

Novel Herbal lipstick formulations and their Quality control

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Abstract- Herbal technology is boosting the economy of India. Herbal lipstick is one of the important herbal products with increasing demand in the national and international markets. The lipstick has become vital cosmetic product that is used since the prehistoric period to make the lips more attractive and healthier. The synthetic lipsticks, even from the reputed commercial brands, are toxic, carcinogenic, and harmful to lips. The synthetic lipsticks mainly cause allergy, nausea, dermatitis, and even drying of lips. This underlined the need for herbal lipsticks. In the present investigation, six novel herbal lipstick formulations have been developed. The different herbal formulations were prepared by adding ingredients like herbal colorants, blending agents, gelling agents, herbal preservatives, and surfactants. All the six herbal lipstick formulations have been evaluated using the quality standards viz. colour, pH, skin irritation test, melting point, breaking point, the force of application, perfume stability, surface abnormalities, and solubility test. Two new parameters viz. Fluorescence analysis and microscopic examination were carried out along with generally used standard the parameters. The herbal lipstick formulation no. 2 was found the best based on all the parameters evaluated. The present investigation would lead to developing the herbal lipstick that is novel, beauty-enhancing, eco-friendly, cost-effective, and with minimal or no side effects.

Index Terms- Eco-friendly, Herbal cosmetics, Herbal lipstick, Quality standards, and Synthetic lipsticks.

I. INTRODUCTION

The idea of self-beautification is prehistoric [1-2]. The use of cosmetics in olden days was not only for developing an outwardly pleasant and attractive personality but towards achieving longevity with the good health care system. Recently the use of herbal cosmetics has increased. The market turnover of herbal cosmetics is more than 1 billion dollars, and still, there is tremendous scope for Indian herbal products. There is a growing demand in the world market and resurgence of herbal cosmetics [3]. The word 'herbal' is a symbol of safety and minimal side effects on human health. The herbal cosmetics viz. herbal shampoo, herbal sindur, and herbal lipstick have become popular among the consumers. Many consumers have reported the adverse effects of synthetic cosmetics [4-5].

The lipstick is one of the most widely used cosmetic products by women. It is a fact that cosmetic products are one of the least regulated product categories by the Food and Drug

Administration (FDA). A woman who applies synthetic lipstick is also ingesting some of it during its application period and ultimately adds 'lead (Pb)' into the bloodstream via the skin of her lips. The lead comes from the synthetic colorant used in the synthetic lipsticks. This lead is the neurotoxin, and a small amount of lead over time is significantly unsafe to human health. It adversely affects the nerves and can also cause brain damage, behavioral problems, hormonal imbalance, delays in puberty, and miscarriage. The petrochemicals in synthetic lipstick are harmful to human health. Many lipstick brands contain harmful ingredients viz. formaldehyde (preservative and carcinogen), mineral oil, and talc (blocks skin pores), parabens (preservative and carcinogen), and bismuth oxychloride (a carcinogen).

The ethnobotanical studies have revealed that the different plant materials have been used as an ingredient in the colouring of the lips. The patenting of 'Luvsticks' herbal lipstick by the National Botanical Research Institute (NBRI), Lucknow, underlines the importance of herbal lipsticks. The lipstick is often unintentionally eaten away by the women, and hence there is a need to use ingredients that are safe for human consumption. So the herbal lipsticks are made from plant extracts. Herbal colourants, herbal blending agents, essential oils, herbal preservatives, and aromas are the main ingredients of herbal lipsticks. The herbal lipstick not only adds beauty but a treat for the senses as well. The aromas used in these lipsticks can be mood alleviator, anti-depressant, anti-stress, and sensual arousal.

In the present investigation, the six novel herbal lipstick formulations have been developed.

These formulations have been evaluated based on the standard quality parameters viz. colour, pH, skin irritation test, melting point, breaking point, the force of application, perfume stability, surface abnormalities, solubility test, fluorescence analysis, and microscopic examination. The main aim of the present investigation is to develop a formulation that is beauty-enhancing, ecofriendly, and lips protective.

II. MATERIALS AND METHODS

The various botanicals (herbals) were selected based on the literature survey. The herbals required were collected from Nearby places of Pune and the Western Ghats (Tamhini, Pune).

Selection of herbs: The herbs used in the formulation of herbal lipsticks were selected on the basis of a literature survey [6].

Formulation of herbal lipstick: The standard method was followed [7]. In the present formulations of herbal lipstick blending agents (Sesame oil, almond oil, castor oil), Beeswax (glossiness), shikakai (surfactant), herbal colourant (turmeric powder, strawberry, Bixa seed colour, pomegranate, strawberry, coffee powder and Kesar), antioxidant (lemon juice) essence (vanilla, orange and rose) and gelling agent (agar and alginate) were used. All the ingredients are taken in definite ratio and six formulations [F1 to F6] and triplicates of each formulation were taken.

Quality control of herbal lipstick: It is very essential to maintain a uniform standard for herbal lipstick. So the herbal lipstick formulations were evaluated on the quality standards viz. melting point, breaking point, the force of application, surface anomalies, pH, etc. The fluorescence analysis was carried out at 254nm and 366nm wavelengths using the U.V. chamber. The microscopic examination of herbal lipstick was carried out for detecting surface abnormalities.

III. RESULTS AND DISCUSSION

Six formulations of herbal lipsticks were developed. The ingredients viz. blending agents, surfactants, colouring agents, preservatives, antioxidants, gelling agents and flavouring agents were mixed in definite proportions as tabulated in Table no.1

Table no.1 Formulation of herbal lipstick

Ingredient	Importance of ingredients	F1	F2	F3	F4	F5	F6
Castor oil	Blending agent	4.0	3.0	-	-	-	-
Sesame oil	Blending agent	-	-	12.5	-	-	10.0
Almond oil	Blending agent	-	-	-	6.0	5.0	-
Beeswax	Glossiness	9.0	9.0	3.0	6.0	7.0	5.0
Shikakai powder	Surfactant	2.0	-	1.5	3.0	2.0	3.0
Coffee powder	Colourant	-	-	-	-	-	2.0
Turmeric powder	Colourant	-	-	2.0	-	-	-
Pomegranate	Colourant	-	-	-	5.0	-	-
Bixa colour	Colourant	-	7.0	-	-	6.0	-

Kesar	Colourant	2.0	-	-	1.0	-	1.0
Beetroot	Colourant	3.0	-	-	-	-	-
Lemon juice	Antioxidant	2.0	1.0	1.0	1.0	1.0	1.0
Vanilla essence	Preservative	*	*	*	*	*	*
Orange essence	Flavoring agent	-	-	1.0	-	1.0	-
Rose water	Essence	1.0	1.0	2.0	1.0	1.0	1.0
Agar	Gelling agent	2.0	-	-	-	-	-
Pectin (Guava)	Gelling agent	-	2.0	-	-	-	-
Alginate	Gelling agent	-	-	2.0	2.0	2.0	2.0

*Vanilla essence is added 50ppm.

In the present investigation, the alginate, pectin, and agar used as gelling agents that originates from the plant materials and hardly have any side effects. These agents help to maintain the consistency of the herbal lipstick.

The evaluation of herbal cosmetics was carried out based on the quality standards tabulated in Table no.2.

Table no.2 Quality standards for herbal lipstick

Parameter	Purpose	Test
Colour	Know the exact colour shade	Match the colour of herbal lipstick with a standard colour chart.
pH meter	Know acidity or alkalinity of herbal lipstick	Use pH meter to test H ⁺ ion conc.
Skin irritation test	To test allergy	Apply herbal lipstick on the skin for 10 min. and note irritation, if any.
Melting point (M.P.)	To indicate the limit of safe storage.	Use capillary tube method. Record temperature when herbal lipstick completely melts.

Breaking point	To determine the strength of lipstick.	Lipstick is held horizontally in a socket ½ inch away from the edge of support and weight is gradually increased by a (10 g) at interval of 30 seconds. Record the weight at which break occurs.
Force of application	To test the force to be applied for application	A piece of coarse brown paper is kept on a shadowgraph balance. The lipstick is applied at 45° angles to cover a 1sq.inch area until fully covered. Record the pressure.
Perfume stability	To know the retention of fragrance	Record the fragrance after 30 days.
Surface abnormalities	To detect uniformity of surface	Record the crystallization if it occurs and the growth of fungus. Microscopic examination also carried out
Solubility test	To test solubility	Record the solubility with different solvents.

Perfume stability	+	+++	+	+	++	+
Surface abnormalities	Not Detected	Not detected	Detected	Detected	Detected	Detected
Solubility test						
Alcohol	+	+	+	+	+	+
Acetone	-	-	-	-	-	-
Chloroform	-	-	-	-	-	-
Water	++	++	++	++	++	++

The fluorescence analysis were carried out for quality control. This can be used for the detection of any adulteration or change in the formulation of the herbal lipstick.

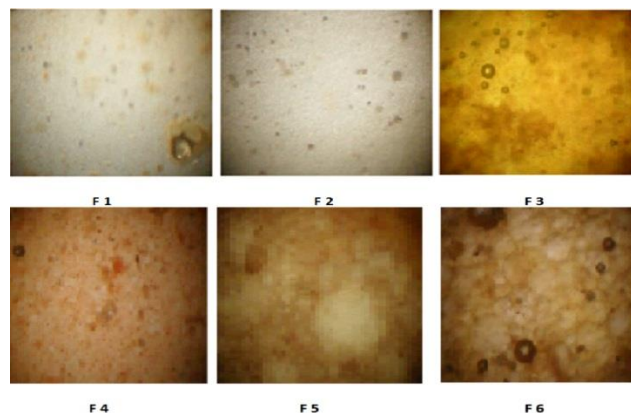


Figure 1 Formulations surface test (Seen under microscope X100)

Using the above standards, the formulations were tested, and testing was repeated three times. In Table no.3, all the results of the quality evaluation of all six formulations are shown.

Table no.3. Quality evaluation of herbal lipstick

Quality parameter	F1	F2	F3	F4	F5	F6
Colour	Brown	Orange	Yellow	Orange red	Orange	Brown
pH	7.5	7.0	6.5	7.7	7.0	7.5
Skin irritation test	No	No	No	No	No	No
Melting point	62-63	60-62	65-67	64-66	60-62	64-66
Breaking point	24	22	25	26	24	23
Force of application	Poor	Easy	Poor	Easy	Poor	Poor

Table no.4 Fluorescence test for herbal formulations

Sr no.	Formulations	254nm	366nm	Natural day light
1	F1	Greenish glaucous	Pistachio green	Brown
2	F2	Olivaceous buff	Primerose	Orange
3	F3	Malachite green	Yellow green	Yellow
4	F4	Isabellite	Dark vinaceous	Orange red
5	F5	Herbage green	Dark green	Orange
6	F6	Yellow green	Green	Brown

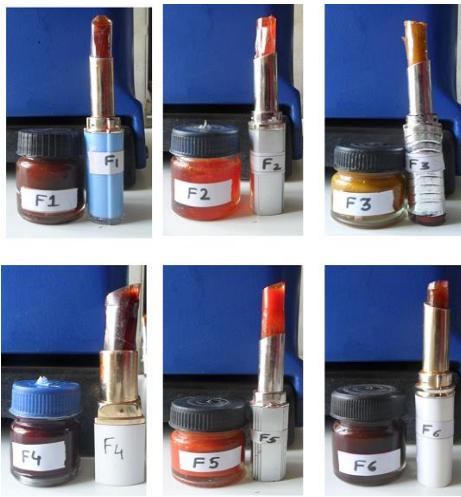


Figure 2 F.1. to F2 Formulations

Many herbal agents used in herbal lipstick have been selected by the process of 'trial and error.' The prepared formulations (Table 1) were evaluated (Table 3). It was found that the F2 (Fig. 1) was the best among the six formulations. Hence, from the present investigation, it was concluded that F2 herbal lipstick formulation is the best option for women with minimal side effects. However, there is a need for performing detailed clinical trials. The base of herbal lipsticks that are made from beeswax and herbal oils can be used for skin problems like leukoderma. In all the six herbal lipstick formulations, paraffin wax has not been used. The earlier research workers have used paraffin as the ingredient [8]. In earlier, There is now growing scientific evidence that plants possess vast and complex active phytochemicals that not only smooth lips but actively re-store, heal, and protect the lips. The pH of the herbal colorant and solubility of lipstick are two critical factors for making health

lipsticks. A glitter composition that comprises of essential oils/aroma isolates is equally important in the herbal lipstick formulations. With some modification in the herbal lipsticks, the herbal lip-gloss and lip balm can be prepared.

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