content, such as sage or thyme. To make macerates, plants are chopped and added to cold water. They are then left to stand for 7 to 12 hours (depending on herb used). For most macerates, 10 hours is used.^[7]

Tinctures are alcoholic extracts of herbs, which are generally stronger than herbal teas.^[8] Tinctures are usually obtained by combining pure ethanol (or a mixture of pure ethanol with water) with the herb. A completed tincture has an ethanol percentage of at least 25% (sometimes up to 90%). Non-alcoholic tinctures can be made with glycerin but it is believed to be less absorbed by the body than alcohol-based tinctures and has a shorter shelf life.^[9] Herbal wine and elixirs are alcoholic extract of herbs, usually with an ethanol percentage of 12–38%.^[10,11] Extracts include liquid extracts, dry extracts, and nebulisates. Liquid extracts are liquids with a lower ethanol percentage than tinctures. They are usually made by vacuum distilling tinctures. Dry extracts are extracts of plant material that are evaporated into a dry mass. They can then be further refined to a capsule or tablet.^[12] The exact composition of an herbal product is influenced by the method of extraction. A tea will be rich in polar components because water is a polar solvent. Oil on the other hand is a non-polar solvent and it will absorb non-polar compounds. Alcohol lies somewhere in between.^[13]

Many herbs are applied topically to the skin in a variety of forms. Essential oil extracts can be applied to the skin, usually diluted in carrier oil. Many essential oils can burn the skin or are simply too high dose used straight; diluting them in olive oil or food grade oil such as almond oil can allow these to be used safely as a topical. Salves, oils, balms, creams, and lotions are other forms of topical delivery mechanisms. Most topical applications are oil extractions of herbs. Taking a food grade oil and soaking herbs in it for anywhere from weeks to months allows certain phytochemicals to be extracted into the oil. This oil can then be made into salves, creams, lotions, or simply

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used as oil for topical application. Many massage oils, antibacterial salves, and wound healing compounds are made this way. [14] Inhalation, as in aromatherapy, can be used as a treatment.

Shampoo

Shampoo is a preparation of a surfactant (i.e. surface-active material) in a suitable form – liquid, solid or powder – which when used under the specified conditions will remove surface grease, dirt, and skin debris from the hair shaft and scalp without adversely affecting the user.

Shampoos are probably the most widely used cosmetic products for cleansing hairs and scalp in our daily life. A shampoo is basically a solution of a detergent containing suitable additives for other benefits such as hair-conditioning enhancement, lubrication, medication etc. Now-a-days many synthetic, herbal, medicated and nonmedicated shampoos are available in the market but popularity of herbal shampoo among consumers is on rise because of their belief that these products being of natural origin are safe and free from side effects. [13,14]

Synthetic surfactants are added to shampoo primarily for the foaming and cleansing action but their regular use leads to dryness of hairs, hair loss, irritation to scalp and eyes. Herbal formulations are considered as alternative to synthetic shampoo but formulating cosmetics using completely natural raw material is a difficult task. There are large numbers of medicinal plants which are reported to have beneficial effects on hair and are commonly used in formulation of shampoo. These plant products may be used in their powdered form, crude form, purified extracts, or derivative form. It is extremely difficult to prepare a herbal shampoo using a single natural material that would be milder and safer than the synthetic ones, and at the same time would compete favorably with its foaming, detergency and solid content.

We, therefore, considered to formulate a pure herbal shampoo using traditionally and commonly used plant materials for hair washing in India and gulf region especially in Oman. The pericarp of *Spindus mukorossi*, commonly known as Soapnut or reetha, fruits of *Phyllanthus emblica* commonly known as Amla, and dried pods of *Acacia concinna* (Sheekakai) have traditionally been used in Indian folklore system for centuries for washing hair. Reetha and Sheekakai produce rich lather when shaken with water due to their high content of saponins. They are also known to produce beneficial effects on skin and other organ systems. Amla fruit is rich in vitamin C and is employed in hair preparations as antidandruff agent, hair growth promoter and to strengthen hairs. The *Ziziphus spinachristi* tree, known as Sidr in Arabic, is indigenous to the Middle East including Oman, and its leaves are traditionally used by women to wash, darken and lengthen hairs. It is reported to contain four saponin glycosides that help in removing excess sebum without causing adverse reactions. Saponins also exhibit antibacterial and antifungal activities that make them important ingredients of cosmetic applications. [15,16,17]

This study was designed to formulate an herbal shampoo and to evaluate and compare its physicochemical properties with the marketed synthetic and herbal shampoo in search of a safe and effective cosmetic product.



Figure 1: Powder herbal Shampoo

Requirements of a Shampoo:

- It should effectively and completely remove dust or soil, excessive sebum or other fatty substances and loose corneal cells from the hair.
- It should produce a good amount of foam to satisfy the psychological requirements of the user. It should be easily removed on rinsing with water.
- It should leave the hair non - dry, soft, lustrous with good manageability and minimum fly away.
- It should impart a pleasant fragrance to the hair.
- It should not cause any side -effects / irritation to skin or eye.
- It should not make the hand rough and chapped. [18,19]

Types of Shampoo

Shampoos are of the following types:

- Powder Shampoo
- Liquid Shampoo
- Lotion Shampoo
- Cream Shampoo
- Jelly Shampoo
- Aerosol Shampoo
- Specialized Shampoo
- Conditioning Shampoo
- Anti- dandruff Shampoo
- Baby Shampoo
- Two Layer Shampoo [20,21]

Materials and Methods

Selected herbal drugs in dried form were purchased from the authenticated agencies. Herbs along with their part used their use in shampoo and quantity taken is tabulated in table 1.

Table 1: Herbs used in Shampoo Formulations

Sr. No.	Constituents
1	Amla
2	Neem
3	Tulsi
4	Shikakai
5	Behera
6	Henna
7	Brahmi

Amla

Phyllanthus emblica, also known as emblic, emblic myrobalan, myrobalan, Indian gooseberry, Malacca tree, or amla from Sanskrit amalaki is a deciduous tree of the family Phyllanthaceae. It is known for its edible fruit of the same name. The tree is considered sacred by Hindus as a deity, Vishnu, is believed to dwell in it. [22]

Traditional medicine

In traditional Indian medicine, dried and fresh fruits of the plant are used. All parts of the plant are used in various Ayurvedic/Unani medicine (Jawarishamla) herbal preparations, including the fruit, seed, leaves, root, bark and flowers. According to Ayurveda, amla fruit is sour (amla) and astringent (kashaya) in taste (rasa), with sweet (madhura), bitter (tikta) and pungent (katu) secondary tastes (anurasas). [15] Its qualities (gunas) are light (laghu) and dry (ruksha), the postdigestive effect (vipaka) is sweet (madhura) and its energy (virya) is cooling (shita). In Ayurvedic polyherbal formulations, Indian gooseberry is a common constituent, and most notably is the primary ingredient in an ancient herbal rasayana called Chyawanprash. This formula, which contains 43 herbal ingredients as well as clarified butter, sesame oil, sugar cane juice, and honey, was first mentioned in the CharakaSamhita as a premier rejuvenative compound. Popularly used in inks, shampoos and hair oils, the high tannin content of Indian gooseberry fruit serves as a mordant for fixing dyes in fabrics. Amla shampoos and hair oil are traditionally believed to nourish the hair and scalp and prevent premature grey hair. [23]

Chemical Constituents

Although these fruits are reputed to contain high amounts of ascorbic acid (vitamin C), up to 445 mg per 100 g, the specific contents are disputed, and the overall bitterness of amla may derive instead from its high density of ellagitannins, such as emblicanin A (37%), emblicanin B (33%), punigluconin (12%) and pedunculagin (14%). It also contains punicafolin and phyllanemblinin A, phyllanemblin other polyphenols, such as flavonoids, kaempferol, ellagic acid, and gallic acid. [25]

Neem

Azadirachta indica, commonly known as neem, nimtree or Indian lilac, is a tree in the mahogany family Meliaceae. It

is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent, i.e. India, Nepal, Pakistan, Bangladesh, Sri Lanka, and Maldives. It is typically grown in tropical and semi-tropical regions. Neem trees also grow in islands located in the southern part of Iran. Its fruits and seeds are the source of neem oil. Neem leaves are dried in India and placed in cupboards to prevent insects eating the clothes, and also in tins where rice is stored. Neem leaves are dried and burnt in the tropical regions to keep away mosquitoes. These flowers are also used in many Indian festivals like Ugadi. [26]

Traditional Medicinal Use

Products made from neem trees have been used in India for over two millennia for their medicinal properties. Neem products are believed by Siddha and Ayurvedic practitioners to be Anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive, and sedative. It is considered a major component in siddha medicine and Ayurvedic and Unani medicine and is particularly prescribed for skin diseases. Neem oil is also used for healthy hair, to improve liver function, detoxify the blood, and balance blood sugar levels. Neem leaves have also been used to treat skin diseases like eczema, psoriasis, etc.

Tulsi

Ocimumten uiflorum (synonym *Ocimum sanctum*), commonly known as holy basil, tulasi (sometimes spelled thulasi) or tulsi, is an aromatic perennial plant in the family Lamiaceae. It is native to the Indian subcontinent and widespread as a cultivated plant throughout the Southeast Asian tropics.

Tulasi is cultivated for religious and supposed traditional medicine purposes, and for its essential oil. It is widely used as a herbal tea, commonly used in Ayurveda, and has a place within the Vaishnava tradition of Hinduism, in which devotees perform worship involving holy basil plants or leaves. [12,13]

Chemical Composition

Some of the phytochemical constituents of tulsi are oleanolic acid, ursolic acid, rosmarinic acid, eugenol, carvacrol, linalool, β -caryophyllene (about 8%). Tulsi essential oil consists mostly of eugenol (~70%) β -elemene (~11.0%), β -caryophyllene (~8%) and germacrene (~2%), with the balance being made up of various trace compounds, mostly terpenes.

Shikakai

Acacia concinna has been used traditionally for hair care in the Indian Subcontinent since ancient times. It is one of the Ayurvedic medicinal plants. It is traditionally used as a shampoo. In order to prepare it the fruit pods, leaves and bark of the plant are dried, ground into a powder, then made into a paste. While this traditional shampoo does not produce the normal amount of lather that a sulfate-containing shampoo would, it is considered a good cleanser. It is mild, having a naturally low pH, and doesn't strip hair of natural oils. Usually no conditioner is needed, for shikakai also acts as a detangler.

An infusion of the leaves has been used in anti-dandruff preparations. A. concinna extracts are used in natural shampoos or hair powders and the tree is now grown commercially in India and Far East Asia. The plant parts used for the dry powder or the extract are the bark, leaves or pods. The bark contains high levels of saponins, which are foaming agents found in several other plant species used as shampoos or soaps. Saponin-containing plants have a long history of use as mild cleaning agents. Saponins from the plant's pods have been traditionally used as a detergent, and in Bengal for poisoning fish; they are documented to be potent marine toxins. [9]

Henna

(Arabic:) is a dye prepared from the plant *Lawsonia inermis*, also known as hina, the henna tree, the mignonette tree, and the Egyptian privet, the sole species of the *Lawsonia* genus. [23]

Henna can also refer to the temporary body art (staining) based on those dyes (see also mehndi). Henna has been used since antiquity to dye skin, hair and fingernails, as well as fabrics including silk, wool and leather. Historically, henna was used in the Arabian Peninsula, Indian Subcontinent, parts of Southeast Asia, Carthage, other parts of North Africa and the Horn of Africa. The name is used in other skin and hair dyes, such as black henna and neutral henna, neither of which is derived from the henna plant.

Bramhi

Bacopamonnieri (waterhyssop, brahmi, thyme-leaved gratiola, water hyssop, herb of grace, Indian pennywort) is a perennial, creeping herb native to the wetlands of southern and Eastern India, Australia, Europe, Africa, Asia, and North and South America. Bacopa is a medicinal herb used in Ayurveda, where it is also known as "Brahmi", after Brahmā, the creator God of the Hindu pantheon. It is a non-aromatic herb. The leaves of this plant are succulent, oblong and 4–6 mm (0.16–0.24 in) thick. Leaves are oblanceolate and are arranged oppositely (opposite decussate) on the stem. The flowers are small, actinomorphic and white, with four to five petals. Its ability to grow in water makes it a popular aquarium plant. It can even grow in slightly brackish conditions. Propagation is often achieved through cuttings. [25]

Natural shampoos contain beneficial natural plant and herb extracts which provide a number of positive results for the hair and scalp. You can enjoy these natural benefits and maintain healthy hair without having to put your body at risk by exposing it to harmful chemicals.

Table 2: The herbs used in the preparation of herbal shampoo powder

S. No.	Constituents	Biological source	Use
1	Amla fruit	Dried ripe fruits of <i>E. officinalis</i>	Hair darkening
2	Neem	Dried leaves of <i>A. indica</i>	Anti-dandruff agent
3	Shikakai fruit	Dried pods of <i>A. concinna</i>	Foaming agent Anti-dandruff agent
4	Tulsi	Dried leaves of <i>O. sanctum</i>	Anti-dandruff agent
5	Bahera	Dried fruits of <i>T. bellirica</i>	Hair darkening
6	Brahmi	Dried leaves of <i>C. asiatica</i>	Support Health of Hair
7	Henna	Dried leaves of <i>L.inermis</i>	Hair conditioner

Evaluation Parameter

Prepared formulations of shampoos were subjected to following evaluation parameters.

Organoleptic evaluation: Organoleptic evaluation on the parameters like colour, odour taste and texture was carried out. Colour and texture was evaluated by vision and touch sensation respectively. For taste and odour evaluation a team of five taste and odour sensitive persons was formed and random sampling was performed.

General powder characteristic: General powder characteristics includes evaluation of those parameters which are going to affect the external properties (like flow properties, appearance, packaging criteria etc.) of the preparation, Characteristics evaluated under this section are powder form, particle size angle of repose and bulk density. Sample for all these evaluation were taken at three different level i.e. from top, middle and lower level. Particle size is a parameter, which could affect various properties like spreadibility, grittiness etc., particle size was determined by sieving method by using I.P. Standard sieves by mechanical shaking for 10 Min. Angle of repose affects the flow properties of a powder. It was determined by glass funnel method. A distance of 6.5 cm is maintained between the graph paper and the bottom of a powder. It was determined by glass funnel. Flowing is continued till the top of the heap touches the bottom of funnel. Bulk density is an important property for the packaging of product. Bulk density depends on particle size, particle size distribution and cohesiveness of particle. For measuring bulk density a weighted amount of powder was introduced in 100ml graduated cylinder. The cylinder is fixed on bulk density apparatus and bulk density was calculated.

Physical Evaluation: Physical evaluation includes determination of extractive values, Ash value, moisture content and pH. Extractive values were calculated for solvents, like petroleum ether, acetone, benzene, chloroform and methanol. 5Gm of powder shampoo was macerated with different solvents and kept for 24hr, filtered and solvent was evaporated dried extracts were weighted to calculate extractive value % w/w. Ash value is calculated to determine the inorganic contents which is characteristic for a herb. About 2 Gm of powder drug was taken in silicon dish previously ignited and weighed. Temperature was increased by gradually increasing the heat not exceeding to red colour. After complete burning, ash is cooled and weighed. Acid insoluble ash was calculated by boiling above obtained ash with 25ml dil. HCl for 5min, insoluble matter was collected in gooch crucible, washed with hot water, ignited and weighed. Moisture content in the formulation is very important as it contains herbs which are liable to be attacked by weather. 2gm of powder was taken and kept in an oven and dried up to two constant reading and % moisture content was calculates as w/w. pH affect the pharmaceutical consideration as well as it affects the effect of shampoo on hairs. 1 Gm of powder shampoo was taken and 9ml of distilled water was added to it. pH of the resulting solution was calculated using pH meter at 37°C

Foaming Capacity: Foaming capacity of the test herbal powder shampoos were calculated using foam stability test with 2 grams of powder with 50 ml water in a graduated cylinder for different time interval.

Evaluation of herbal shampoo powder Particle size: The particle size of herbal shampoo powder was determined by using microscopic method. Place the stage micrometer on the stage of the microscope and initially focus on lower power by positioning the object to the center of the object. Focus the object, measure the size of each particle in terms of eyepiece division. Select two points one on left side other on right side. Calculation can be done by using calibration factor: Calibration Factor= number of stage division/ Number of eyepiece division $\times 10$

Angle of repose: A glass funnel was held in place with a clamp on ring support over a glass plate. The glass plate was placed on a micro lab jack. Approximately, 10 g of the powder was transferred into the funnel keeping the orifice of funnel blocked by the thumb. As the thumb was removed, the lab jack was adjusted so as to lower the plate and maintain about 2 cm gap between the bottom of the funnel stem and the top of the powder pile. When the powder was emptied from the funnel, the angle of the heap to the horizontal plane was measured with a protractor. The height and radius were measured using a ruler. The angle of repose was thus estimated by the following formula. It is expressed in g/cm³.

$$\theta = \tan^{-1} (h/r)$$

Where,

h = Height of the pile formed.

r = the radius of the base of pile. Bulk density

Bulk Density: The bulk density of a powder is the ratio of the mass of an untapped powder sample and its volume, including the contribution of inter particulate void volume. Hence, the bulk density depends on both the density of powder particles and the spatial arrangement of particles in the powdered. The bulk density is expressed in g/cm³. A volume of 100 ml graduated cylinder was taken and required amount of herbal shampoo powders was added to the graduated cylinder. This was transferred to bulk density apparatus and bulk density was calculated. It is an important property for packaging and uniformity in the bulk of the product. [27,28,29]

Bulk density=Mass of powder/Bulk volume of the powder
Physicochemical evaluation

Ash value: This value is used to determine quality and purity of herbal shampoo powder and to establish the identity of it.

Determination of total ash: A flat, thin, porcelain dish or a tarred silica crucible was weighed and ignited. About 2 g of herbal shampoo powder formulation were weighed and taken into a dish. Support the dish on a pipe-clay triangle placed on a ring of retort stand. Heat the dish about 7 cm above the flame, with the help of a burner, using a flame of about 2 cm high, heat till vapors almost cease to be evolved, then lower the dish and heat more strongly until all the carbon is burnt off. Cool in a dessicator. Weigh the ash and calculate the percentage of total ash with reference to the air dried shampoo powders.

Total ash value of the sample = $100(z-x)/y\%$

Moisture content determination: 10 g of herbal shampoo powder formulations was placed in a tarred evaporating dish and kept in hot air oven for 105°C. The weight loss was observed at an interval of 15 minutes until constant weight was obtained.

pH: A pH meter is an electronic device used for measuring the pH of a liquid. A typical pH meter consists of a special measuring probe connected to an electronic meter that measures and displays the pH reading [11].

1 g each of herbal shampoo powder formulations was taken and dissolved in 10 ml of water. Their pH was checked with the help of pH meter.

Cleaning action: 5 g of wool yarn/cotton ball was taken and placed in grease; the same was then placed in a 200 ml of water containing 1 g of each herbal shampoo powder formulations in a flask and was shaken for 4 minutes. The solution was removed and sample was taken out, dried and weighed. The amount of grease removed was calculated using the formula: [12]

$$DP = 100 (1 - T/C)$$

Foaming capacity: 2 g of each herbal shampoo powder formulations were taken in a 250 ml graduated cylinder, 50 ml of water was added and shaken for 5-10 times. The foaming capacities of all the formulations after 1 minute shaking and % foaming capacities of all the five formulations for a time period of 60 minutes were performed. [13]

Dirt dispersion: Two drops of each 1% herbal shampoo powder formulations were added in a large test tube containing 10 ml of distilled water. A drop of Indian ink was added; the test tubes were stoppered and shaken. The amount of ink in the foam was estimated as none, moderate, or heavy [14].

Wetting time: A canvas was taken and cut into 1 inch diameter discs. The discs were floated on the surface of each formulation of 1% herbal shampoo powder solution and time was noted. The time required for the disc to begin to sink was measured accurately and noted as wetting time [15].

Nature of hair after wash: Nature of hair after wash was done by applying a small quantity of herbal shampoo powder formulations on hair and then washed. [31]

Summary and Conclusion

This effort includes creating herbal shampoo powder using several plant herbs such as Amla, Shikakai, Reetha, Bhringraj, Tulasi, Neem, Hibiscus, and Curry leaves. Every plant material was collected fresh from the college's medicinal garden. The collected materials were air-dried, milled, and sieved. The powders were blended to generate herbal shampoo powder, following the formulation table. A study discovered that using several plants to make an herbal shampoo powder improved hair quality. In other words, the hair smoothed down and hid the gray hair.

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