

FORMULATION AND EVALUATION OF HERBAL LIPSTICK CONTAINING AMARANTHUS CAUDATUS AS COLOURING AGENT

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ABSTRACT

Lipsticks, a widely used cosmetic product, has the major concerns associated with synthetic ingredients incorporated, such as potential toxicity and adverse health effects like allergies, dermatitis, and even cancer risks. This has led to a shift towards natural ingredients in cosmetic formulations. The present research paper discusses the historical and contemporary use of herbal cosmetics, focusing on the development and evaluation of an herbal lipstick formulation.

The text describes the formulation process of an herbal lipstick, which includes natural dye amaranth tincture and other excipients such as beeswax, lanolin, lemon juice, mustard oil and propylene glycol. This herbal lipstick aims to provide a safer, non-toxic alternative with minimal side effects.

The methodology section details the preparation process utilized to prepare the herbal lipstick. The herbal lipstick undergoes various evaluation tests, including color control, melting point, breaking point, thixotropic character, application force, surface anomalies, aging stability, solubility test, pH parameter, skin irritation test, and fragrance stability. The results indicate that all formulations exhibit good properties, such as consistent wine red color, suitable melting and breaking points, no surface defects and no skin irritation.

Keywords: Herbal Lipstick, *Amaranthus caudate*, evaluation parameters

INTRODUCTION

From the dawn of civilization, herbal cosmetics, also referred to as "natural cosmetics," have been integral in human grooming and self-presentation. Both men and women have been captivated by the allure of enhancing their appearance, and numerous herbal cosmetic products have emerged to augment beauty routines, offering a high degree of safety for the skin.¹ With advancements in science and technology, the beneficial properties of medicinal plants, used historically for nourishment and healing, have been further harnessed and explored.²

Cosmetics play a vital role in the daily routine of every woman. Herbal cosmetics constitute a category of products crafted from approved cosmetic ingredients, incorporating one or more herbal components to deliver specific cosmetic advantages.³⁻⁶

This sector represents the forefront of contemporary beauty and fashion trends, with the herbal cosmetics industry gaining prominence globally, and its diverse array of products finding markets worldwide. Although numerous cosmetic brands exist, the industry persists in expanding, introducing novel products that cater to consumer demands for premium-quality natural alternatives.⁶

The rising popularity of herbal products can be attributed to the growing preference among women for natural over chemical-laden products for personal care and beauty enhancement. This preference stems from the fact that natural products offer nourishment to the body and promote health, owing to their lack of synthetic chemicals and their generally lower risk of side effects compared to conventional synthetic cosmetics.⁷⁻⁸

The term "herb" is often associated with safety, contrasting with the potentially harmful impacts of synthetic products on human health. The popularity of herbal preparations among consumers is on the rise. Herbal remedies represent the fastest expanding sector in the realm of health improvement strategies. Consumers who opt for plant-based solutions are increasingly taking charge of their own healthcare needs. This trend is possibly due to the underutilization of effective personal health systems and the growing awareness of the side effects associated with synthetic products, leading more people to turn towards herbal alternatives.⁹⁻¹⁰

The burgeoning trend of plant-based products is transforming into a comprehensive health and beauty sector. The lips, often considered the most delicate area of our body and situated near the nose and mouth, play a crucial role in this industry. Natural scents and colorants in lipsticks are absorbed through the delicate skin of the lips and also inhaled as aromatic vapors. These selected compounds can trigger the release of neurochemicals in the brain through receptors in the mouth (lips) and nose, thereby producing the intended effect.¹¹⁻¹² In the realm of cosmetics, lipstick stands out for its safety, eco-friendliness, and health benefits, thanks to its plant-derived colors and fragrances. Nowadays, natural pigments are extensively researched and recognized as effective contributors to physical health.¹³⁻¹⁵ The applied paint must withstand sunlight, water washing and the effects of mild acids and alkalis. The demand for herbal cosmetics in the world market is growing and it is an irreplaceable gift of nature¹⁶⁻²⁰.

The ingredient in the study is *Amaranthus caudatus* of Amaranthaceae family.

Amaranthus caudatus, known as Inca wheat or love-lies-bleeding, originates from the high-altitude areas of Bolivia, Peru, and Ecuador. Grain amaranth seeds vary in their use among species - they can be sprouted, parched, toasted, ground into flour, baked, sweetened for confections, shaped into balls, cooked as porridge, or even popped.

Recently, grain amaranth has seen a revival, particularly in the health food sector. Its protein content is impressive (14–19%), featuring high levels of lysine (up to about 6% of the protein) and tryptophan. This nutritional profile is attractive to contemporary consumers, especially as these essential amino acids are typically low in cereals. Grain amaranth is evolving into an energy-rich food, combined with traditional cereals in various products like breakfast foods, bread, multigrain crackers, pastes, pancake mixes, and even as a popped snack. However, popping may alter its nutritional quality. The grain is easily digestible, and heat processing enhances this digestibility.

Amaranth starch, which constitutes up to 69% of the grain, mainly consists of amylopectin. Its granules are smaller (1–3 μm) compared to those of cereals (3–30 μm), resulting in higher solubility and gelatinization temperature, which produces a unique gel. The seed can contain up to 10% oil, including squalene, used in cosmetics. However, amaranth also has antinutritional factors like trypsin inhibitors, at levels up to double those found in wheat.²¹⁻²²

The purpose of present research was to formulate and evaluate an herbal lipstick using natural dyes such as amaranth dye. In addition to various natural ingredients such as beeswax, lanolin, lemon juice, mustard oil and propylene glycol, herbal lipstick was used. The prepared herbal lipstick was evaluated based on various evaluation tests such as color, texture, breaking point, melting point, spread ability, surface irregularities, aging stability, pH parameter, solubility test, skin irritation test, fragrance stability and marketed standard formulations.

MATERIAL AND METHODS

All the ingredients (amaranth dye, beeswax, lanolin, lemon juice, mustard oil and propylene glycol) of laboratory scale were collected. Four different quantities of mustard oil and bees wax were used to obtain the best formulation. The details of ingredients used are given in Table no. 1.

Table no. 1 Details of herbal ingredients used

Sr no.	Ingredients	Properties	Quantity Taken			
			F1	F2	F3	F4
1.	Mustard Oil	Blending agent	10 ml	12 ml	13 ml	15 ml
2.	Bees wax	Hardness and glossy	20 gm	22 gm	23 gm	25 gm
3.	Lemon flavor	Flavoring agent	01 ml	01 ml	01 ml	01 ml
4.	Lanolin	Softening agent	12.5gm	12.5gm	12.5gm	12.5gm
5.	Amaranth tincture	Coloring agent	2 gm	2 gm	2 gm	2 gm
6.	PropyleneGlycol	Moisturizing agent	5 ml	5 ml	5 ml	5 ml

METHODOLOGY

Raw materials such as oil, beeswax, lanolin were melted in a separate stainless steel container. The oils and beeswax were then mixed. Then lanolin and lemon flavor were added. This mixture was mixed with color pigments. After the pigment mass was grounded and mixed, it was added to the hot wax until a uniform color and consistency is achieved. When the lipstick mass was mixed and free of air, it was ready to be poured into tubes. The molten mass was divided into a mold with a metal base and a mold tube. The lipstick was poured upside down so that the bottom of the tube rests at the top of the mold and the excess material was scraped off. The formulation was cooled and separated lipsticks were sealed. The lipstick goes through a flame test to close the pores and give the product a finish.²¹



Figure no. 1 (a) F1 (b) F2 (c) F3 (d) F4

EVALUATION

The evaluation of herbal lipsticks was performed by following methods and their results are mentioned in Table no. 2.

- **Color Control:** Controlling lipstick colors is critical and Colorimeter equipment is used to check the shade of lipstick.
- **Melting point:** Determining the melting point is important because it indicates a safe storage limit. The melting point of the finished lipstick was determined by the capillary tube method, the capillary was filled, kept in the capillary apparatus, and first it was observed that the product was ground slowly-slowly. Sometimes the product melted completely after tracking. The above procedure was carried out 3 times and the melting temperature ratio was observed in all formulations.
- **Breaking point:** The breaking point is determined to determine the strength of the lipstick. The lipstick was held in a horizontal slot $\frac{1}{2}$ inch from the edge of the support. The weight was gradually increased by a certain value (10 g) at certain intervals of 30 seconds, and the breaking point was taken as the weight at which pauses are made.
- **Thixotropic Character:** It shows thixotropic quality and was done by penetrometer. A standard needle of a certain diameter was allowed to pierce for 5 seconds under a load of 50 g at 25 °C. Penetration depth is a measure of the thixotropic structure of the lipstick.
- **Force of application:** This is a test that compares the force applied in the application. A thick piece of brown paper was held in the balance of the shade chart and the lipstick was applied at a 45° angle to cover an area of 1 square inch until it was completely covered. The pressure reading indicates the driving force.
- **Surface Anomalies:** It was examined for surface defects, for example, no crystals, contamination caused by molds, fungi, etc. on surfaces.
- **Aging resistance:** The product was kept at 40°C for 1 hour. Various parameters such as leakage, surface crystallization and ease of use were observed.
- **Solubility Test:** The herbal lipstick formula was dissolved in different solvents to check solubility.
- **pH parameter:** The pH of the herbal lipstick was determined using a pH meter.
- **Skin irritation test:** This was done by applying the product to the skin for 10 minutes.
 - **Fragrance stability:** The herbal lipstick formula was tested after 30 days to maintain the fragrance²²⁻²³.

Table no. 2 Results of Evaluation of herbal Lipsticks

Sr. No.	Evaluation Parameters	Inference			
		F1	F2	F3	F4
1	Color	Wine red	Wine red	Wine red	Wine red
2	Melting Point (°C)	60-30	62-64	59-61	61-62
3	Breaking Point (gm)	30	32	31	30
4	Thixotrophy Character	10.1	10.4	10.4	10.0
5	Force of application	Poor	Good	Easy	Easy
6	Surface anomalies	No defect	No defect	No defect	No defect
7	Aging stability	Smooth	Smooth	Smooth	Smooth
8	Solubility test	Chloroform	Chloroform	Chloroform	Chloroform
9	pH parameter	6.43±0.3	6.9±0.22	6.89±0.12	6.72±0.13
10	Skin irritation test	No	No	No	No
11	Perfume Stability	++	+++	++	+

RESULTS AND CONCLUSION

The evaluation parameters of herbal lipsticks suggest that the Formulation F2 with Mustard oil (12ml) and beeswax (22 gm) was the best formulation. It has Wine red colour with no skin irritation. The melting point of F2 formulation was found to be in range of 62-64°C. It was easy to apply the lipstick and it had no surface anomalies. It had the best perfume stability as compared to other formulations.

Initially, the article outlines the evolution of cosmetics from natural to synthetic products, highlighting the growing preference for herbal products due to their safety and fewer side effects. It emphasizes the rising popularity of herbal cosmetics in the global market and the increasing consumer demand for natural, non-toxic products.

The conclusion emphasizes the growing concern about the harmful effects of synthetic chemicals in cosmetics and the importance of developing safer alternatives. The study concludes that the formulated herbal lipstick is a better option for women, offering minimal side effects and aligning with the increasing preference for natural, health-conscious beauty products.

In recent decades, women's use of cosmetics has grown greatly. However, the dangers posed by these chemicals have come into focus very recently²⁴⁻²⁶. The goal of the current herbal lipstick formulation and evaluation was to create a lipstick that uses herbal ingredients in hopes of minimizing the side effects of existing lipsticks.

Hence from present investigation it was concluded that the formulated herbal lipstick has better option to women with minimal side effect.

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