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A Review on Formulation and Evaluation of Herbal Lip Balm

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Abstract: ***Cosmeceuticals are cosmetic products containing biologically active ingredients that offer benefits similar to medical or pharmaceutical treatments. This study focused on the development and evaluation of a lip balm formulated with natural ingredients. The lip balm was created using a blend of beetroot, almond oil, aloe vera, vitamin E, and rose essence. To ensure uniform consistency, a homogenous mixing method was employed during production. The formulated lip balm was tested by applying it to a glass slide, and various evaluation parameters such as chemical stability, pH, melting point, and spreadability were assessed. The pH value of the lip balm was found to be 6.0, with a melting point range between 63-65 °C. Stability testing conducted under different conditions—room temperature (25.0±3.0°C), refrigerated conditions (4.0±2.0°C), and oven temperature (40.0±2.0°C)—demonstrated that the lip balm remained stable, with no deformation observed at room temperature and refrigeration. These findings suggest that the lip balm, made from the selected natural ingredients, is a promising option for treating various lip-related issues.***

Keywords: Lip balm, Lips, spread ability, Formulation, Natural ingredients.

I. INTRODUCRION

The increasing concern over the use of hazardous synthetic ingredients in cosmetics has led to a shift towards more organic sources. Since lips lack oil glands, it is crucial to provide them with extra moisture and protection throughout the day. Conventional lip balms often contain harmful substances like petrolatum, synthetic waxes, alumina, parabens, hydrogenated oils, and artificial fragrances and colors, which can be toxic. Additionally, because lip balms are frequently ingested, they pose a significant health risk, making it an important issue for health regulators. Cosmeceuticals, which are ingredients with medicinal properties, offer benefits through topical application and provide protection against skin degeneration. This study was focused on using ingredients that have minimal side effects. Lip balms, which are used to protect rather than embellish the lips, form a moisture-resistant barrier made from oils, typically without any added dyes. Beeswax, a natural substance secreted by female bees, is commonly used in lip balms due to its moisturizing properties. It helps shield the lips from harmful UV rays and imparts a pleasant fragrance.

As a natural emulsifier, beeswax helps blend the ingredients in lip balms effectively. Vitamin E, a well- known antioxidant, serves as a natural conditioner for the lips, helping to preserve their youthful appearance by minimizing signs of aging.

Almond oil deeply penetrates the skin tissue and provides moisturizing benefits. Its anti-inflammatory properties help soothe redness and discomfort caused by chapped or sunburned lips. Aloe vera, known for its anti-inflammatory effects, alleviates irritation while supplying the lips with antioxidants that protect against wrinkles and other skin damage. Beetroot, rich in antioxidants, enhances the softness and elasticity of the lips, contributing to their overall health and appearance.

A: Aloe-Vera

B: Beetroot

C: Almond

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A. Anatomy of Lips

The lips are the structures surrounding the opening of the mouth. In the middle region, the upper border aligns with the lower edge of the nasal base. On the sides, the boundaries follow the alar sulci, with the upper and lower lips meeting at the corners of the mouth, known as the oral commissures.

The lower boundary of the lips in the center is marked by the mentolabial sulcus. From an anatomical perspective, the philtrum and its supporting pillars are part of the upper lip. The lip's surface is divided into four distinct zones: the hairy skin, vermilion border, vermilion, and oral mucosa. The natural shape of the lips can change over time and is also influenced by ethnic background.

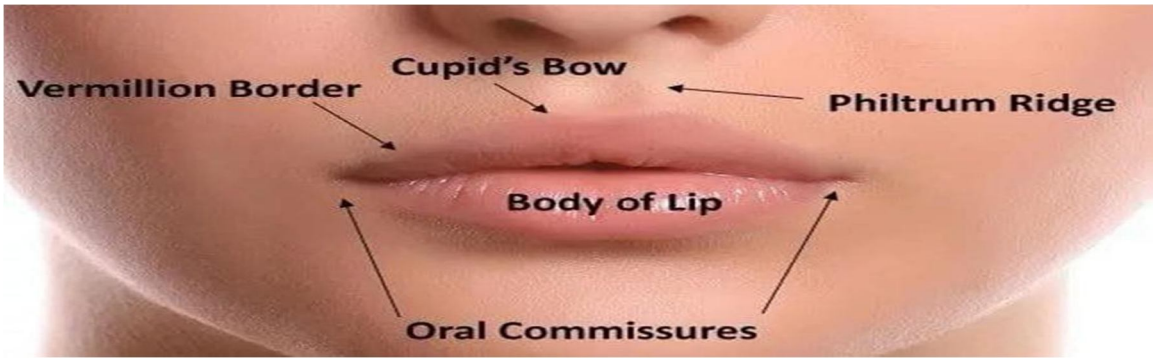

Fig no.1: Human lip

B. Advantages of Natural Lip Balm

1) Natural lip balms helps to care the natural health and beauty of the lips. The natural lip balm can use both men and women can use them.

2) The use of natural Lip Balm Cosmetic to treat the appearance of the face and condition of the skin.

C. *Disadvantages of Natural Lip Balm*

1) Lip balms made of low quality ingredients can harm the lips seriously.

2) Compared to commercially prepared lip balms, homemade lip balms tend to stay on the lips for a shorter duration of time.

3) Natural oils have other disadvantages such as greasier and less spreadability.

D. Types of Lip Balm

There are 7 kinds of lip balms to choose from

1) Tinted Lip Balm: A type of lip balm used to hydrate and colorize the lips called tinted. If the user doesn't want to wear a heavy coat of lipstick, tinted lip balms are a perfect alternative. Users use tinted lip balm to moisturize their lips as well as to give them a brilliant wash of color. Just apply the colored lip balm directly to the lips to use it.

2) Medicated Lip Balm: Medicated lip balms are most likely to be the least soothing and irritating lip balms amongest the others. This lip balm is usually prescribed by dermatologists in medication for chapped lips and other conditions regarding the lips.

3) Flavoured Lip Balm: The flavoured lip balm is a kind of lip balm which has flavourings. Flavoured lip balms are lip balms that are added with flavour such as vanilla, mint, mango and many more fruity flavours. This lip balm is made for moisturizing and is also added with special flavours in order to entice the taste buds and smell of the users.

4) Organic Lip Balm: The organic lip balm is a kind of lip balm which have organic or natural ingredients. While there are other lip balms which has chemical ingredients that may harm the lips and skin, the organic lip balm is usually made from organic ingredients such as avocado oils, jojoba oils, beeswax, vitamin E, hemp, and cocoa butter.

5) SPF Lip Balm: The SPF lip balm are a kind of lip balm which contains ingredients that protect the lips from the harmful effects of the Sun rays. The SPF lip balm functions like a sunscreen to protect the lips from sun damage, burning, and even skin cancer. If the user is skin conscious and is avoiding the harmful effects of the sun, then this lip balm is the perfect thing to use on a day's out.

6) Plumping Lip Balm: The plumping lip balm is a kind of lip balm that doesn't just moisturize the lips, but also makes the lips look more rounder. Plumping lip balms is made to give protection to the lips, but at the same time it has special ingredients to make the lips look fuller.

7) CBD or Hemp Oil Lip Balm: Cannabidiol (CBD) or hemp oil lip balm are a kind of lip balm that contains CBD oil or hemp oil. Hemp oil is from the hemp plant which is an excellent moisturizer for the lips, while the CBD oil is an active compound of cannabinoids which has anti- inflammatory benefits. The lip balm will act as an antioxidant to the lips to help sooth dry and heal chapped lip.

E. Application of Natural Lip Balm

1) Natural Lip Balms Are Products Applied Onto The Lips To Avoid Dryness And Protect Against Adverse Environmental Factors.
2) Numerous Lip Balms Of Chemical Origin Are Currently Available In The Market From Companies Like The Body Shop, Nivea, Himalaya, Blistex, Babylip Etc. Natural Lip Balm Being A Product Intended For Use By Both Men And Women.
3) To Produce Lip Balm, It Is Necessary To Balance The Concentration Of The Main Ingredients Including Butters, Oils And Waxes And Other Excipients.
4) Lip Balms Are Often Eaten Away By The User And Hence It Is Imperative That Health Regulators Have A Microscopic Look At The Ingredients That Go In To The Lip Balm.

II. HERB AND EXCIPIENT PROFILE

A. Beetroot Powder

Fig no. 2: Beetroot

- Synonyms: Beetroot, Beta vulgaris L.
- Family: Chenopodiaceae
- Biological source: Beetroot (Beta vulgaris L.) is an herbaceous flowering biennial plant belonging to Chenopodiaceae family, originated in Asia and Europe.

B. Aloe Vera

Fig no.3: Aloe vera

- Synonyms: Aloe barbadensis miller
- Family: Asphodelaceae (Liliaceae)
- Biological source: Aloe is the dried juice collected by incision, from the bases of the leaves of various species of Aloe.

C. Almond oil

Fig no.4: Almond oil

- Synonyms: (Prunus dulcis (Mill.) D. A. Webb)
- Family: Rosaceae
- Biological source: Almond oil is a fixed oil obtained by expression from the seeds of Prunus amygdalus (Rosaceae) var. dulcis (sweet almonds) or P. amygdalus var. amara (bitter almonds).

D. Rose Water

Fig no.5: Rose water

- Synonyms: rosadamascena
- Family: Rosaceae
- Biological source: It is a volatile oil obtained by distillation of the fresh flowers of R. damascene.

E. Bees Wax

Fig no.6: Bees wax

- Synonyms: Cera alba
- Family: Beeswax is the purified wax obtained from honeycomb of hive bee, Apis mellifera Linn and other species of Apis, belonging to family Apidae.
- Biological source: Beeswax is a naturally occurring wax produced in the bee's hives by honeybees A. mellifera. Glands under the abdomen of the bees secrete this wax and it is used to build the honeycomb.

III. METHOD OF EXTRACTION

1) Beetroot extract: The extraction of beetroot was carried out using a modified version of the method outlined by Wiley and Lee. After washing the beetroots, their skins were removed, and the beetroots were chopped into small cubes (0.5 × 0.5 × 0.5 cm) to enhance mass transfer to the solvent. These chopped beetroot pieces were then mixed with water containing 0.5% citric acid at a beetroot-to- water ratio of 1:3. The extraction process was performed in a shaking water bath at 80 °C for one hour, with a shaking speed of 150 rpm. Once the extraction was completed, the resulting beetroot extract was cooled to room temperature and filtered through Whatman filter paper no. 4.

2) Aloe vera extract: To use a fresh aloe vera leaf from a plant, start by cutting one of the outer leaves near the base. You can also opt for a store-bought aloe leaf. Thoroughly wash the leaf to remove any dirt, then place it upright in a cup or bowl for about 10-15 minutes. This step allows the yellowish resin to drain out, which contains latex and can irritate the skin, so it's crucial to let it drain completely. After the resin has fully drained, rinse the leaf to remove any remaining residue. Next, use a small knife or vegetable peeler to carefully remove the thick outer skin. Once the skin is peeled away, you'll be left with the clear aloe vera gel inside. Using a spoon, scoop the gel into a blender, ensuring you don't include any skin pieces. Blend the gel for a few seconds until it becomes frothy and liquid. At this stage, the gel is ready for use. If you plan to store the gel for longer than a week, consider adding preservatives. Vitamins C and E are excellent choices, as they can significantly prolong the shelf life of your aloe vera gel. While the gel naturally contains some of these vitamins, the quantity is not sufficient to preserve it for extended periods. By adding more of these vitamins, you can increase the gel's shelf life, plus their antioxidant and anti-aging properties will enhance the skin-protecting benefits of your homemade aloe vera gel.

3) Almond oil: To create almond oil, you'll need raw almonds and a carrier oil of your choice. Start by placing the raw almonds into a food processor or blender and grind them until they become a fine powder. If you're using a high-speed blender, you'll achieve a smoother consistency. During the grinding process, the almonds will release their natural oils, forming a paste-like texture.Once the almonds are ground, transfer the powder into a beaker or container and add your carrier oil at a 1:2 ratio of almond powder to oil. Stir the mixture well, ensuring the almond powder is fully coated in oil. Cover the container with a lid or some cheesecloth, and let the mixture sit in a cool, dark spot for at least 48 hours. Be sure to stir it every 12 hours to keep everything well mixed. After the 48-hour infusion period, strain the mixture using a fine-mesh strainer or cheesecloth to separate the oil from the almond powder. Gently squeeze the cloth to extract as much oil as possible from the paste.

4) Method of Formulation: All the materials were carefully weighed using a digital balance with an accuracy of 0.1 grams. The method chosen for preparing the herbal lip balm stick involved heating the solid raw ingredients at a consistent temperature using indirect heat. The beeswax, which was crude and ground into small, uniform pieces, was melted in a 50 ml beaker over indirect heat, with the temperature reaching a maximum of 90°C.

Once melted, other ingredients such as vitamin E, beetroot juice, rose essence, and almond oil were added to the mixture and stirred vigorously. The mixture was continuously stirred until it became homogeneous. Before pouring the mixture into the lip balm molds, a thin layer of glycerine was applied to the molds using a cotton pad. The molds were then placed in an ice bath for about an hour in a cool, dry area, away from direct sunlight, allowing the mixture to solidify. The lip balm sticks were left for 48 hours at room temperature for stability, after which they were tested for quality and performance.

Fig no.7: Formulation of Lip Balm

Formula for formulation of herbal

Sr. no	Ingredients	Quantity (%)	Role
1.	Bees Wax	12%	Impart Glossiness and hardness
2.	Beetroot	11%	Colouring Agent
3.	Almond Oil	5%	Moisturizing agent
4.	Aloe-vera	4%	Antioxidant, anti- inflammatory
5.	Vitamin-E	1.5%	Antioxidant, maintain the stability
6.	Rose water	2%	Flavouring agent
7.	Glycerol	2% to 10%	Glossy effect

Table no.2: formulation table

IV. EVALUATION TESTING FOR HERBAL LIP BALM

A. Organoleptic Evaluation

The lip balm thus obtained was evaluated for its organoleptic properties like color, odour, and state. The appearance of the lip balm was judged by its color and roughness and graded.

Sr. no	Property	Limit
1.	Colour	Deep red
2.	Odour	Rose
3.	Taste	Tasteless
4.	Appearance	Smooth

Table no.3: Organoleptic Property

B. Melting Point

For melting point, the sample of lip balm was taken in a glass capillary whose one end was sealed by flame. The capillary containing drug was dipped in liquid paraffin inside the melting point apparatus which was equipped with magnetic stirring facility. Melting was determined visually, and melting point was reported.

C. Test of Spreadability

The product was applied (at room temperature) repeatedly onto a glass slide to visually observe the uniformity in the formation of the protective layer and whether the stick fragmented, deformed or broke during application.

G- Good: uniform, no fragmentation; perfect application, without deformation of the lip balm.

I- Intermediate: uniform; leaves few fragments; appropriate application; little deformation of the lip balm.

B- Bad: not uniform; leaves many fragments; difficult or inappropriate application, intense deformation of the lip balm.

D. Skin Irritation Test

Mark an area (1sq.cm) on the left hand dorsal surface. The lip balm was applied to the specified area and time was noted. Irritancy, erythematic, edema, was checked if any for regular intervals up to 24 hrs and reported.

PH-5.6

E. pH Measurement

The pH study was carried out by dissolving 1 gm of sample into 100 ml water. The pH measurement was done using pH paper.

F. Stability Studies

Prepared lip balm was placed for accelerated stability studies at room temperature (25.0 ± 3.0 ºC), refrigeration (4± 2.0 ºC) and oven temperature (40.0 ± 2.0 ºC) for 30 days. After 30 days, it was again characterized for organoleptic properties, melting point, spreadability and pH.

V. RESULT AND DISCUSSION

The use of beetroot provided natural colour which are moreover less toxic compared to synthetic colours. Evaluation of prepared lip balm was done for melting point, pH measurement, test for spreadability and stability studies.

The melting point was found to be 63-65°C and the pH was found to be 6.0. Test of spreadability was found to be G- Good: uniform, no fragmentation; perfect application, without any deformation of the lip balm.

After performing the Stability studies for the lip balm at different temperatures, it was observed that the lip balm at room temperature (25.0±3.0°C) and refrigerator (4.0± 2.0°C) showed; Good: uniform, no fragmentation; perfect application, without deformation of the lip balm, but Intermediate: uniform; leaves few fragments; appropriate application; little deformation of the lip balm at oven temperature (40.0± 2.0°C).

Sr.no	Parameter	Interference
1.	Appearance	Deep red
2.	Odour	Rose
3.	pH	5.6
4.	Homogeneity	Homogeneous Smooth and consistent
5.	Spreadability	Good
6.	Wash ability	Washable
7.	Skin irritancy	No redness and edema
8.	Accelerated stability study	Stable

Table no.4: - Result and Discussion

A. Stability Study

Prepared lip balm was placed for accelerated stability studies at room temperature (25.0 ± 3.0 ºC), refrigeration (4± 2.0 ºC) and oven temperature (40.0 ± 2.0 ºC) for 30 days. After 30 days, it was again characterized for organoleptic properties, melting point, spreadability and pH.

Sr.no	Parameter	At 40^0
1.	Appearance	No change
2.	Odour	No change
3.	pH	No change
4.	Homogeneity	No change

Table no.5: Stability study

VI. CONCLUSION

The evaluation of the lip balm's sensory qualities, such as color, fragrance, taste, and overall appearance, plays a crucial role in ensuring the product is visually and sensorially appealing to consumers. Positive organoleptic properties enhance the overall user experience. The melting point of the lip balm was found to be within an acceptable range, confirming that the product can endure typical storage conditions without melting or altering its texture. This is essential for maintaining the lip balm's integrity during storage and transport.

The spreadability test measures how smoothly and evenly the lip balm can be applied. The formulation showed excellent spreadability, indicating it can be applied easily and uniformly to the lips, forming a smooth protective layer without cracking or separating. Whether stored at room temperature or in a refrigerator, the lip balm maintained consistent stability. It was concluded that the spreadability was "good," and the organoleptic properties remained stable. Storing the product under these conditions was sufficient, as it retained its functionality and performance.

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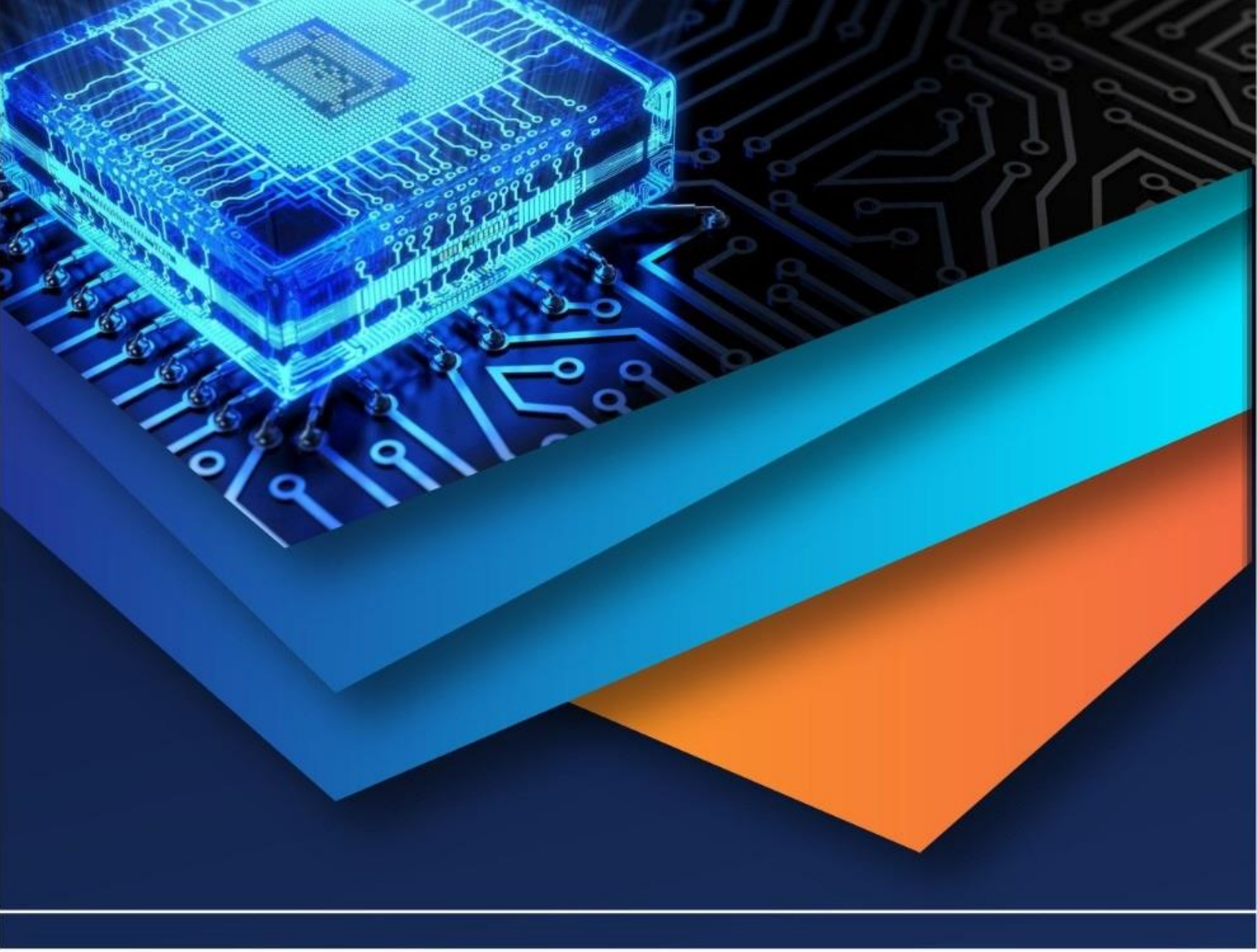

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