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Design, Development and Evaluation of Herbal Lipstick from Natural Color Pigment



**Anilkumar.V^{*1}, Kalyani. R², Sangeeta kumari.L³,
Aswini Lavanya.P⁴**

1.Assistant Professor, Department of Pharmaceutical Technology, GIET School of Pharmacy, Rajahmundry, East Godavari, Andhra Pradesh. India

2.Assistant Professor, Department of Pharmaceutical Technology, Sri Venkateswara college of Pharmacy, Etcherla, Srikakulam, Andhra Pradesh. India

3.Assistant Professor, Department of Pharmaceutical Analysis and Quality Assurance, Raghu College of Pharmacy, Dakamarri, Visakhapatnam, Andhra Pradesh. India

4.Research Scholar, Department of Pharmaceutical Technology, AU College of Pharmaceutical Sciences, Visakhapatnam, Andhra Pradesh. India

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ABSTRACT

Background & Objective: To Design, Development and Estimate of Herbal lipstick from Natural Color pigment made from the standardized extracts of Beta vulgaris. This ecofriendly, herbal lip beautifying product are made-up of natural plant Extracts that guarantees to rejuvenate and revitalize lip skin with new freshness. a variety of Castor oil, Bees wax and physical properties. **Method:** The Beet root color pigment extracted with ethanol. The extract was subsequently regulated based on the herbal pharmacopoeia. Castor oil and beeswax was later added as oil base. Ripe fruit of Shikakai as a Surfactant. Next Herbal lipsticks were Evaluated for their Physical properties like breaking point, melting point skin irritation etc.. **Results:** The results exhibit that all the herbal lipsticks were stable and has good force of application while the Breaking point reached 30-39 sec. The melting point containing different weights of castor oil and beeswax were 59-70 respectively, while the pH test resulted in 6.5- 6.9. In addition, hedonic test showed that respondents like the exciting color, fragrant smell, and oily texture of the lipsticks. The lipsticks themselves did not cause any irritation, so they were safe to apply. **Conclusion:** The Herbal lipstick from natural color pigment formulations F3 had met the physical requirements stability standards, as well as a safety requirements.

INTRODUCTION

According to D&C act 1940 & rules 1945, cosmetics means any article intended to be sprayed, poured, rubbed, or sprinkled on or introduced into, or applied to the human body or its any part for ablution, glamorize, promoting enchantment or reshape the appearance.¹ Lipstick get their colours from diffusion of pigments and lake dyes however now not limited to Bromo acid, D&C Red No: 21 , Calcium lake which include D&C Red 7 and D&C Red 34, and Orange No: 17 there are organic and inorganic pigments.²

Herbal cosmetic are also known as natural cosmetics. Herbal cosmetics are developed by applying distinct Cosmetic essentials to form the base in which one or more elements of natural origin are used. Plants are primarily used for improvement of new drug products for cosmetic formulation. In herbal cosmetics the herbs are used in crude or extract form. Herbs include crude plant material like fruits, flowers, leaves, seeds, wood, bark, stems, rhizomes, roots or other plant parts, which may be integrated, disintegrated or powdered. Herbal materials also include fresh juices, gums, fixed oils, essential oils, resins and dry powders on herbs. Herbal cosmetics are formulated by using different decant cosmetic ingredients to form the best in which one or more herbal ingredients are used to cater defined cosmetic benefits. Herbs do not produce immediate treatment. They provide a way to make the body in proper composition with nature. An excessive number of cosmetic and toiletry formulation have been devise and developed which are based upon herbs. The application of herbal medicines is increasing immediately due to their skin ability and lack of side effects. The best tract of the herbal cosmetics is that it is hardly made by the herbs and shrubs and hence without any side-effects. The natural ingredients in the herbs also provide nutrients and minerals to body. The term Cosmaceuticals was first developed by Raymond Read member of U.S Society of Cosmetics Chemist in 1961. The word cosmetic was derived from the Greek word” kosmtikos” which means having the power, to arrange and having skill in decoration.^{3,4}

Advantages of herbal cosmetic over synthetic cosmetics: Herbal cosmetics are popular nowadays and are preferred over chemical as these products provide nutrients to the body enhance health and are free from synthetic chemicals and have no side effect as compared to the synthetic cosmetics. Some of the advantage of using natural cosmetics which make them a better choice over the synthetic ones are as follows.⁵

- 1) Safe to use
- 2) Compatible with body
- 3) Natural in nature
- 4) Affordable and non expensive
- 5) Variety of products
- 6) No side effects
- 7) Not tested on animals

Ideal characteristic of Lipstick:

1. Smooth and easy to apply.
2. Non-irritant and non-toxic
3. Should have attractive colour and shine
4. Free from grittiness and should be non-drying
5. It should have required pasticity
6. It should pleasant taste, odour, and flavor.
7. Don't lose its smooth and shiny appearance during storage.
8. Stable during its shelf life-means free from bloom or sweating during storage.
9. It should not melt or harden within reasonable variation of climate temperature.

Natural Coloring agents: colorants or coloring agents are mainly used to impart a distinctive appearance to the cosmetic products. Color has been used in cosmetics since early times. Basically, a desire to buy a cosmetic product is controlled by three senses namely sight, touch and smell. As such as, color is an important ingredient of cosmetic formulation.⁶

The color is imparted to the lips in two ways:

- 1) By staining the skin with a solution of dyestuff which can penetrate the outer layer of the lip skin.
- 2) By covering the lips with a colored layer which serves to hide any skin roughness and give a smooth appearances.

The first requirement is met by soluble dyes and the second one is met is insoluble dyes and pigments which make the film More or less opaque. The colors should be from the list of certified dyes under the drugs and cosmetic act.⁷ The naturally occurring colors from different plant and fruit sources. The colorants derived from natural source should be non toxic with no physiological activity. It should be a definite chemical compound because then only its coloring power will be reliable, its assay will be practicable and easier. Its tinctorial (coloring) power should be high enough so that only small quantities would be sufficient for use. Colorants should be unaffected by light, tropical temperatures, hydrolysis and micro organisms and therefore they must be stable on storage.^{8,9,10,11} Colorants should not affected by oxidizing or reducing agents and pH changes and also should not interfere with the tests and assays water soluble colorants are equally desirable with oil soluble and spirit soluble colors. The most important characteristics of colorants is compatibility with other ingredient and medicament. It should be free from objectionable taste and odour and must be readily available and inexpensive. The example of natural colorants are obtained from Beetroot, saffron, Tumeric, Tomato, etc.

Table: 1 Natural Coloring agents

S.NO	Colour	Chromophore Plant	Sources ^{12,13,14,15,16,17,18}
1.	Purple blue	Anthocyanin	Grapes, Blueberry, Pulm, Purple cabbage, Black berry
2.	Green	Chlorophyll	Avocado, kiwi, Cucumber, Spinch, Broccoli.
3.	Yellow orange	Caroteniods	Papaya, pineapple, Pumkin, Carrot, Orange.
4.	Red	Lycopene	Beetroot, Tomato, Strawberry, Water, watermelon, Pomegranate
5.	White-tan	Anthoxanthines	Cauliflower, Potato, Ginger, Oninons, Banana.

Table:2 Taxonomical classification of Beetroot:¹⁹

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Caryophyllales
Family	Chenopodiaceae
Genus	Beta L.
Species	Betavulgaris

Annual or biennial herb; leaves glabrous ovate to cordate, dark green or reddish, frequently forming a rosette from the underground stem, roots conspicuously swollen at junction with same; flowering stalk 1.2-1.8 m tall, produced the second year from the top of the tuber; flowers small numerous in a tall open panicle; fruit an aggregate of 2 or more fruits forming an irregular dry body; in garden beets roots are usually a deep red color and may be globular or cylindrical. In another study, garden beets are reported to have powerful detoxification, kidney ailment and increases sex drive and in another study beetroot have lowers cholesterol.¹⁹

Beet root health benefits:

Nutritional values of Beetroot: Antioxidants betalains that is betacyanins (red-violet pigment) and betaxanthins(yellow pigment) are the main compounds found in beetroot, flavonoids, polyphenols, vitamins, and folic acid other components.²⁰

Table:3 Nutritional values of Beetroot^{21,22,23,24}

Compound	Amount/100g
Energy	43 kcal
Protein	1.61 g
Total lipid (Fat)s	0.17 g
Carbohydrates	9.56 g
Dietary fiber	2.8 g
Sugar	6.76 g
Minerals	
Calcium	16 mg
Iron	0.80 mg
Magnesium	23 mg
Phosphorous	40 mg
Potassium	325 mg
Sodium	78 mg
Vitamins	
Folates	109 μ
Niacin	0.33 mg
Riboflavin	0.04 mg
Thiamin	0.031 mg
Vitamin B6	0.06 mg
Vitamin A	33 IU
Vitamin E	0.04 mg
Vitamin C	4.9 mg

Health benefits of Beetroot:

1. Treats anxiety disorder
2. Lowers blood pressure
3. Anti-thrombotic and Anti-inflammatory properties
4. Improve athletic performance

5. Protects Liver
6. Prevents demntia
7. Anti-cancerous
8. Treat anemia
9. Good for pregnancy
10. Healthy heart
11. Prevents birth defects
12. Antidiabetic
13. prevents respiratory infections

MATERIALS AND METHODS:

Castor oil, Beeswax, lanolin, Ripe fruit of shikakai, Eugenol,

Beetroot extract, Rose oil, Lemon juice Vanilla essences.

Extraction of color pigment from Beet root: Beetroot is that the main supply box natural red dye called “Beet root red”. Betanine is the main part of the red colorants extracted from common beet. The roots bare most typically deep red- purple in color, however it is available a large kind of alternative shades, like golden yellow, red and white stripy. Extraction of pigment is by homogenization of equal ratio of fruit pulp and solvents(1/1 w/v) .Take 100 g of the peeled fruit , of watery consistency, and macerated it with 100 ml of Solvents (Et OH, aqueous ethanol 50:50) for 15 minutes under icebath. Centrifuge the aqueous mixture at 18,000 RPM, 4⁰c for 20 min, and filter immediately through Nylon mesh. By using rotary evaporator concentrate the extract in vacuum at 35⁰c , to 3-4 ml. Completely remove the alcohol through concentration process and keep the samples in a dark vessel.^{25,26}



Fig:1 Beetroot plant

Formulation method:

The herbal lipstick was formulated as per general method of lipstick formulation. In brief , all hard and soft waxes were melted in China dish on water bath or heating Mantle with decreasing order of their melting point. Concentrated colorings pigment was mixed and Castor oil heated, both phases were mixed at some temperature. Rose oil, Lemon juice, eugenol, shikakai powder, vanilla essences were added at 40⁰ c , then mixture was poured into lipstick mould in excess amount and mould was kept on ice bath .After solidification surplus amount was scrapped with blade, lipsticks were removed from mould and flammed. prepared lipsticks were fitted in lipsticks container and used for further evaluation (Jain & Dharma 2005).

Table: 4 Composition and importance of different ingredients used formulation of herbal Lipsticks

S. No	Ingredients	F1	F2	F3	F4
1.	Castor oil- Blending agent	20g	20g	20g	20g
2.	Beeswax-Glossy & Hardness	15g	10g	10g	15g
3.	Lanolin- Glossy & Hardness	15g	14g	10g	14g
4.	Ripe fruit of Shikakai-Surfactant	7.5g	6.5g	8.5g	8g
5.	Eugenol-Anti infective agent	6.5ml	7ml	6.5ml	7ml
6.	Beetroot extract-Colouring agent	10ml	12ml	15ml	10ml
7.	Rose oil-Flavouring agent	Q.s	Q.s	Q.s	Q.s
8.	Lemon juice-Antioxidant	Q.s	Q.s	Q.s	Q.s
9.	Vanilla essences	Q.s	Q.s	Q.s	Q.s

Physiochemical evaluation of Herbal lipstick: 27

Evaluation of herbal lipstick is important to maintain a standard of herbal lipstick. The prepared formulations were evaluated for the following tests.

Color of lipstick: The evaluation of color was assessed by Physical observation of the lipstick products.

Determination of Melting point: Take both ends of lipstick in open glass capillary tubes. Then a sufficient amount of lipstick was introduced into each of five capillary tubes, about 10 mm high and allows tubes to stand for the appropriate time and at the Prescribed temperature in capillary tube apparatus. After that, the temperature at which the lipsticks begin to melt in the capillary tube was taken as the melting point. The operations were repeated for five times, and the average was calculated and recorded.

Determination of Spreadability: It was tested by repeatedly applying the lipstick onto the glass slide to observe the uniformity in the formulation of the protective layer and whether the stick fragmented, deformed, or broke during application.

Good: Uniform, fragments do not occur, perfect application, without deformation of lipstick.

Intermediate: uniform, leave fragments, good application but with little deformed.

Bad: Not uniform, leaves many fragments, difficult to apply and deformed.

Determination of Hardness: Four formulated lipstick from each formulation were selected randomly and measured using Monsanto hardness tester. The average result of each formulation was calculated and recorded.

Determination of surface anomalies: Determination of surface anomalies was studied about the surface defects, such as any crystal formation on lipstick surfaces, any contamination by moulds, fungi.

Determination of aging stability: The formulated lipstick was stored in hot air oven (40⁰c), room temperature (22⁰c) and refrigerator (4 to 8⁰c) for one hour each and observed various parameters such as bleeding, crystallization on surface and ease of application. There lipsticks for each condition were used to ensure obtained the consistency and accurate results.

Determination of solubility: The solubility of the herbals was observed after dissolved lipstick in various solvents such as acetone, ethanol, hexane, ether and water.

Determination of pH: pH of the herbal lipstick was determined by using pH meter and pH paper. the average result of each formulation was calculated and recorded.

Determination of Perfume stability: This stability test was conducted to evaluate the Spreadability, and organoleptic properties of lipstick formulation (colour, odour and appearance) for 30 days under the conditions such as room temperature (22 to 30°c) ,and refrigerator temperature (3 to 5°c) .the formulation were stored at room temperature for forty eight hours and then evaluated at base line(t₀). It was then stored under different conditions. According to the stability studies, and the characteristics will be assessed on the 3rd, 7th, 15th and 30th days. The value of t₀ will be used to compare with the value of the results (Fernande's et al., 2013).

Skin irritation test: It is carried out by applying product on the skin for 10 min.

Determination of Breaking point: Breaking point was done to determine the strength of lipstick. The lipstick was held horizontally in a socket inch away from the edge of support. The weight was gradually increased by a specific value (10gm) at a specific interval of 30 seconds and weight at breaks was considered as the breaking point.



Fig: 2 Lipsticks formulations from Beetroot extract



Fig: 3 Lipsticks in moulds

RESULTS AND DISCUSSION:

Colour of lipstick: All the formulated lipstick shown attractive pinkred colour except F3 shows faint red. 10ml of Beet vulgaris extract pigment for F1 was insufficient to formulate an attractive lipstick where as a range of 10 to 15ml of the extract pigment sufficiency to formulate a bright and attractive lipstick colour.

The Melting point of herbal lipstick: All the formulated lipsticks have melting point in the range of 59- 63°C. F1 fall out the optimum range of 60- 70°C where as other were within the range. According to the Howard, 1974,(Venkat et al.,) F3 is the most quality lipstick as the temperature fall exactly 62°C when compare to F1,F2,F4 the amount of Castor oil was same the difference was amount of lanolin, beeswax and color pigment.

Spreadability: F1 and F2 showed intermediate result because they leave fragment and little deformation of the lipstick whereas F3 and F4 showed good results because of little deformed of lipstick and without leaving any fragment on a glass slide.

Hardness: The hardness of prepared herbal lipstick was in the range from 3.2 kg/cm² to 3.8 kg/cm². The difference in the result is due to amount of beetroot extract.

Breaking point: Breaking point of prepared herbal lipsticks were in the range of 30 to 39 sec. The difference in the results is due to difference in the amount in beeswax.

The solubility of herbal lipstick: All the formulated herbal lipsticks were tested various in solvents for solubility. All the formulations were dissolved in ethanol and acetone only.

The pH of herbal lipstick: The pH of all formulations were near to 7 and should not cause any irritation on the lips.

Surface Anomalies: All the herbal lipstick formed did not show any surface defects such as any crystal formation on Lipstick surface, any contamination moulds and fungi.

Ageing stability: All the formulated lipsticks did not exhibit any bleeding and crystallisation on the lipstick surface and perfect application.

Perfume stability: All the formulations remained fragrance after 30 days also.

Table 5: evaluation tests for formulations of herbal lipstick

Formulation code	Colour	Average Melting point	Spreadability	Average Hardness [kg/cm ²]	pH	Breaking point (sec)
F1	Pink-red	60-70	Intermediate	3.2	6.7±0.2	30
F2	Pink-red	61-63	Intermediate	3.5	6.9±0.3	32
F3	Faint red	60-62	Good	3.8	6.5±0.1	31
F4	Pink-red	59-61	Good	3.2	6.7±0.5	39

Table: 6 Aging Stability

S.No	Condition	Formulation code				
			F1	F2	F3	F4
1.	Hot air oven [48°C]	Bleeding on lipstick surface	NO	NO	NO	NO
		Crystallization on surface	NO	NO	NO	NO
		Ease of application	YES	YES	YES	YES
2.	Room temperature [22°C]	Bleeding on lipstick surface	NO	NO	NO	NO
		Crystallization on surface	NO	NO	NO	NO
		Ease of application	YES	YES	YES	YES
3.	Refrigerator [4-8°C]	Bleeding on lipstick surface	NO	NO	NO	NO
		Crystallization on surface	NO	NO	NO	NO
		Ease of application	YES	YES	YES	YES

Stability studies: Stability studies of lipsticks important to predict the possible changes that may occur to the lipsticks since the product manufactured until the end of the product shelf life. In the stability study, the formulation were subjected to different temperature conditions to assess the changes that occur over time the stability studies was conducted for one month. the herbal lipstick formulated did not exhibit any change overtime. The colour, odour and Spreadability of all the formulated herbal lipstick remained unchanged over one month.

Table: 7 stability studies for optimized formulation F3

Stability studies	Optimised formulation (F3)
Color	Faint red
Odour	Good
Spreadability	Good
Melting point	60-62
Breaking point	30-39
Hardness	3.2-3.8

CONCLUSION

Different natural or herbal ingredients were used for the formulations of the herbal lipstick. like Beeswax, lanolin, castor oil Eugenol. Beet root extract obtained from Beta vulgaris used

as coloring pigment. The lipstick were evaluated for various criterions. From the above evaluation criterions it was concluded that F3 formulation was found to pass all those criterions and it shows no side effects, showing maximum local effects and good properties like shining, spreading and smoothness of liphence F3 formulation was considered as the optimised formulation even it shows good results in stability studies. The research finding also provides a guidelines on effect of herbal ingredients towards the properties of lipsticks and consumer acceptance of the herbal lipstick formulations.

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<i>Image</i> <i>Author -1</i>	<i>Anilkumar.V– Corresponding Author</i> <i>Assistant Professor</i> <i>Department of Pharmaceutical technology</i> <i>GIET school of Pharmacy</i> <i>Rajahmundry, East Godavari, Andhra Pradesh</i>
<i>Image</i> <i>Author -2</i>	<i>Kalyani. R</i> <i>Assistant Professor</i> <i>Department of Pharmaceutical technology</i> <i>Sri Venkateswara college of Pharmacy, Etcherla,</i> <i>Srikakulam</i>
<i>Image</i> <i>Author -3</i>	<i>Sangeeta Kumari.L</i> <i>Assistant Professor</i> <i>Department of Pharmaceutical Analysis and Quality</i> <i>Assurance</i> <i>Raghu college of Pharmacy</i> <i>Visakhapatnam</i>
<i>Image</i> <i>Author -4</i>	<i>Aswini Lavanya.P</i> <i>Assistant Professor</i> <i>Department of Pharmaceutical technology</i> <i>AU college of Pharmaceutical Sciences</i> <i>Visakhapatnam</i>