DESINE AND CHARACTERISATION OF NUTRACEUTICAL LIPSTICK OF BEETROOT POWDER

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ABSTRACT
Cosmetics are incredible in demand since historical time till day. Lipstick formulations are most widely used to enhance the beauty of lips and to add glamour’s touch to the makeup. It is difficult to apply lipsticks to the dried, chafed, chapped, cracked lips with sores and lesions. In such cases, one can use nutraceutical lipsticks for the purpose of curing topical condition and beautification of lips. With this aim and objectives, an attempt was made to formulate and evaluate nutraceutical lipstick by using cow ghee and honey as natural excipients that substituted synthetic ingredients like lanolin, cetyl alcohol, and castor oil. Beet powder extract containing vitamin B-complex and silica element was selected for the local action on lips and beet root powder B cyanine selected as colouring agent. The lipsticks were evaluated for their organoleptic properties such as spreading, covering property, hardness, shine, and gloss and found to be satisfactory product to give attractive beauty with therapeutic effect on the diseased lips. Thus, the nutraceutical lipsticks with the natural ingredients like cow ghee and honey can serve as economical and effective cosmeceutical product.

Key word: Beet root powder, cosmeceutical, cow ghee, honey, lipstick

INTRODUCTION

According to D&C act 1940 and rules 1945, cosmetic 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 cleansing, beautifying, promoting attractiveness or altering the appearance. It also includes any articles intended for use as a component of cosmetic. Cosmetics are substances used to enhance the appearance of the human body. [3] Now a day’s the demand of herbal cosmetics in the world market are growing and are inevitable gifts of nature.

Formulations of nutraceutical cosmetics can be used to cure skin problems by achieving esthetic sense. Lipsticks are cosmetic formulations for the modification or accentuation of lip colour and are prepared by molding a dispersion of colours in a waxy base, in the form of stick/crayon. The consumption of lipsticks in makeup preparation field exceeds that of any other product. Rather than decreasing in use, they posses increasing popularity. No substitute has been found to replace them. Lipsticks provide a convenient means of either freshening a makeup by coloring or protection of lips from the effects of cold, dry weather, UV light, and wind. Lip problems caused because of infection or pollution are dryness of lips, chafed, chapped, cracked lips, sores and Lesions on lips, Sunburn, and wind-burned lips.

Suitable drug candidates for nutraceutical lipsticks are locally acting on the lips, soothing, anti-irritant agent, skin protectant, and anti-inflammatory agents. Lipsticks were used for coloring the lips, but lipsticks could be used for coloring as well as to treat lip infections. Beet root powder was selected as a drug of choice because of their anti-irritating, moisturizing properties soothing and nontoxic agent naturally obtaining and used in the treatment of skin ulcers, wound, skin eruptions, fissures.

Aim and objective of the present study was to formulate nutraceutical lipsticks with cow ghee and honey as natural excipients that replaced conventional synthetic vehicles of lipsticks. The castor oil was replaced by cow ghee and formulations were subjected to the different evaluation. Honey helps to promote tissue regeneration and helps in healing. Antibacterial activity of honey is largely due to the presence of hydrogen peroxide. Cows’ ghee have a great historical background for skin care and nourishment and is highly effective for all sorts of skin rashes. It also acts as a moisturizer.[1,2,3]

ADVANTAGES OF LIPSTICK

Beauty
No matter what style of lip color you prefer (sharp, bold and dramatic colors, or more natural and subdued shades that can be translucent), you will instantly feel more beautiful. If your goal is to stand out in the crowd, be more beautiful, or you simply need a boost in your confidence, lipstick is a perfect fashion tool for you.

Hydration
Even though some older brands of lipsticks use ingredients that can suck moisture from you lips, most of them are very conscientious about hydration and are made to preserve the natural state of your lips. New brands of lipstick can often contain some form of moisturizing additive, such as vitamin E or aloe-vera.

Sunscreen
Even in early 20th century, chemist and fashion designers came to conclusion that sunscreen protection is important and that most people leave their sensitive lips up to the mercy of the sun even if they are conscious about protecting the rest of the face. Lipstick manufacturers then added sun protection ingredients to their products, enabling you to protect your lips from sun, drying, wind, and other harmful and aging effects.

Posture
Several studies have shown that women who regularly use lipstick have a better posture in the later years of their life. With long and steady tradition of standing in front of the mirror and keeping your posture and body shape in healthy conditions, women in the ages of 65 to 85 have significantly less problems with their posture and balance.[4]

DISADVANTAGES

The following are a few harmful effects of lipsticks that can occur if you use low quality products constantly.

Heavy Metals
Studies have shown that lipsticks have concerning levels of chromium, cadmium and magnesium. This will result in increasing your risk to dangerous diseases and organ damage. High levels of cadmium can be stored in the kidney and finally result in renal failure.

Lead
It has been revealed that most of the lipsticks have a dangerously high
amount of lead. Lead is a neurotoxin and can affect the nervous system. It can also cause brain damage. This is one of the reasons for hormone imbalance and infertility. Even if it's taken in small quantities, it can have drastic effects on the body.

**Formaldehyde and Mineral Oil**

Formaldehyde is a preservative, which is also known as human carcinogen. Wheezing, coughing, irritation of the eyes and skin are other effects of formaldehyde. Mineral oil is another ingredient which is used in lipstick to block the pores. Many of the harmful effects of lipsticks are due to these chemicals.

**Parabens and Bismuth oxy chloride**

These are two other ingredients that are used in the making of lipsticks. The harmful effect of lipsticks is due to the carcinogenic property of these two ingredients. The parabens act as preservatives just like the formaldehyde. Though this is used in preserving the lipstick, it is very harmful for the body.\[^4\]

**IDEAL CHARACTERISTICS OF A GOOD LIPSTICK**

- Smooth and easy to apply.
- Non-irritant and non-toxic.
- Should have attractive colour and shine.
- Free from grittiness and should be non-drying.
- It should have required plasticity.
- It should have pleasant taste, odour and flavour.
- Don’t lose its smooth and shiny appearance during storage.
- Stable during its shelf life- means free from bloom or sweating during storage.
- It should not melt or harden within reasonable variation of climatic temperature.\[^5\]

**ANATOMY OF LIPS**

![Fig. 1: Anatomy of lips.](Image)

The upper and lower lips are referred to as the "Labium superiusorisis" and "Labium inferiusorisis", respectively. The juncture where the lips meet the surrounding skin of the mouth area is the vermilion border, and the typically reddish area within the borders is called the vermilion zone. The vermilion border of the upper lip is known as the Cupid’s bow. The fleshy protuberance located in the center of the upper lip is a tuberculum labii superiusorisis", and the "labial tuberence". The vertical groove extending from the protuberance to the nasal septum is called the philtrum. The skin of the lip, with three to five cellular layers, is very thin compared to typical face skin, which has up to 16 layers. With light skin color, the lip skin contains fewer melanocytes (cells which produce melanin pigment, which give skin its color). Because of this, the blood vessels appear through the skin of the lips, which leads to their notable red coloring. With darker skin color this effect is less prominent, as in this case the skin of the lips contains more melanin and thus is visually darker. The skin of the lip forms the border between the exterior skin of the face, and the interior mucous membrane of the inside of the mouth. The lower lip is formed from the mandibular prominence, a branch of the first pharyngeal arch.

The lower lip covers the anterior body of the mandible. It is lowered by the depressor labiinferioris muscle and the orbicularis oris borders it inferiorly.

The upper lip covers the anterior surface of the body of the maxilla. Its upper half is of usual skin color and has a depression at its center, directly under the nasal septum, called the philtrum, which is Latin for lower nose, while its lower half is a markedly different, redcolored skin tone more similar to the color of the inside of the mouth, and the term vermilion refers to the colored portion of either the upper or lower lip. It is raised by the levatorlabii superiusorisis and is connected to the lower lip by the thin lining of the lip itself, which can be seen by opening your mouth wide in front of a mirror. Thinning of the vermilion of the upper lip and flattening of the philtrum are two of the facial characteristics of fetal alcohol syndrome, a lifelong disability caused by the consumption of alcohol during pregnancy.\[^6\]

**FORMULATION OF LIPSTICK**

**Table 1: Components of lipstick and functions**

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>% (%/W/W)</th>
<th>Functional category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beet root</td>
<td>7</td>
<td>Anti-irritating, moisturizing properties</td>
</tr>
<tr>
<td>Honey (A grade)</td>
<td>15</td>
<td>Antibacterial activity, Tissue regeneration</td>
</tr>
<tr>
<td>Cows ghee (A grade)</td>
<td>65</td>
<td>Nourishment, skin care</td>
</tr>
<tr>
<td>Waxes</td>
<td>10</td>
<td>Provides hardness and creaminess</td>
</tr>
<tr>
<td>Perfumes</td>
<td>Adequate</td>
<td>Lubricates lipstick after application</td>
</tr>
<tr>
<td>Miscellaneous agents</td>
<td>Adequate</td>
<td>Give aroma</td>
</tr>
<tr>
<td>(Preservatives, Antioxidants, Flavours)</td>
<td></td>
<td>Stabilize the formulation</td>
</tr>
</tbody>
</table>

**Table 2: Ingredients with their prescribed quantity in the formulation of herbal lipstick**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Quantity (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beet root</td>
<td>11 (%) (F(I))</td>
</tr>
<tr>
<td>Honey (A grade)</td>
<td>6gm</td>
</tr>
<tr>
<td>Cows ghee (A grade)</td>
<td>6ml</td>
</tr>
<tr>
<td>Waxes</td>
<td>12 (%) (F(II))</td>
</tr>
<tr>
<td>Perfumes</td>
<td>q.s.</td>
</tr>
<tr>
<td>Miscellaneous agents</td>
<td>q.s.</td>
</tr>
<tr>
<td>(Preservatives, Antioxidants, Flavours)</td>
<td></td>
</tr>
</tbody>
</table>

**NATURAL COLOURING AGENTS**

**Table 3: Common Colour and Plant Sources\[^7\]**

<table>
<thead>
<tr>
<th>COLOUR</th>
<th>CHROMOPHORE PLANT</th>
<th>SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purple</td>
<td>Anthocyanin</td>
<td>Grapes, blueberry, plum, purple cabbage, black berry</td>
</tr>
<tr>
<td>Green</td>
<td>Chlorophyll</td>
<td>Avocado, cucumber, spinach, broccoli, lettuce, kiwi</td>
</tr>
<tr>
<td>White-tan</td>
<td>Anthoxanthins</td>
<td>Cauliflower, potato, ginger, onions, banana</td>
</tr>
<tr>
<td>Yellow</td>
<td>Carotenoids</td>
<td>Papaya, pine apple, pumpkin, carrot, orange</td>
</tr>
<tr>
<td>Red</td>
<td>Lycopene</td>
<td>Beet root, tomato, strawberry, watermelon, pomegranate</td>
</tr>
</tbody>
</table>

**EXTRACTION OF NATURAL COLOURING AGENTS**

**EXTRACTION OF BETANIN FROM BETA VULGARIS (Beetroot)**

Beetroot is that the main supply of natural red dye, called “beetroot red”. Betanine is that the main part of the red colorant extracted from common beet. The roots are most typically deep red-purple in colour, however are available a largekind of alternative shades, as well as golden yellow and
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 macerate it with 100 mL solvents (EtOH, aqueous ethanol 50:50) for 15 minutes under ice bath. Centrifuge the aqueous mixture at 18,000 rpm, 4°C for 20 min, and filter immediately through nylon mesh. By using rotary evaporator concentrate the extract in vacuum at 35°C, to 3–4 mL completely remove the alcohol by concentration process and keep the samples in a dark vessel. [9]

**METHOD OF PREPARATION**

- First, melt and mix the raw ingredients for the separately according to their melting point.
- Heat the solvents, oils, waxes in separate stainless steel or ceramic containers.
- Then mix solvent and liquid with the colour pigments.
- Mix the pigment mass with the hot wax.
- Then pour this into tubing moulds, cool, and separate the lipstick from the mould and fit it in the lipstick case. [9]

**MATERIALS AND METHODS**

Beet root, Honey (A grade), Cows ghee (A grade) was purchased from local market, Malkapur Dist. Buldana Maharashtra. Waxes and other excipients used were provided by IBSS college of Pharmacy Malkapur Dist Buldana.

**Preparation of nutraceutical lipstick base**

Cow ghee heat at 50°C with beet root powder and weighed amount of bees wax and carnauba wax were melted at 80°C. Color phase was added to molten wax phase and cooled to 60°C, followed by addition of honey. The mixture was stirred vigorously till a smooth emulsion was formed.

**Preparation of lipstick**

Accurately weighed amount of nutraceutical was dissolved in honey by using 0.05% tween 80. Slowly, this mixture was added with continuous stirring at 500 rpm using over head stirrer (Universal motor). The mixture was poured into clean and lubricated moulds.

**EVALUATION OF HERBAL LIPSTICK**

It is very essential to maintain a uniform standard for herbal lipstick, keeping this view in mind the formulated herbal lipsticks was evaluated on the parameters such as melting point, breaking point, thixotropy character, force of application, surface anomalies etc. ( Mittal et al., 2003; Dwivedi et al., 2009).

**Melting point**

Take both ends open glass capillary tubes. Introduce into each of 5 capillary tubes a sufficient amount of the lipstick, about 10 mm high and allow the tubes to stand for the appropriate time and at the prescribed temperature in capillary tube apparatus. The temperature at which the substance begins to melt in the capillary tube is taken as the melting point. Repeat the operation 3 times using other 4 capillary tubes and calculate the result.

**Breaking point**

Breaking point test is to determine the strength of lipstick. Place lipstick horizontally in a socket inch away from the edge of support. Increase the weight by a specific value (10gm) at specific interval of 30 second and weight at which breaks is considered as the breaking point. [10]

**Force of application**

It is test for determine the force to be applied for application. Keep a piece of coarse brown paper on a shadow graph balance and apply lipstick at 45° angle to cover a 1 sq. Inch area until fully covered. The pressure leading is an indication of force of application.

**Surface anomalies**

This test is for determining the surface defects, such as no formation crystals on surfaces, no contamination by moulds, fungi etc.

**Aging stability** Store the products in 40°C for 1 hour and observing various parameters such as application characteristics, crystallisation of wax on surface and oil bleeds. [11]

**Solubility test**

The formulation herbal lipstick was dissolved in various solvents to observe the solubility.

**PH parameter**

The pH of formulated herbal lipstick was determined using pH meter.

**Skin irritation test**

It is carried out by applying product on the skin for 10 min.

**Perfume stability**

Perfume stability can also be assessed by storing lipsticks in oven at 40°C and by making periodic comparison of perfume with fresh lipstick. [12]

<table>
<thead>
<tr>
<th>Sr/No</th>
<th>Evaluation Parameter</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Melting point</td>
<td>65°C</td>
</tr>
<tr>
<td>2</td>
<td>Breaking point</td>
<td>288.67 g</td>
</tr>
<tr>
<td>3</td>
<td>Force of application</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Surface anomalies</td>
<td>No defect</td>
</tr>
<tr>
<td>5</td>
<td>Aging stability</td>
<td>Smooth</td>
</tr>
<tr>
<td>6</td>
<td>Color</td>
<td>Red</td>
</tr>
<tr>
<td>7</td>
<td>PH parameter</td>
<td>6.5 ±0.2</td>
</tr>
<tr>
<td>8</td>
<td>Skin irritation test</td>
<td>No</td>
</tr>
</tbody>
</table>

**DEFECTS IN LIPSTICKS**

**FORMULATION RELATED PROBLEMS**

**Sweating**

It is the most common problem of lipstick formulation due to high oil content or inferior oil binding. It may rise in any climate or temperature range.

**Bleeding**

This refers to the separation of coloured liquids from the waxy base.

**Streaking**

A thin line or band of a different colour or a substance appears on the finished product.

**MOULDING RELATED PROBLEMS**

**Lathering**

Lipstick does not look smooth or homogenous after congealing and setting but instead has a multi-layered appearance.

**Deformation**

This is a moulding problem where the shape of the lipstick looks deformed. It is noticeable and appears on both sides of the lipstick.

**Cratering**

This appears in split moulding and it shows up flaming when stick develops dimples.

**Mushy Failure**

This is a problem in which the central core of the lipstick lacks structure and breaks. [13]

**RESULT AND DISCUSSION**

**Preparation of lipstick base**

The lipstick base prepared was found to be satisfactory in all aspects as per ideal base requirement, i.e., hardness, spreadability, shine, spreading, and smoothness.

**Preparation of medicatd lipstick**
The nutraceutical lipstick prepared was found to be satisfactory in all aspects as per ideal requirement, i.e., hardness, spread ability, shine, spreading, smoothness, color, taste, and odor.

**Melting point**

The melting point of medicated lipstick was found to be 65°C. At this temperature, lipstick mass moves through the capillary, which complies with literature limits of 60-65°C.

**Softening point (Ring and Ball method)**

Softening point was the temperature at which the lipstick mass and steel ball were loosened and falls to the bottom of the beaker. It was found to be 58°C, which complies with literature limits of 50-60°C.

**Breaking load test**

The weight at which the lipstick breaks was found to be 288.67 g. So it was observed that the lipstick was strong enough to withstand pressure of application.

**Stability studies**

The lipstick was placed in stability chamber at temperature 4°C in refrigerator, 20-25°C at room temperature, 30-40°C in oven and was observed that there were no sweating, bleeding, streaking, and blooming.

**CONCLUSION**

Different natural ingredients such as ghee and honey were used for formulating, nutraceutical lipsticks that contain beet root powder. Study indicates that these excipients would increase the customer compliance by substituting chemical ingredients like isopropyl myristate, lanolin, and cetyl alcohol that may cause darkening of lips. These nutraceutical lipsticks exhibit excellent properties such as spreading, shining, smoothness, and covering.

**REFERENCE**

4. www.lipstickhistory.com