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Available online at: [www.jparonline.com](http://www.jparonline.com)**Formulation and evaluation of herbal powdered shampoo**

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**ABSTRACT: Background:** Hairs are the integral part of human beauty. People are using herbs for cleaning, beautifying and managing hair. The synthetic agents have taken a large share but possess harmful effects on hairs, skin and eyes. Hair shampoos are used not only for cleansing purpose but also for imparting gloss to hair. Shampoos are of various types, like powder, clear liquid, liquid, shampoo, solid gel, medicated and liquid herbal shampoo. Depending upon the nature of the ingredients they may be simple or plain shampoo, antiseptic or antidandruff shampoo. **Aim:** The present research study was aimed to formulate and evaluate herbal powder shampoo. **Methods:** The herbal powder shampoo was formulated using bahera, amla, neem, tulsi, shikakai, henna and brahmi at different ratios. The ash value was calculated to determine the inorganic contents which are characteristic for an herb. **Results:** Particle size and bulk density of powdered shampoo were 25-20 µm and 20.55 g/cc respectively. Average percentage foaming capacity, total ash, acid insoluble ash, moisture content, pH value were found to be 151.8, 4.45 % w/w, 2.35 %, 2.00 % w/w and 6.5 respectively. Cleaning percentage, surface tension, detergency, viscosity, foaming ability and foaming solubility of formulated powder shampoo were found to be 24.21 %, 32.15 dyne/cm, 64.23 %, 94607.84 cps and 170 ml respectively. **Conclusion:** The herbal powder shampoo exhibited good physicochemical properties and could be safely used for cleansing and conditioning hair.

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**INTRODUCTIONS:**

*Phyllanthusemblica*, also known as is a deciduous tree of the family *Phyllanthaceae*. 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. *Azadirachta indica*, commonly known as neem, is a tree in the mahogany family *Meliaceae*. 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 <sup>[1]</sup>. *Ocimum tenuiflorum* is commonly known as holy basil, tulasi is an aromatic perennial plant in the family *Lamiaceae*. It is widely used as a herbal tea, commonly used in Ayurveda .

*Acacia concinna* has been used traditionally for hair care in the Indian Subcontinent and is used as a shampoo. In order to prepare it the fruit pods, leaves and bark of the plant are dried, ground into a powder, and then made into a paste. *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. *Bacopa monnieri* (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 Brahm , the creator God of the Hindu pantheon <sup>[1-5]</sup>.

Natural and eco-friendly products are becoming increasingly popular amongst the health and environmentally conscious shoppers of today. 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 <sup>[6,7]</sup>.

## MATERIALS AND METHODS:

### Preparation of herbal powder shampoo:

Selected herbal drugs in dried form were purchased from the authenticated agencies. Herbs along with their part used. Each herbal constituent and their use in shampoo and quantity taken are tabulated in table 1. About four shampoos formulation were prepared by the uniformly powdering and mixing in ascending order by weight with continuous trituration <sup>[5,6]</sup>. Six batches of each formulation were prepared, labeled and kept in closed container for further studies.

### Evaluation of herbal shampoo powder:

#### Organoleptic evaluation:

The 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 <sup>[7,8]</sup>.

#### Particle size:

The particle size of herbal shampoo powder was determined by using microscopic method. The stage micrometer was placed on the stage of the microscope and initially focused on lower power by positioning the object to the centre of the object. The object was focused and the size of each particle in terms of eyepiece division was measured. The two points one on left side other on right side was calculated by using calibration factor (CF) <sup>[9]</sup>;  $CF = (Ns/Ne) \times 10$  ..... (1)

Where, Ns is no of stage division and Ne is no of eye piece division.

#### 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 <sup>[9]</sup>. The angle of repose was thus estimated by using the following formula;  $\theta = \tan^{-1} (h/r)$  ..... (2)

Where, h is height of the pile formed and r is the radius of the base of pile.

#### 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  $g/cm^3$ . 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 <sup>[10]</sup>.

$$\rho_b = M/V \text{ ..... (3)}$$

Where,  $\rho_b$  is bulk density in  $g/cm^3$ , M and V are mass and volume of powder mass.

**Ash value:**

This value is used to determine quality and purity of herbal shampoo powder and to establish the identity of it [11].

**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 vapours 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 [11].

$$\text{Total ash (\%)} = [(z-x)/y] \times 100 \dots\dots (4)$$

Where z-x is the residue in g and y is the total wt in g.

**Moisture content determination:**

About 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 min until constant weight was obtained [12].

**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].

About 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 [12].

**Cleaning action:**

About 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 min. The solution was removed and sample was taken out, dried and weighed. The amount of grease removed was calculated using the formula [12];  $DP=100(1-T/C) \dots (5)$  Where, T and C are theoretical and practical drug content.

**Foaming capacity:**

About 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 min of shaking and percentage foaming capacities of all the five formulations for a time period of 60 min 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 formulations 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 [14].

**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 [14].

**RESULTS AND DISCUSSION:**

The preparations were formulated using bahera, amla, neem, tulsi, shikakai, henna and brahmi (F2). Ash value was calculated to determine the inorganic contents which are characteristic for an herb. Particle size of shampoo powder was in the ranges of 25-20 µm and bulk density of powdered shampoo was 20.550 g/cc. The particle size was less, which might be suitable for good flow property. Average percentage foaming capacity, total Ash, acid insoluble ash, moisture content, pH value of powdered shampoo were 151.8, 4.45 % w/w, 2.35 %, 2.00 % w/w and 6.5 respectively. The pH of shampoo was found to be within the skin pH range, thus this shampoo shall be compatible with skin. Cleaning percentage, surface tension, detergency, viscosity, foaming ability and foaming solubility were found to be 24.21 %, 32.15dyne/cm, 64.23 %, 94607.84 cps and 170 ml respectively. The foaming ability of shampoo was found to be satisfactory. The surface tension value showed that this shampoo exhibited good wetting property.

**CONCLUSION:**

Depending upon the nature of the ingredients they may be simple or plain shampoo, antiseptic or antidandruff

shampoo and nutritional shampoo containing vitamin, aminoacids and proteins hydrolysate. The preparations were formulated using bahera, amla, neem, tulsi, shikakai, henna & brahmi at different ratios. Today people are getting aware of their harmful effects on hairs, skin and eyes. These regions attracted to community towards the herbal products, which are less expensive and have negligible side effects. The formulated shampoos were not only safer than the chemical conditioning agents, but also greatly reduce the protein loss during combing. The pH of the shampoos was adjusted to 5.5, to retain the acidic mantle of scalp. The herbal powder shampoo exhibited good physicochemical properties and could be safely used for cleansing and conditioning hair.

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