



FORMULATION AND EVALUATION OF HERBAL LIPBALM USING NATURAL PIGMENTS

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ABSTRACT

Presently the entire world is endeavouring to return towards the natural herbal materials as it has better performance and are safer than synthetic ones. The aim of this present study is to formulate and evaluate Herbal Lip balm emphasizing its efficacy, eliminating harmful synthetic ingredients by using safe natural ingredients. The herbal Lip balm was formulated using various natural dyes and ingredients such as Betel leaf extract, Red dragon fruit extract, Beeswax, Cocoa butter, Coconut oil, Tween 80, lemon juice, Ginger extract, Neem oil, Pomegranate dried flower powder, Rose oil, Vitamin E oil. Various evaluation tests were performed such as organoleptic evaluation, pH determination, melting point, aging stability, viscosity, skin sensitivity and spreadability. The formulated Herbal Lip balm was found clear and appealing. The pH of the Herbal Lip balm was found to be 6.8, which is near to skin pH. The formulated Herbal Lip balm demonstrated good aging stability, skin sensitivity and spreadability. The physicochemical evaluation of Herbal Lip balm showed ideal results. However, to improve its quality, product performance and safety, further study is required.

KEYWORDS: Herbal lip balm, Red dragon fruit extract, betel leaf extract, Spreadability.

INTRODUCTION

Cosmetics plays a significant role in today's lifestyle. Due to increasing public concern, on the presence of hazardous synthetic excipients in cosmetics, new techniques are gained to produce products using organic sources. Chapped, dry or cracked lips are very common beauty dilemma, particularly in harsh weather.^[1]

Lip skin is thin and different from other body parts. It does not have hair follicle, sebaceous and sweat glands. And it is devoid of an inherent mechanism to retain moisture and protection from the external environment. Hence lips need more care, protection and moisture retention.^[2] Due to various adverse effects of available synthetic preparation, herbal lip products are on demand recently. Various natural dyes and ingredients are usually incorporated in these preparations in order to make them safe with minimal side effects. Most commonly used dyes are obtained from Beta Vulgaris, Piper betel, Dragon fruit, Amaranthus etc.^[3,4]

The betel leaf is an evergreen and perennial creeper, with glossy heart shaped and white catkin. The genus Piper (Piperaceae) is largely distributed in tropical and subtropical regions of the world. Piper betel is cultivated in India, Sri Lanka, Malaysia, Indonesia and East Africa. It has light yellow aromatic essential oil, with sharp taste.^[5]

The *Hylocereus Pitaya* (Dragon) fruit is a perennial, epiphytic, climbing cactus with a triangular beefy, jointed stalk which belongs to the family Cactacea and of genus *Hylocereus*. The color pigment in red dragon fruit is contributed by betalains which is water soluble pigment that can be classified in two groups: betacyanins and betaxanthins. Interestingly betalains offer a broad colour palette.^[6]

MATERIALS AND METHODS

Procurement of materials

The betel leaves are collected from various locations of Mangalore and washed under running water to remove the contaminants. They are dried under the shade, converted into coarse powders. Dragon fruit, vitamin E capsules, ginger, lemon, pomegranate flower powder are collected from the local markets. Beeswax, cocoa butter, coconut oil, tween 80, neem oil, rose oil obtained from the drug store of Srinivas college of pharmacy.

Preparation of extract

Extraction method: Dragon fruit

Fresh red dragon fruits were purchased from the local market and washed with tap water to remove the dirt and dust on the surface. Then, the red dragon fruit was cut and the flesh was blended for 30 sec in a blender. After that, the blended flesh was homogenized at a ratio of 1: 3 with ethanol (95 % v/v). The solution was kept for 15

min for betalains to leach out from the red dragon fruit juice. This step was necessary to carry out to remove the pectic substances from the red dragon fruit. After that, the homogenized fruit juice was sieved to remove the little black seeds that is found in red dragon fruit. Lastly, Rotary flash evaporator was used to get the betacyanin pigment.^[7]

Extraction method: Betel leaves

Fresh betel leaves were washed with clean water and dried at room temperature. To extract dye from betel leaves, cold extraction technique was used with ethanol as the organic solvent. The betel leaves were first crushed with mortar and pestle followed by soaking in ethanol (1:5 ratio) and stored in dark area for two days. The glassware used to store the dyes were covered with aluminum foil to minimize photooxidation. Rotary flash evaporator was used obtain the extractive compound. The crude extract was stored in a refrigerator (4°C) until further used.^[8]

Formulation of polyherbal shampoo

About 0.5 g of each herbal extract and 1g of aloe vera was added to the gelatin solution (10%) and mixed thoroughly. 1ml of lemon juice was added by continuous stirring. To impart fragrance to the preparation sufficient quantity of rose oil was added and the volume was made upto 100ml using gelatin solution.^[6]

Formulation of herbal lip balm

The herbal lip balm was formulated as per general method of formulation in which the bees wax and cocoa butter were melted in porcelain dish on water bath with the decreasing order of melting point, coconut oil with tween 80 were heated in other porcelain dish, then both the phases were mixed at the same temperature. Fresh ginger extract and lemon juice were heated together in another porcelain dish (just before mixing). All the contents were mixed at 40°C with the dye extract. The essential oils and essence were added drop wise with continuous stirring. The mixture was transferred from water bath to ice-bath and was allowed to solidify and then taken out of the ice-bath for further homogenization in mortar-pestle to get the dried texture. The homogenized herbal lip balm was kept under refrigeration.^[9]

Evaluation of organic lip balm

● Organoleptic Evaluation/Visual assessment

The prepared formulations were assessed for colour, appearance and odour.^[10]

● Melting point

The lip balm was melted and molten preparation was filled into the capillaries and was allowed to cool to regain its original nature. Then capillary was coupled with the thermometer and this coupled system was immersed in water at controlled temperature. The

temperature at which the lip balm was observed as fully molten was noted as its melting point.^[11]

● Measurement of pH

The pH measurement was done by using digital pH meter. 1 g of the formulation was mixed with 100ml of distilled water and pH was determined. Readings were documented using digital pH meter three times and mean value was estimated.^[12]

● Test for spreadability

The spreadability of the formulation was determined by taking two glass slides of equal length. The formulation was sandwiched in between two slides and load (200g) was applied; the formulation was spread over the slides. The time taken for the second glass slide to slip off from the first glass slide was determined. A shorter interval indicates better spreadability.

The spreadability was then calculated from the following formula:

$$\text{Spreadability} = M \times L/T$$

Where, M = mass in grams, T = time taken in seconds, L = distance travelled by lip balm^[13]

● Determination of viscosity

The viscosity of the formulation was analysed using Brookfield DV-E viscometer using spindle S-64. The value of viscosity was measured in terms of cps.^[14]

● Skin sensitivity test

It was carried out by applying the product in the form of a patch on the skin for 30 minutes and reaction was observed. The response obtained was noted as below:^[15]

N- No reaction

R- Redness of the skin.

I- Irritancy or itching

● Aging stability

The formulated lip balms were stored in temperature-controlled oven at 40°C for 1 hour. The formulated lip balm was evaluated for various parameters such as bleeding, crystallization on surface and ease of application.

● Perfume stability

The formulated herbal lip balm was stored in standard storage condition of cool temperature then it was tested for its fragrance after 30 days.^[16]

RESULTS AND DISCUSSION

● Organoleptic evaluation / visual assessment:

The prepared lip balm has showed good characteristics in terms of appearance, colour and odour on the visual inspection of the formulation. The results are shown in table no. 1

Table No. 1: Organoleptic evaluation.

Formulation Code	Color	Appearance	Odour
F1	Deep Red	Smooth	Pleasant
F2	Olive Green	Smooth	Pleasant
F3	Orange	Smooth	Pleasant

- Melting point**

The melting point of the lip balm was found to be in the range of 68⁰ C, which matches with the appropriate melting point of lip balm i.e., between 65 and 75⁰ C. Results are showed in Table no. 2

- pH determination:**

The pH of the lip balm was determined to investigate the possibility of any side effects, as acidic or alkaline pH may cause irritation to lips. As seen in Table no. 2, the formulated lip balm shows the pH of 6.7- 6.9 which is near to the lip pH. Resulted pH prevents swelling and promotes tightening of the lips, there by inducing color to the lips.

- Test for spreadability**

Prepared lip balm was tested for its ability of spreading. The results are given in table no. 2. The formulations showed good spreadability.

- Determination of viscosity:**

The result of rheological evaluation is presented in table No. 2. The viscosity of the formulation was identified using Brookfield DV-E viscometer at temperature of 25⁰ C using spindle S-64 at rpm 0.3. The value of viscosity was measured in terms of cps. The viscosity of the formulation was found optimum.

Table no. 2: Evaluation parameters of formulated lip balm.

Sl. No.	Formulation	Melting Point* (° C)	pH*	Spreadability (g.cm/ sec) *	Viscosity(cps)*
1.	F1	68 ± 0.5	6.7± 0.37	23.09 ± 0.54	334 ± 0.54
2.	F2	68 ± 0.4	6.8± 0.26	22. 87 ± 0.43	1055 ± 0.62
3.	F3	68± 0.2	6.9± 0.25	23. 54 ± 0.13	979 ± 0.45

*Data expressed as a mean ± SD, n=3

- Skin sensitivity test**

A skin sensitivity test was carried out to check the allergic reaction of formulation with skin components. Results showed that the formulation was compatible with

skin and no redness or allergic reaction was found. These results were indicative of the safety of the formulation for topical use. Results are shown in table no. 3

Table no. 3: Skin sensitivity test.

Sl. No.	Formulation	Sensitivity
1	F1	N
2	F2	N
3	F3	N

N- No reaction

R- Redness of the skin.

I - Irritancy or itching

- Aging stability**

The aging stability of the formulation was performed to determine parameters like bleeding, crystallization and ease of application. The formulation did not show any signs of bleeding and crystal formation. The results are given in table no. 4.

- Perfume stability**

The perfume stability of the formulation was performed to determine parameters like aroma, fragrance. The formulation did not show any bad aroma or fragrance. The results are given in Table no .4.

Table no. 4: Aging stability and perfume stability.

Sl. No.	Formulation	Aging stability	Perfume stability
1	F1	Ease of application, no crystal formation, No bleeding.	+
2	F2	Ease of application, no crystal formation, No bleeding	++
3	F3	Ease of application, no crystal formation, No bleeding	+++

+ Good

++ Best

+++ Excellent

CONCLUSION

The current study is a successful attempt to formulate and evaluate herbal lip balm utilizing safe natural ingredients, emphasizing its efficacy and excluding dangerous synthetic ingredients. From the reproducible results of executed experiments, it can be concluded that; The natural dyes can be used in herbal lip products as colouring agents to mask lip imperfections. The dyes are extracted from natural sources and are incorporated into lip balm base. The results depict that natural ingredients when added to lip balm produce more stable products with good aesthetic appeal. The formulations were evaluated for various parameters like organoleptic properties, pH, viscosity, spreadability, melting point and ageing stability. Organoleptic evaluation showed good results in terms of colour, appearance and odour. pH and viscosity of the formulations were found optimum. The designed lip balm showed good spreadability and was compatible with skin with no sign of redness or allergy. But additional research is needed to enhance its quality, product performance, and safety.

Conflict of interest

The authors declare no conflict of interest.

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