Research Article

Formulation and Evaluation of Herbal Lipsticks by Using *Beta vulgaris*

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ABSTRACT

Lipstick is a type of cosmetic that contains pigments, oils, waxes, and emollients to give the lip colour and texture. The lipstick provides the lips a lovely colour and a lustrous sheen. It also reduces the creation of lip cracks, which can lead to bacterial infections. It has an emollient effect on the lips as well. Lipstick is mostly made up of an oil wax foundation that is hard enough to create a stick dye. The major goal of this project is to create and test natural lipstick utilizing coloured pigments from Beta vulgaris taproot while minimizing the negative impacts of synthetic formulations. The Beet root extract is prepared by using microwave assisted extraction technique. The prepared lipstick is evaluated for solubility, pH, melting point, breaking point etc. The stability studies indicated that the prepared lipstick using beta vulgaris extract was stable throughout the period of study.

Keywords: Beetroot, Lipstick, Herbal, Microwave.

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INTRODUCTION

Lips are the part of the mouth. Lip skin is different from regular skin as lip skin don't have protective outer layer as that of other skin. It consists of Epidermis and Dermis layer[1]. The upper lip is known as Labium superius oris and lower lip is known as Labium inferius oris. Edges of the lips contain reddish border, which is known as *vermilion border*. The lip skin is not hairy and does not contain sweat glands. The lip skin contains fewer melanocytes. Melanocytes produce melanin pigments which gives colour to the lips[1,2]. Saliva provides the moisture to the lips. Lips form an integral part of facial expression like smiling, frowning etc. Lips are used for eating functions like holding food or to get it in the mouth[3].

Lipstick formulas are most commonly used to enhance the beauty of the lips and add a touch of elegance to the makeup. Both synthetic and natural lipsticks are available nowadays. As synthetic lipstick contains certain chemical agents, it causes harmful effects when it is ingested along with food. So, we prefer to use natural over synthetic. Natural lipstick contains natural coloring agents like petals of *Rosa rubiginosa*, flower of *Bougainvillea spectabilis, Beta vulgaris (*Beetroot) and flower of *Crocus sativus.*

Types of Lipstick

It can be of several types based on shape of one's lips and desire. Lipsticks of different characteristics and effects[4].

Some types are,

1. Cream lipstick: provides a smooth texture for lips. lipsticks with cream formula are not shiny. It mainly contains high amount of wax which provides protection. Also has dry lips as its after effect.
2. Gloss lipstick: this kind of lipstick can make lips shine and improves the dimension of depth. Ones with small and thin lips prefer this.
3. Mate and lipstick: Give non shiny lips and mostly selected by women's who is seeking colorful and nice shades.
4. Moisturizing lipstick: makes lips softer and smoother. This effect it due to the presence of glycerin, aloe and vitamin E.
5. Pearl and Frosted lipstick: it can make the lips glisten and sparkle. Due to its ability to reflect, it gives a shiny effect on your lips.
6. Satin and Sheer lipstick: it nourishes and moisturize the lips. It contains high oil ingredients.

Uses of Lipstick

- Improves the appearance of lips[5]
- Protection from bacterial infections
- Provides color and texture to lips
- It hydrates the lips.

Role of Beetroot in Natural Lipstick

Natural ingredients give nourishment to lips and which help to heel soring chapped and dry lips. Usually, we think that natural lipsticks are not very convincing, but the raw ingredients are also powerful. It containing natural ingredients that are best to moisturize our lips. It keeps our

lips hydrated, smooth and delicate. Organic oils and waxes present in the natural lipsticks which protect the lips from UV rays. Beet (*Beta vulgaris*) is the primary source of beet red, a natural red color. The roots and leaves of beet have long been used in traditional recipes. Beetroot is also used as medicine to treat illness. Beets were utilized by ancient romans to heal a variety of ailments. Fever, Constipation and other illness are among them. The coloring agent is made from the coloured pigment found in the taproot of beta vulgaris. It is made up of betalain pigments and is used as a red food coloring in industry. The table beet, also known as garden beet, red or golden beet, or simply the beet, refers to any of the cultivated beet (Beta vulgaris) types produced for their edible taproots[5,6].

MATERIALS AND METHODS

Freshly harvested beetroot was purchased and local market in Ernakulam. The thick layers were peeled from the fruits manually and the peels were washed thoroughly in running tap water to remove any impurities. Crushed beetroot grind without using water. Filter the extract using muslin cloth. After the filtration microwave assisted extraction was used. Microwave-assisted extraction (MIE) is a novel and green extraction technique that can offer high reproducibility in shorter time, simplified manipulation, reduced solvent consumption and lower energy input without decreasing the extraction yield of the target species. Due to these advantages, microwave-assisted extraction (MIE) is used as an alternative to the release of bioactive components from waste food resources. Moreover, the optimization of process variables in MIE process such as temperature, mass of the sample and extraction time may enhance the treatment efficiency as well as it also creates the novel opportunity to know the in-depth knowledge of mechanism behind in MIE techniques[7].

Microwave

Microwave assisted synthesis has opened a new era in the field of synthesis & extraction. Now a day's this procedure is considered as an important weapon to employ green chemistry. Microwave heating will result in instantaneous heating of reaction mixture as microwave directly couple up with the molecules present in reaction mixture.

Microwave assisted extraction technique involves combination of microwaves in the conventional solvent extraction system, which enhances the penetration of solvent into the crude plant material/extract promoting the dissolution of phytoconstituents.

Principle: Microwaves are part of electromagnetic spectrum with a range of 300 GHz & wavelength of these waves range from 1cm to 1m. These waves are made up of 2 perpendicular oscillating fields which are used as energy & information carriers. Microwaves interact with specific material which can absorb a part of its electromagnetic energy and convert it into heat

Decoction process was used for the extraction of colour pigment and it was prepared by boiling the beetroot with ethanol at 65 to 85 °C approximately for 15 min. The starting ratio of crude drug to ethanol is 1:5; the volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, the concentrated extract is filtered and used as such in the formulation. Dark reddish coloured extract was obtained. The concentrated extract was then kept in desiccators to remove the excessive moisture. The dried extract was packed in air tight glass container for further studies.

Materials: Bee's wax, White soft paraffin, Olive oil, Pigment Betanin, Acacia, Lemon juice, Vanilla essence, perfume are the various material which are used in a current investigation. Following method was adopted during the course of present investigation[9].

Selection of herbs: The various herbs used in present formulation of herbal lipsticks were selected on the basis of literature survey[9,10]

Ingredients	Quantity			
	F-I	F -II	F-III	F-IV
Bees Wax	10g	12g	13g	13g
Beetroot extract	2g	3g	4g	5g
Castor Oil	4ml	3ml	2ml	1ml
Coconut oil	1ml	1ml	1ml	1ml
Olive oil	1ml	1ml	1ml	1ml
Vitamin E	1ml	1ml	1ml	1ml

Preparation of beetroot extract

1. Fresh beetroot is thoroughly washed, peeled and crushed[11].
2. Crushed beetroot grind without using water.
3. Filter the extract using muslin cloth.
4. Then carried out microwave assisted extraction using ethanol.

Preparation of herbal lipstick

1. Weigh all ingredients separately[12].
2. Waxes and oils are heated separately in water bath.
3. Betanin pigment is added to the oil base and mixed.
4. This is then added to the melted wax and thoroughly stirred to appropriate consistency.
5. Added to the lipstick mold lubricated with glycerin and freeze.

FT-IR characterization

The FTIR images shows major peaks at the following wave numbers and the corresponding bonds are given. In FTIR images the common peaks at 3335.94 cm^{-1}, 3234.38cm^{-1}, 571.42 cm^{-1} and 1355.30cm^{-1} corresponding to O-H, C-H, N-H for 1o amines and C-C stretch respectively were observed. There was a minor or no shift with varying absorbance intensity for all the samples analysed. In samples dried at higher microwave output powers of 180 and 300 W additional peak at 781 cm-1 was observed, indicating a better yield of extractible suggesting higher power of microwave energy opened more pores for improved dehydration. FT-IR peaks and bonds Frequency, cm-1 Bond Functional group 3335.84 O–H stretch, H–bonded Alcohols, Phenols 3234.38 C-H stretch Aromatic 1355.30 C-C stretch Aromatic 1700.42 N–H bend 1° amines From the Figure a similar functional group before and after treatment were observed. This shows that the treatment does not play a major role in changing the chemical structure of the extract. It might be undesirable if the pigment structure is altered due to microwave treatment thus making it unsuitable pre-treatment for extraction.

Evaluation of Herbal Lipstick

It is very essential to maintain a uniform standard for herbal lipstick[14,15], keeping this view in mind the formulated lipstick was evaluated on the parameters such as melting point, breaking point, force of application, surface anomalies etc. which are as follows: -

The prepared herbal lipstick was evaluated with the following parameters

1. Organoleptic properties

The prepared herbal lipsticks were evaluated for organoleptic properties such as color, odour and texture.

2. Melting point

This test is done to know about the limit of safe storage. Determination of melting point was done by taking a melted lipstick sample and filled it into a glass capillary tube. The capillary tube is then subjected to cooling in ice for about 2 hours and is then tied to a thermometer. This assembly was then dipped into a beaker containing water which was subjected to continuous stirring. A temperature at which the material starts moving along the capillary tube is considered as melting point.

3. Determination of pH[16]

The pH of the formulated lipstick was analyzed by using PH meter.

4. Breaking point[17]

This test is performed to determine the strength of the lipstick. The lipstick is placed in a horizontal position in a socket away from the edge of the support. The lipstick was then subjected to number of weights hanging from the support. This weight was gradually increased at time interval of 15secs and the weights at which the lipstick breaks is considered as the breaking point

5. Force of application[17]

This test is performed to get at a comparative measurement of the force to be applied in this test, a piece of coarse brown paper is kept on a shadow graph balance and the lipstick is applied at 45º angle to cover 1 sq. inch area till it is fully covered. The pressure reading gives an indication of force of application.

6. Perfume stability[17]

These studies were conducted on all the six (F1- F4) formulations of herbal lipstick to record the fragrance.

7. ***Thixotropy character***

This test is performed to check the depth of penetration by using penetrometer. Here, a standard needle of specifies diameter is allowed to penetrate into the lipstick for 5secs under certain load. The depth of the penetration of the needle is a measure of thixotropic character of the herbal lipstick.

8. ***Softening point[20,21,22] (Ring and ball method)***

It is the temperature at which the mass of the lipstick and the steel ball gets loosened and feel into the bottom of the breaker. An aluminum ring was taken and the lipstick sample was fitted into it. The extra mass of the lipstick was removed by using a sharp blade to get an intact amount of the lipstick into the ring. This was then placed in the refrigerator for 10mins at the temperature of 10ºC. Thereafter, lipstick was tied to a stand and steel ball was placed on the above assembly. Assembly was then dipped into a beaker containing water which was subjected to heating with continuous stirring & temperature recorded by using thermometer.

9. Surface abnormalities[19,18]

These studies were conducted on all the four (F1- F4) formulations of herbal lipstick to detect the presence of crystals on the surfaces of the prepared herbal lipsticks.

RESULTS AND DISCUSSION

The prepared formulation was evaluated and it was found that the, F4 was best among the six formulations. Hence, from present investigation it was concluded that this formulated herbal lipstick has better option to women with minimal side effects.

Evaluation parameters	Formulation code			
	F-I	F-II	F-III	F-IV
Color	Reddish	Light Reddish	Reddish	Reddish
Odour	Aromatic	Aromatic	Aromatic	Aromatic
Texture	Smooth	Smooth	Smooth	Smooth
Melting point	56-56.5°C	56-56.5°C	60-61°C	60-62°C
Determination of pH	6.5	6.0	6.0	6.3
Breaking Point	23	24	28	30
Force of application	Poor	Easy	Easy	Good
Surface abnormalities	No defect	No defect	No defect	No defect
Perfume stability	Good	Very good	good	excellent
Softening point	56-57°C	55-56°C	54-56°C	54-56°C
Thixotropic character	8.3	8.2	8.3	8.5
Skin irritation	No	No	No	No

The present study formulation and evaluation of lipstick containing herbal ingredients was aimed to manufacture a lipstick containing herbal ingredients to minimize the side effects over the synthetic ones. The formulation table containing all formulations (F1–F4) was prepared and evaluation studies were performed on the prepared lipstick containing herbal ingredients. All the four formulations (F1–F4) showed promising and challenging results. The organoleptic studies displayed the color of the lipstick along with the odor. The results can be seen in the table 2. The composition of herbal lipstick consisting of betanin, castor oil, olive oil, coconut oil, bees wax and vitamin E, offers a suitable practical approach to achieve a better formulation as lipstick containing herbal ingredients.

CONCLUSION

Conclusion In the present work, containing herbal ingredients was prepared successfully according to the given formulations. The following are the conclusions are

Lipstick containing herbal ingredients was successfully formulated by using six different formulations (F1 – F4), among all the 4 formulations, F4 formulations exhibited good results.

F4 formulation lipstick containing herbal ingredients was found to be in compliance with all the evaluations tests. Likewise, even all the other formulations also exhibited satisfactory results, but when compared with all the formulations F4 formulation exhibited good results regarding all the aspects.

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