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To prepare and evaluate watermelon and mulberry Lip peel-off gel mask for lip pigmentation correction.

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ABSTRACT:
Pigmentation of the lip is a common condition nowadays. Lip pigmentation, also known as lip discoloration, is the darkening, patchy, or two-toned appearance of the lips. While there are several hereditary as well as non-genetic reasons for lip pigmentation, like Sun exposure, Smoking and chewing tobacco and topical chemicals such as lipsticks. Pigmentation of the lips can significantly impact one's aesthetic appearance and self-confidence.There are various treatments available in the market for lip care. They can be a lip balm, lip sleeping mask, laser treatment etc.The present work deals with the development and evaluation of the lip peel-off gel mask containing herbal powdered drugs i.e. mulberry and watermelon and other chemical reagents like polymers (polyvinyl alcohol) others like tween 80, PEG200, preservatives are used in gel formulation. Peel-off mask is the type of dosage form that is gently applied onto the facial skin surface and is peeled off after a few minutes of its application. The mulberry and watermelon powder used in this peel-off gel formulation has been reported in the literature for its activity against lip pigmentation i.e., it reduces pigmentation and deeply hydrates and nourishes the lips, helps to restore moisture balance and alleviates dryness commonly associated with pigmented lips, while the gel also showed good results for all the evaluation parameters. Therefore, this peel-off gel mask would be a good alternative to other treatments.

Keywords: lip pigmentation, lip peel-off gel mask, mulberry, watermelon, lip discoloration

INTRODUCTION:

As cosmetic science evolves we get access to a myriad of products especially for enhancing the appearance of our facial features. The product that we have formulated is designed to depigment lips and also provide lipcare as lips are the most neglected part of skincare. Lips are a visible body part on the mouth of humans and many animals. The lips are soft and mobile and serve as openings for food intake and in the articulation of speech and sound. Anatomically, the upper and lower lips are referred to as "Labium superius oris" Labium inferius is respectively. The joint where the lips meet the surrounding skin of the mouth area is called the vermilion border and the typical reddish area inside the borders it is called the vermilion zone. The vermilion border of the upper lip is known as the cupid's bow and is the transition area from the skin to the oral mucosa. (Vidyaa Hari Iyer and Sana Farista, 2014)

Lips pigmentation also be influenced by the following factors:

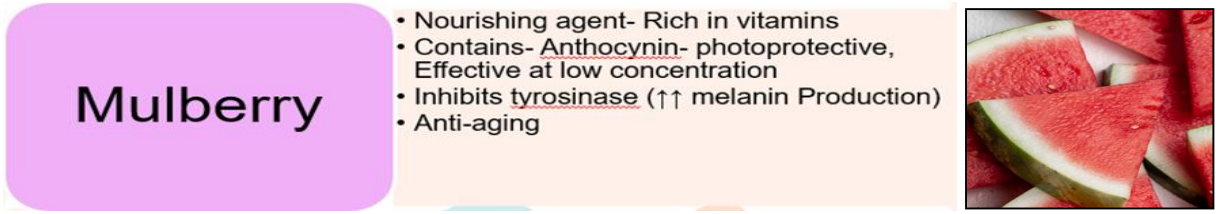
- Sun exposure
- Smoking and/or ingestion of tobacco products(as it contains nicotine)
- Anemia: causing pale lips
- Medications: antimalarials: clofazimine, chloroquine, and amodiaquine
- Antimicrobial agents: minocycline
- Antiretroviral agents: zidovudine
- Antifungals: ketoconazole
- Topical chemicals: cosmetic products and lipstick
- Hormones: melanocyte-stimulating hormone and adrenocorticotropic hormone

- Malignant pigmented lesions
- Inflammations
- Vascularity Genetic color of the skin (Manaf Taher Agha et al., 2021)

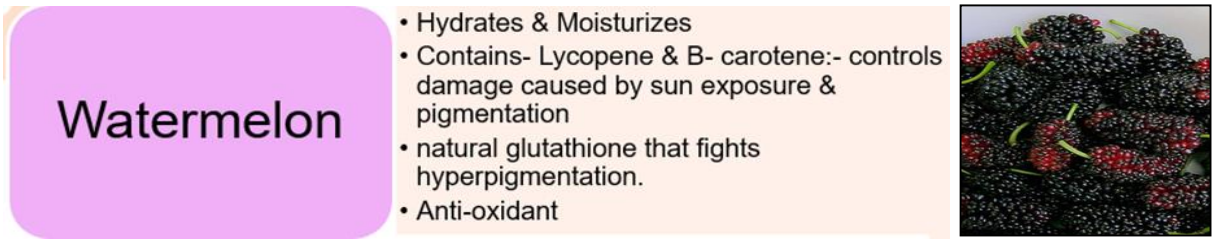
Lip mask was made up of active ingredients such as watermelon and mulberry fruit extracts. This lipmask is made in a polymer base made up of PVA (poly vinyl alcohol). All the ingredients used are safe if ingested by accident with no significant toxicity profile. (However deliberate consumption is not advisable).
There are various types of gels that are determined by colloidal phase, type of solvent used, physical properties, Rheological properties ,etc.
single-phase system: They consist of large organic molecules that reside on twisted surfaces. Strands were separated in the continuous phase.
Synthetic polymers are called gelling agents. Easily entwined with each other. Retained by random motion, or van der Waals forces.
Hydrogel (water-based): They contain water as the continuous liquid phase.
For example, bentonite magma, gelatin, cellulose derivatives, carbopol and poloxamer gels are formed and are not associated with breakage or spoilage problems. (Mane P, 2021)

A water-based hydrogel was used in the formulation. The spray-dried powder is readily soluble in water with PVA. Similarly for other secondary materials along with preservatives. Watermelon and mulberry are the ingredients with an increasing recognition in the field of cosmetic science. While watermelon has exfoliation and protective factors, it also contains lycopene which heals sun damage with prolonged use.

1. Mulberry extract:
Mulberry is deductively known as *Morus alba*. It belongs to the family Moraceae. It is one of the foremost vital herb plants that are utilized as a source of drugs and cures. The Latin word 'morus' which suggests 'oddly enough' has driven to the root of the word 'mul'. Different species are found inside the class Morus and a few imperative Mulberry species among others are the local red mulberry (Morus rubra), the East Asian white mulberry (Morus alba), and the southwestern Asian dark mulberry (Morus nigra).(Ramesh H.,2014)



2. Watermelon extract:
The scientific name of watermelon is *Citrullus lanatus*, hailing from the family called Cucurbitaceae, it is considered a fruit. It is native to the African desert of Kalahari but these days, it is also cultivated in tropical regions of the world. Historically, its first harvest was documented 5000 years ago in Egypt that later spread to different parts of the world. Presently, China is the top producer followed by Turkey, United States, Iran and Republics of Korea Watermelon is a prominent source of natural antioxidants with special reference to lycopene, vitamin C and citrulline.(etÃcia Caramori Cefali et al., 2014)



MATERIAL AND METHODS:
Significance of each chemical
1) PVA - The synthetic polymer polyvinyl alcohol (PVA) is a colorless and odorless water-soluble substance. PVA was gradually dissolved in cold water while being stirred continuously by mechanical means, and it was then left to swell for a couple of hours. It serves as a substance that forms films.
2) GLYCERINE - Glycerin serves as a denaturant, humectant, oral care agent, skin protectant, skin conditioning agent—humectant, viscosity-decreasing agent, and lubricant in addition to its many other uses. Additionally, it is reputable. It is a well-known humectant that stops items from losing moisture, preventing rapid drying.

Polyvinyl Alcohol

Glycerine

Tween 80

3) PEG (polyethylene Glycol)- pegs have three different purposes in cosmetics: as emollients (which assist soften and lubricate the skin), as emulsifiers (which aid in the proper mixing of water- and oil-based substances), and as carriers for delivering other compounds deeper into the skin.
4) Water - It serves as the foundation for the whole formulation.
5) TWEEN 80 - It is a skincare component that enhances the texture of cosmetics and personal care items. In order to create supple, simple-to-apply skincare and body care products, polysorbate 80 is employed as a surfactant and solubilizer. Even though the texture of a product primarily affects the sense of touch, it is crucial that it spreads smoothly and distributes its activity.
6) Sodium benzoate - It is a salt of benzoic acid that is well soluble in water, tasteless, and odorless. Because of its antifungal and antibacterial qualities, it is a preservative added to food in precisely controlled amounts. It Prevents the development of yeast, mold, and bacteria. The Food and Drug Administration (FDA) approved sodium benzoate as the first food preservative.
7) Active pharmaceutical ingredients (API)- Mulberry Powder & Watermelon powder.

Changing proportion of tween 80, water, PVA, PEG 200 decided following Formula.

Table 1: Formula for Lip peel off mask

Ingredients	Category	Quantity
PVA	Film former	6.6%
Glycerine	Smoothing Agent	1.6%
Water	Base	84.5%.
PEG 200	Surfactant	0.8%
TWEEN 80	Solubilizer	1.2%
Sodium benzoate	Preservatives	2%
Api	Active ingredients	3.3%

Fig no.5: Flowchart of the procedure

PROCEDURE:

1. Step I: During this step, 80% distilled water and 6.6% polyvinyl alcohol are combined in the beaker at a temperature of 80°C while being vigorously stirred continuously. Additionally, this mixture was given a 40°C cooling period.
2. Step II: At a temperature of 40°C, phase I is combined with a 3:1 mixture of glycerin and PEG, which is then thoroughly mixed.
3. Step III: Add 1.2% of tween-eighty to the above mixture.
4. Step IV: To the step III mixture, add 4.5% distilled water and 3.3% of the drug (watermelon and mulberry lyophilized powder) and thoroughly mix.

5. Step V: Add 2% sodium benzoate, stir well, and allow it to cool for a short while. Add the flavoring and coloring agent to the finished formulation. (as Shown in above flow chart)

Prepared Formulation Check for various evaluation parameter like Color, odour, pH, Consistency, Spredability, stability, Viscosity, peel off film status etc.

RESULTS AND DISCUSSION

Evaluation criteria

1) Color- The color of the peel off mask is Reddish pink.

2) Consistency-It spreads easily and it is smooth.

3) Odor- It has no odour, when the essence was added later, it became sweet & Fruity.

4) pH - The pH was determined using a pH meter by dissolving 10% of the drug in water.

5) Folding endurance- The prepared film's folding endurance was carefully measured. The skin's surface was treated with a peel off gel. A strip of film (3×3 cm) was cut uniformly after drying, it was repeatedly folded until it broke. The exact amount of folding endurance was determined by counting how many times the film could be folded in the same position without breaking.

6) Viscosity-Viscosity was measured by Brookfield Viscometer.

7) Spreadability-To measure Spreadability extra sample gel was spread between two glass slides & compacted to a consistent thickness by adding 50 gm of weight to a slide. The Spreadability was measured by the amount of time it took to separate 2 slides, or the amount of time the upper glass slide moved over the lower slide.

Formula- $S= m \times l/t$

Where, S=Spreadability

m=weight put on upper slide

l= length moved on glass slide

t=time taken

8) Peel- off film Status- After drying, the film was removed from the applied site. Drying time took longer time. (10-12min)

9) Peel Test- The peel off mask evenly distributed over the skin surface. The peel was allowed to dry. After 15 min the peel was removed from the skin. It was observed that the peel was removed easily without breaking.

10) Thermodynamic Stability Studies- The formulation was kept at refrigerator temperature (4°C), Room temperature & accelerated temperature (40°C) with storage at each temperature for three months. The visual testing was done at each temperature. The test was performed to see the stress effect and stability of formulations at low and high temperatures. (Sweta V .kulkarni, 2019)

Table 2: Evaluation parameter of Lip peel off Mask.

Parameters	**Observations**
Colour	Reddish pink
Odour	Sweet & fruity
Consistency	Smooth & light to spread
pH	6 -7
Folding endurance	The 200 time film could be folded at the same place without breaking
Viscosity	1068cp
Spreadability	Smooth and easily spreadable
Status of peel off film	Drying time was found to be 10-12 min
Peel Test	Easily removable without breaking



Comparison of our formulation with the other existing methods like the laser treatment or the allopathic treatment. Our product has been made easy to apply with less pain during and even after the application. This peel off mask concentrates on natural retrieval of lip color by decreasing the pigmentation of the lips with the use of natural fruit ingredients i.e Watermelon & Mulberry Powder.

CONCLUSION

Lip hyperpigmentation is an aesthetic concern because it covers a person's overall visual appeal. Today's culture places a great deal of value on attractive appearances, and patients who feel an internal need to fulfill the high standards of society are more likely to undergo such intraoral and extraoral cosmetic procedures. Lip depigmentation solutions help patients' personalities enhance further. Lip skin is more delicate and extremely susceptible to environmental factors than facial skin. Regular protection with hydrating lip care products aids in preserving a healthy appearance and feeling of well-being. The formulation provides a natural and genuine approach to treating pigmentation of the lips. Overnight application of the product helps to achieve good results. In conclusion, herbal peel-off lip masks can be a beneficial addition to the lip care routine, providing hydration, nourishment and potential depigmentation. However, it's essential to remember that consistent overall lip care, including proper hydration, a healthy diet, and protection from harsh environmental factors, is crucial for maintaining healthy and beautiful lips.

FUTURE SCOPE

Looking at the current situation where people are exposed to harsh and harmful UV radiations of the Sun, the increasing habits of adolescents of consuming tobacco and getting involved in activities like smoking and dark lipstick application will for sure increase the victims of lip pigmentation. Now in this case not everyone will be able to afford the expensive and the painful treatment for the same. At the same time the Available allopathic treatments are also expensive with a great amount of side effects and toxicity upon accumulation. But lip peel off mask, we ensure the most reliable, affordable and a nourishing product. The formulation consists of the unique combination of watermelon and mulberry powder with a goodness of antioxidants and potential depigmenting composition.

In the future, our formulation promises to give a painless and a pocket-friendly treatment to the victims of lip pigmentation. As this is a natural product the healing will take time, but ensures a less intensified pigmentation of the lips. On a regular application of the formulation with proper care, an established effect will be seen. As the victims of pigmentation increase with time due to the environment and the lifestyle of the people, there will be an increased demand for such formulation.

Conflict of Interest: None

Author contributions: Use this form to specify the contribution of each author of your manuscript. A distinction is made between five types of contributions: Conceived and designed the analysis; Collected the data; Contributed data or analysis tools; Performed the analysis; Wrote the paper.

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