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Research Article

Formulation And Evaluation Of Herbal Shampoo

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ABSTRACT

The main object of this present study is to study an herbal shampoo and determine physiochemical function that emphasizes on safety, efficacy and quality of the product Herbal Shampoo is the natural haircare product which is use to remove grease, dirt, dandruff and promote hair growth, strenthness and darkness of the hair. It is also provide softness, smoothness, andshiness for the hair. Various drugs are used for the preparation of cosmetics shampoo. Such drugs shows various side effects such as hair loss, increased scaling, scratching, discomfort, nausea and headache. Therefore an attempt is made to study herbal shampoo that is free from side effects.

INTRODUCTION

Herbal Shampoo are probably the most widely used cosmetic products for cleansing hairs and scalp in our daily life Herbal shampoos are the cosmetic preparations that with the use of traditional ayurvedic herbs are meant for cleansing the hair And scalp just like the regular shampoo. They are used for removal of oils, dandruff, environmental pollutions etc. shampoo is a type of cosmetic mixture that uses herbs from plants as an alternative to the synthetic Shampoo available in the market. The herbal shampoo is important, as

people today prefer herbal products than chemical ones for they proved to enhance. Shampoos are most probably used as cosmetics. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives preservatives and active ingredients. It is a harmless, chronic condition that occurs when scalp becomes dry or greasy and produces white flakes of dead skin that appear in hair or on shoulders. People most often think of it as anything that produces a flaky scalp. A good shampoo should almost Immediate form abundant

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foam irrespective of the type of water used Or the nature of soil or fat to be removed from hair. Concept foam formation is not released to the Cleansing effect, but people psychologically always prefer a high foam product. Some good shampoos Are found to have side effects like drying effect on the hair. This leaves the hair too dry to handle or Comb. hence proper conditioning of the hair is also an important consideration, some shampoos cause Irritation to the eye and a lasting corneal cloud.

History-Indian Subcontinent :-

In the Indian subcontinent, a variation of herbs and their extracts have been used as shampoos since ancient times. A very effective early Shampoo was made by boiling sapindus with dried Indian gooseberry (amla) and a selection of other herbs, using the strained extract. Sapindus, also known a soap berries or soapnuts, a tropical tree Wide spread in India, is called ksuna. In ancient Indian texts and its fruit pulp contains saponins which are a natural surfactant. The extract of Soap berries creates a lather which Indian texts called phenaka.It Leaves the hair soft, shiny and manageable. Other products used for hair Cleansing were shikakai (Acacia concinna), hibiscus flowers, ritha (Sapindus mukorossi) and arappu (Albizzia amara)Guru Nanak the Founder and the first Guru of Sikhism, made references to soap berry tree And soap in the 16th century

ANATOMY OF HAIR:-

The hair is made up of 95% keratin protein. Each hair has a hair shaft and hair root. Hair is a protein filament that grows from follicles found in dermis.The hair shaft consists of a cortex and

cuticle cells, and a medulla for some types of hair. The hair structure consists of 3 different parts.

- **Medulla :**

It is the inner most layer of the hairshaft, made up of an amorphous, soft, oily substance

- **Cuticle :**

Thin protective outer layer that contains nutrients beneficial for hair growth. It is highly keratinized with cell shaped like scales that are layered one over the other,measuring about 60 micrometers long and about 6 micrometers wide.

- **Cortex :**

It is the main constituents of the hair,containing long keratin chains which give selasticity, suppleness and resistance to the hair.The cells of the cortex are joined together by an intercellular cement rich in lipids and proteins.

GROWTH CYCLE OF HAIR:-

Hair growth cycle consists of four phases:

- **Anagen (growth phase):**

It is the growingphase. The anagen phase is when your hair grows your hair follicle forms a new hair shaft

- **Catagen (transitional phase):**

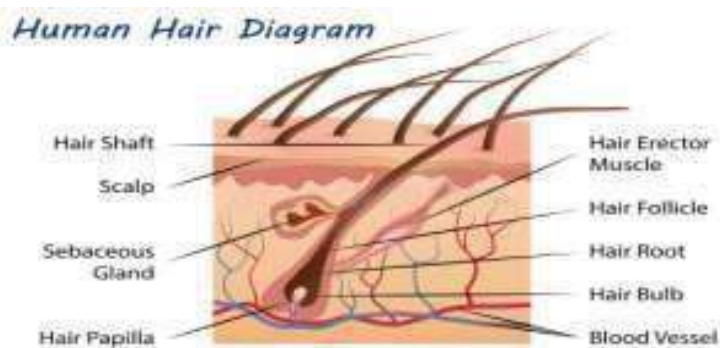
During this phase the hair follicle shrinks and hair growthslows.

- **Telogen (resting phase):**

It is the resting phasewhere hair growth stops and new hair begins the growth phase, pushing the old hair out.

- **Exogen phase (last phase):**

It is hair growth cycle where hair strand completely detaches from the scalp and sheds off.



HAIR PROBLEMS:-

- **Dandruff :**

Dandruff is a non-inflammatory harmless skin condition that affects scalp and might result in hair loss. It is scaly and adheres to the root of the hair.

- **Hair loss:**

The main reason behind the hairloss is stress, medication, changes in hormone and many hairstyling products can contribute to hair loss

- **Oily hair/Greasy hair:**

Oily hair is caused by excessive production of natural oil (sebum) by the scalp sebum is produced by sebaceous glands which sometimes “work overtime” leading to excessive amount of oil.

- **Dry hair:**

Dry hair occurs due to deficiency of proteins in the diet, menopause, anaemia, hormonal imbalance, birth control pill can also lead to dry hair.

- **Split Ends:**

Splits ends occurs when the hair ends dry and other reasons are exposure to extreme weather conditions. Hair care techniques such as

straightening and curling and chemical hair products may cause split ends.

TYPES OF SHAMPOOS:-

Shampoos are of following types:

- **Powder shampoo :**

"Powdered shampoo, often referred to as "dry shampoo," is a type of shampoo that comes in powder form rather than the traditional liquid or gel form. It's designed to help refresh and clean your hair without the need for water. You can apply it to your roots, wait for a short time, and then brush or shake out the excess product. This can help absorb excess oil and add volume to your hair between regular washes. Dry shampoos are especially convenient for people on the go or when you don't have access to water for a traditional shampoo.

- **Lotion shampoo :**

Lotion shampoo is a type of shampoo that typically contains moisturizing or conditioning ingredients to help improve the texture and health of your hair. It's designed to provide additional hydration and can be a good choice for people with dry or damaged hair.



- **Clear liquid shampoo :**

Clear liquid shampoo is a type of shampoo that has a transparent or translucent appearance, as opposed to the opaque or creamy texture of some other shampoos. It's often preferred for its lightweight and non-greasy feel, and it can be used for various hair types.

- **Solid gel shampoo :**

Solid gel shampoo is a type of shampoo that is formulated in a solid, gel-like form rather than the traditional liquid or bar form. It offers a convenient and eco-friendly alternative to liquid shampoos, as it typically requires less packaging and can be more travel-friendly. Solid gel shampoos are activated with water and lather up when massaged into wet hair, similar to traditional shampoos. They come in various formulations to cater to different hair types and concerns.

- **Medicated shampoo :**

Medicated shampoo is a specialized type of shampoo that contains active ingredients designed to treat specific scalp and hair conditions. These shampoos are formulated to address issues such as dandruff, psoriasis, seborrheic dermatitis, or fungal infections. The active ingredients in medicated shampoos may include coal tar, ketoconazole, salicylic acid, selenium sulfide, or zinc pyrithione, among others. They are typically used for short-term treatment of these conditions under the guidance of a healthcare professional and should be used as directed on the product label.

BENIFITS OF HERBAL SHAMPOO

1. More shine
2. Less hair loss
3. Long lasting colour
4. All natural, no chemicals
5. Stronger and more fortified hairs
6. Won't irritate skin or scalp
7. Keep healthy natural oils

FUNCTION OF HERBAL SHAMPOO

1. Lubrication
2. Conditioning
3. Hair growth
4. Maintenance of hair colour
5. Medication

Need of Herbal Shampoo

The skin on our head produce a greasyfluid called sebum. It is produced to protect the hair by coating itself all over the head. This give thehair a healthy shine but when secretes in largeamount it makes the hair look dirty. Herbal shampoos for hair growth are formulated to strengthen the hair follicles by delivering essential oils and nourishment all through the roots and follicles.

ADVANTAGES OF HERBAL SHAMPOO

1. Pure and organic ingredients
2. Free from side effects
3. No surfactants eg- SLS
4. No synthetic additives
5. No animal testing
6. Earth and skin friendly
7. Promote hair growth
8. Remove dandruff

LIMITATIONS OF HERBAL SHAMPOO

1. Natural products affect product uniformity,quality control.
2. Less stable so, preservatives should be added.
3. Seasonal variation of plant constituents
4. Some herbs are to scalp. Ex: lemon, menthol,peppermint and papaya etc.

LIST OF MARKETED HERBALSHAMPOOS

1. **Patanjali Kesh Kanti Hair Wash:**



Patanjali kesh kanti hair cleanser safely washes away dirt, and dust from hair with its herbal composition that also leaves your tresses silky and shining. The natural medicinal ingredients treat hair and scalp of dryness and dandruff. Patanjali kesh kanti hair wash is a 100% natural herbal shampoo that strengthens and shines your hairs. It is fine at reducing hair loss and removing dandruffs, also prevents hardness and dryness from your hair. It provides necessary nutrients to your hair and makes it healthy and strong.

Features and Review

- Beneficial in healing the dryness and roughness of hair
- Prevent hair fall and improve the hair texture
- Nourish the dry scalp
- Minimizes the dandruff and flakes
- Makes hair soft, silky and shiny

2. Himalaya anti hair fall herbal shampoo:



Himalaya anti hair fall shampoo is not just a herbal shampoo amongst so many shampoos in India but it is a shampoo with anti-hair fall features. So, in case you are looking for a good herbal shampoo for the hair fall problems in men and women, then this can be used. Along with the hair fall control qualities, it is also a clarifying shampoo. This is herbal shampoo with hair fall fighting abilities has ecliptha alba that strengthens the roots of the hairs and butea fondosa to fight the hair fall. Even people with no hair fall problem can use this.

Features and Review:

- Lathers less as it clarifies

- Reduces hair fall.
- The shampoo has a soft floral fragrance that is nice and mild.

It is pearly white in color and has a smooth medium consistency, not too thick or too runny

3. Indulekha bringha anti hair fall shampoo



Dabur vatika naturals health shampoos has the goodness of satt poshan which mean seven beneficial ingredients like henna, shikakai, olive, almond, hibiscus, amla, reetha. The herbal shampoo with seven natural ingredients not only cleanses the scalp and hair effectively to remove all the dead skin cells, product build up and oils but it also reinforces strength and shine. The power ingredients make the scalp clear and induce strength and smoother to the hair. Dry and damaged cuticle of the hair is also repaired by such herbal botanicals. It's the best herbal moisturizing shampoo in India.

Features and Review:

- Goodness seven natural ingredients like henna, shikakai, olive, almond, hibiscus, amla and reetha.
- Makes hair smooth, shiny and nourished.
- Gently cleanses the hair deep conditions.

4. Havintha Natural Hair Shampoo



Havintha Amla, Reetha And Shikakai Powder Shampoo 3 in1 Powder is gentle care for your hair. Relieve your hair from the bad effects of synthetic detergent-based shampoos. Amla fruit powder, Reetha fruit powder, Shikakai fruit pod powder. Legal Disclaimer: Statements regarding dietary supplements have not been evaluated by the FDA. Havintha organic hair shampoo is made with 100% natural herbs. This not only cleans hair but also gives body, shine, and strength to hair 4 in1 Powder increases pigmentation of hair and preserves Its natural beauty. It is a gentle care for your hair. Relieve your hair from bad effects of synthetic detergent based shampoos.

Features and Review:

- Designed to cleanse scalp and fight premature greying of hair
- Natural Hair Shampoo with Amla, Reetha, Shikakai and Methi dana
- Reduces hair fall and make them stronger

5. Khadi Herbal Shampoo



Amla & Bhringraj Hair Cleanser has best ayurvedic scalp and hair cleansing herbs & oils which results in complete hair care. It is beneficial for all types of hair and treats thin, rough & oily hair. It is enriched with powerful ingredients like amla, bhringraj & reetha results in healthy, shiny & silky hair.

How to Use:

Take the required amount as per hair length, apply over wet hair, gently massage all over scalp and rinse off.

Features and Review:

- Makes the hair soft and has a light fragrance
- It is a nice shampoo and has a light fragrance. Natural and 100% organic. Must try if you have dry hair.
- It makes hair very silky-smooth and shiny in first wash without conditioner using
- Makes hair soft, silky and shiny.

USE OF INGREDIENTS

1. Reetha

Sapindus Mukorossi-Sapindaceae, Soapnuts is also called as Arishtak in Ayurveda And “Soap nut tree” in India. It is well known for Its traditional medicinal uses and is commonly used As a hair cleanser. Anti-dandruff agentIs an anti-hair loss shampoo,the Natural antifungal and anti bacterial which may Helps in anti dandruff. It can be used on a daily basis to provide nourishment to the hair scalp and promote hair regrowth. Reetha helps to control dandruff and promotes hair growth due to its Tridosha stabilize property



2. Amla

Strengthen the scalp and Hair.
Reduce Hair Loss.
Stimulate Hair Growth.
Prevent or treat dandruff and dry scalp.
Improve overall appearance of Hairs.
Prevent or treat fungal and Bacterial hair and scalp infections



3. Neem

It Prevents Dandruff
Strength in hair root
Promote hair growth



4. Gelatin

Gelatin Can improve hair thickness and growth.
Gelatin supplement or placebo for 50 weeks to 24 people with alopecia.
It gives thickness to hairs.
For strengthening of Hairs



5. Rose Oil

It repairs hair damage
Improves Growth of hairs
Reduces the dandruff
Gives fragrance to the shampoo



6. Lemon Juice

Add More shine.
Get rid of dandruff
Split ends
Reduces Hair fall



7. Glycerin

Helpful for conditioning damage hair
Preventing breakage as well as hydrating the scalp
Glycerin also Used to strengthen the hair



It is used to prevent growth of mole and other harmful bacteria.



8. Activated Charcoal Powder

It is effective in removal of dust particle and toxic substance



9. Capsule Vitamin E

Vitamin E capsule is used to remove hair health



10. Methyl Paraben

Methyl paraben is used as preservative ,to give product longer shealf life.

Formulation of Herbal Shampoo

Table no 1: Ingredients Used in Formulation Of Herbal shampoo

Sr. No.	Ingredient used	Quantity taken
1	Sodium Chloride	3.5ml
2	Glycerin	0.1ml
3	Gelatin	3.5gm
4	Cap. Vitamin E	1 Cap.
5	Activated Charcoal	1gm
6	Reetha	2.55gm
7	Amla	5gm
8	Neem	1.95gm
9	Lemon Oil	1-2drops
10	Rose Oil	3-5drops
11	Methyl Paraben	1gm

Method of Preparation:-

Plant collection

The leaves of Azadirachta indica were collected from tree, After that the leaves were shade dried and coarsely powdered using mortar and pestle for extraction using maceration technique. The fruits of Phyllanthus emblica and Sapindus mukorossi were brought from the local market. After that the fruits were shade dried and coarsely powdered using mortar and pestle.

Preparation of solvent extract

Extraction of Neem

- Fresh neem leaves are collected and shed dried for 15 days.
- The dried leaves are then powdered using a motor and pestle.
- The Powdered Neem leaves are sieved and weighed 24.45 g and macerated in a beaker using 200 ml of distilled water with continuous stirring.
- The prepared mixture is kept covered with aluminium foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.
- The excess solvent is evaporated using a Rotary evaporator and then the remaining mixture was dried on a hot water bath.
- The dried extract was collected and kept in desiccator for cooling.
- The prepared extract is weighed
- Take the filtrate out of rotary evaporator and completely dry it on hot water bath.
- Keep the extract in desiccator for cooling.
- Collect and weigh the obtained extract.

Extraction of Reetha:

- Fresh reetha fruit is collected; seed is removed and chopped finely using a clean knife.
- The chopped fruit is shed dried for 3 weeks.
- The dried fruit is then powdered using a mixer grinder; the prepared powder is sieved so as to remove any large pieces of the fruit.
- The fine powder is then weighed 17.15 gm.
- Measured 100 ml of petroleum ether using a measuring cylinder, transfer it to a beaker and add the prepared powder.
- Stir the mixture and cover it with an aluminium foil and macerate it for 3 days.
- After that the macerated mixture is filtered using a filter paper and the filtrate is then kept on hot water bath for drying.
- The completely dried extract is then collected and kept in desiccator for cooling.
- The cool extract is then weighed on a digital weighing machine.

Formulation Procedure of Herbal Shampoo:

- Take 3.5 ml of 0.1M sodium chloride in a beaker.
- Add 1gm of guar gum to the beaker
- Weigh 0.1ml of glycerine and add it to the beaker .
- Add 3.5gm gelatine, one capsule of vitamin E and 1gm of activated charcoal powder to the beaker.
- Add 2.55 gm of reetha extract, 5gm of amla extract and 1.95 gm of neem extract and mix it well
- Add water as required to make it a smooth and uniform paste.
- Now add 2-4 drops of rose oil to the mixture.
- Add 1 drop of lemon oil .
- Add 1gm Of methyl paraben to preserve it for long time



Fig1a. Filtration Process Of Neem

Fig1b. Maceration Of Neem

Extraction of Amla:

- Fresh amla fruit were finely chopped and shed dried for 15 days and powdered using mortar and pestle.
- The powered amla weigh 17.02g mixed with 0.25ml chloroform in 100ml water.
- Stir it for 15mins and macerate it for 3 days while stirring in between.
- Filter the solution and allow it to evaporate in rotary evaporator.

- i. Continue to stir it for some times to avoid formation of any lumps
- j. Allow it to cool and evaluate.

Evaluation of Herbal Shampoo :

To evaluate the prepared formulation, quality control test including visual assessment and physico-chemical controls such as PH, density, viscosity, surface tension, foam volume, foam stability and wetting time was performed using standard protocol.

1. Physical appearance/visual inspection:

The formulation prepared was evaluated for the clarity, colour, odour and foam producing ability and fluidity.

2. Determination of PH:

A 10% v/v shampoo solution was constituted in distilled water and the PH of the solution was measured by using a calibrated PH meter

3. Determination of solid content percentage:

A clean dry evaporating disc was weighed and 4gm of shampoo was added to the evaporating disc. The evaporating disc with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the solid content present in the shampoo was calculated after drying.

4. Wetting time:

Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.42gm was cut into a disc of diameter measuring 1 inch. Over the shampoo [1%v/v] surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch.

5. Cleansing action:

The cleansing property of the herbal shampoo was evaluated by the application of the shampoo on hair that has not been washed for 7 days. The shampoo was used to wash the hair of human subject that had applied oil 4-5 hours before washing. The performance of the shampoo was

assessed on its ability to remove oily dirt from scalp.

6. Foaming ability and foam stability:

Cylinder shake method was used for determining foaming ability. 50ml of the 1% herbal shampoo solution was put into a 250ml graduated cylinder and the cylinder was covered with hands and shaken for 10 minutes. The total volume of the foam content after 1min shaking was recorded. Immediately after shaking the volume of the foam at 1min intervals for 10 minutes were recorded. The foam volume remains same throughout the period of about 5min showing that the generated foam by the shampoo has good stability and the prepared shampoo exhibits higher foam property which may be due to the presence of soapnut. 1ml shampoo is dissolved with 2ml water and shaken vigorously for 10 minutes produced 0.4ml foam.

7. Stability study:

The stability of the formulation was studied for a period of 4 weeks by keeping at temperature of 25-30°C.

8. Skin irritation test:

Prepared herbal shampoo was applied on skin for 5 minutes after that was washed and tested for irritation or inflammation to the skin.

9. Conditioning attributes:

The conditioning effect of the shampoo on hair was evaluated after the hair had been washed with it. Conditioning properties include all desirable benefits imparted to the hair such as increase mass to the hair, improved lusture, softness and silkiness.

10. Viscosity:

Viscosity of shampoo was determined by using Ostwald's viscometer. The viscosity of herbal shampoo was measured by counting drops of herbal shampoo from the mark to bottom.

11. Density:

First take empty weight of pycnometer, then fill it till neck with shampoo and then weigh it along



with shampoo. Again, fill the pycnometer with water and weigh it.

$$\text{Density} = \frac{\text{Weight of pycnometer with shampoo} - \text{Weight of empty pycnometer}}{\text{Weight of pycnometer with water} - \text{Weight of empty pycnometer}}$$

Weight of pycnometer with water – Weight of empty pycnometer

12. Microbial examination:

1ml of shampoo was poured to sterile petri dish under aseptic condition and then allowed to set. The plates were incubated at 37°C for 24 hours and observed for microbial growth.

Evaluation parameter of Herbal Shampoo	
Organoleptic evaluation	Organoleptic evaluation
Physiochemical evaluation	Physiochemical evaluation
Cleaning action	Cleaning action
Foaming index	Foaming index
Wetting time	Wetting time
Solubility	Solubility
Dirt dispersion	Dirt dispersion
Stability study	Stability study
Safety parameter	Safety parameter

RESULT :

Physical appearance/visual inspection:

The formulated herbal shampoo was Greyish Black in colour. It has a slight odour.

pH:

The PH of formulated shampoo was 6.8, falling within the ideal PH range for shampoo which is between 5 and 7.8. The formulated shampoo is acid balanced which is near to the skin P H. The PH of shampoo is important for enhancing the qualities of hair, stabilizing ecological balance of scalp and minimizing irritation to the eyes.

Percentage of solid content: If the shampoo has too many solids it will be hard to work into the hair or too hard to wash out. The result of percent of solid content 0.10%.

Wetting time:

The wetting ability of a surfactant is dependent on its concentration and is commonly used to test its efficacy. The canvas disk method is a quick, reliable and efficient to evaluate the wetting ability

of a shampoo. The wetting time of herbal shampoo was found to be 2.73 secs which is good.

Cleansing action:

The cleansing action was tested on human hairs that had applied oil and not been washed for 7 days. The results of detergency studies showed that the formulation had significant cleansing ability as it was able to remove both dirt and oil from hairs. The silkiness and softness of hairs after hair wash attributes to the conditioning property of the herbal shampoo.

Foaming ability and foam stability:

Although foam generation has little to do with the cleansing ability of shampoos, it is of importance to the consumer. The final formulation produced stable foams, there was little bit change in foam volume.



Fig no 3 : Height of foam

Skin irritation test:

The prepared shampoo does not produce any harmful effect on the skin, this is due to the absence of harmful synthetic ingredients. Mostly the synthetic chemicals produce inflammation and

irritation to the skin but in this formulation almost all ingredients are obtained naturally



Fig no 4 : Skin irritation test

Density:

The density of the herbal shampoo was found to be 1.12gm/ml which was good enough for its compactness.

DISCUSSION :

The prepared herbal shampoo appeared to be Greyish and had a slight odour. Its pH was recorded at 6.8 which is in between the ideal range. Parameters that are evaluated for having significant amounts of solid contents in the shampoo. Its wetting time was found to be 4 seconds, its cleansing action was hugely successful, had a good amount of foam formation. The shampoo was kept at room temperature (25-30) and it showed good stability. Due to inclusion of natural excipients the shampoo doesn't show any sort of skin irritation. To have the consistency, the viscosity was recorded to be 0.67 pois pascal and the density was 1.12g/ml which held out its compactness. In the span of 24 hours, the shampoo which was being kept at room temperature showed very trace microbial growth which laid it out that the shampoo embarked all the necessary qualities required for the shampoo to pass out for production.

CONCLUSION

Herbal shampoo using reetha, amla and neem extract is prepared and evaluations were carried out for those following parameters: physical appearance/visual inspection, PH determination,

determination of solid content percentage, wetting time, cleansing action, foaming ability and foam stability, stability study, skin irritation test, conditioning attributes, viscosity, density, microbial examination. The evaluation parameters data were shown in acceptance range. Further studies are appreciated for comparing this preparation with marketed one and establishing some effective results for hair cleansing action and conditioning effect as well.

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