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PREPARATION AND EVALUATION OF LIPSTICK BY USING DIFFERENT RATIOS OF OILS AND WAX BASES

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Abstract
Formulations for lipstick are used to enhance the appearance of lips. Natural elements like colors, waxes, oils, and emollients were used to create lipstick, a cosmetic product. There are several different types of lipstick that are only worn by women. Pink lipstick is created by blending red and white titanium dioxide. The two types of pigments utilized are organic and inorganic. One of the main cosmetics that women use is lipstick. The primary topics of this review include lipstick, natural waxes, evaluation, and lipstick flaws.

INTRODUCTION

Cosmetics are compounds that are used to enhance feminine look, and they represent one of the most prosperous global industries. Numerous new cosmetics products that are superior to earlier models are created every day. Lotions, powders, lipsticks, and other products are examples of cosmetics. Both emerging and developed nations have a high need for deodorants, infant goods, bath oils, bubble bath, bath salts, butters, and other products [1]. The term "cosmetics" refers to an external preparation that is meant to be rubbed, poured, sprinkled, sprayed, inserted into, or otherwise applied to the human body or any portion of it for washing, beautifying, boosting attractiveness, or changing the appearance.

Science and technological advancements are fueling the expansion of the beauty business by enabling the development of new cosmetics. Lipstick is one of the cosmetics products that are used to improve the appearance of the human body and plays a significant part in this business [2]. For millennia, lipstick has been a recognizable cosmetic. Lipstick has practically always been a part of women's purses because it allows the user to alter the lip outline and the external perception and aesthetic impact of mouth form and texture. Smooth lips, shiny lips, shiny lips, and moist lips can all be achieved with simple cosmetic application. Lipstick cans can significantly modify the user's perceived facial traits when applied skillfully [3]. It is responsible for changing the natural appearance of the lips, giving them a different and lively look, as well as a different color and glow. It is made of a combination of oils, waxes, pigments, and antioxidants. Without a doubt, the color of any lipstick is its most eye-catching feature [4].

Lip coloring is a long-standing custom that dates to the Paleolithic era. The use of this product has grown in recent years, and the variety of color and texture options has changed and gotten wider [5]. There has been a discernible trend towards glossy effects in recent years. To give the lips a better shine, oil bases were utilized. In order to accommodate the wide range of needs resulting from skin and hair color, fashion, and the age range of the intended user group, a modern lipstick range will include numerous shades of true red in addition to rose, pink, and coral tones. Lipsticks are often given in a small number of variations on the cylindrical shape, in a wide variety of more or less sophisticated containers, and weigh about 5–6g on average. Although a brush can be used to advantage to provide a smooth contour, especially when applying the gentler type of stick, the latter are specifically made to protect the substance and ease direct application to the lips [3].

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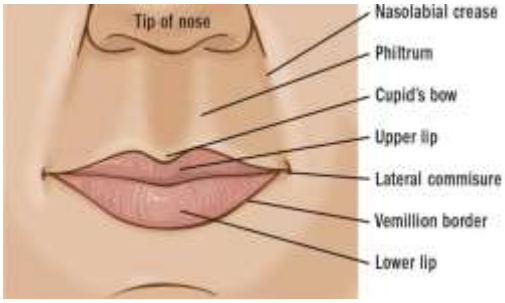

Figure 1. Anatomy of lips

The lips function as a prehension, suction, and speaking organ. The margins of the lips are covered with dry, red mucous membrane that is continuous with the skin and contains numerous vascular papillae and touch corpuscles. It is made up of the skin, superficial fascia, orbicular, a muscle, and the muscles inserted around it (areolar tissue and mucous membrane). The mucous membrane produces superior and inferior folds in the median line and is internally reflected from the upper and lower lip onto the gums. The coronary arteries that completely encircle the buccal orifice close to the free margin of the lips are found in the areolar tissue or submucous layer. The face region gives rise to the coronary arteries. A tiny artery exits from the superior coronary, which is larger than the inferior and anastomoses with its partner on the other side, to the septum arterial septi nasi.

Nasal bleeding can sometimes be controlled by compressing this artery. The integument, the mucous membrane, and the fascia of the lip and chin are all served by the lower lip's nerve, which emerges from the mental foramen. While some of the lymphatic vessels in the lips travel to the submaxillary glands, others travel to a gland located just above the hyoid bone's body. In the submucosal layer of the lips, close to the mouth's entrance, are the labial glands. They expel a mucus substance. Cysts of mucous retention form when the ducts of these glands are blocked.

When exposed to cold, dry air, the skin on the lips has a tendency to dry out and form tiny cracks, which makes this unique skin extremely sensitive to other external influences. Lips must therefore be accorded special affliction and protection. The perfect lipstick should taste neutral and be simple to apply. Lips should be left smooth and supple after applying a light amount of pressure to the stick, and the fat film should not be greasy, sticky, or prone to smudging[6].

INGREDIENTS

Beeswax

Beeswax has long been used as a traditional lipstick stiffener and is still widely used today. Lipstick will lack gloss if used as the only wax and will take longer to apply. It is a wax that has been purified and removed from the honeycomb of bees called Apis mellifera, members of the Apididae family. 70% of the ingredients in beeswax are ester myricyl palmitate. Water is incorporated into beeswax to create an emulsion.

Paraffin wax

Molecular formula: Paraffin is made from petroleum or shale oil and is a purified mixture of solid saturated hydrocarbons with the general formula CNH2N+1.

Characteristics:

- Paraffin is a transparent, colorless, or white substance that has no flavor or odor.
- It has a slight greasy feeling to the touch and could be fractured brittlely.
- Microscopically, it is a mixture of bundles of microcrystal
- Paraffin burns with a luminous, sooty flame. When melted, paraffin is essentially free from fluorescence in daylight; a slight odor may be apparent.

Hard paraffin:

It is a refined blend of hydrocarbons that were extracted through distillation from petroleum or shale oil. It is used to stiffen or harden the bases of ointments and is a colorless or white transparent, odorless substance.

Cetostearyl Alcohol

Molecular formula: Cetostearyl alcohol has the molecular formula: It is a combination of solid aliphatic alcohols, primarily stearyl (C18H38O) and cetyl (C16H34O) alcohols. While the ratio of stearyl to cetyl alcohol varies substantially, it typically contains 50–70% stearyl and 20–35% cetyl alcohol, with pharmacopeial restrictions.

Characteristics:

- Cetostearyl alcohol is found as unctuous masses that are white or cream in color, or as virtually white flakes or granules.
- There is a slight sweet aroma to it.
- Cetostearyl alcohols melt when heated and become a transparent, colorless, or pale-yellow liquid without any suspended particles.

Fats:

Lanolin

Molecular formula: The pure wax-like material extracted from sheep's wool is referred to as lanolin by the USP. Ovis aries Linne, after cleaning, decolorizing, and deodorizing. Family Bovidae. The PhEur defines up to 200ppm of butylated hydroxytoluene as an acceptable antioxidant, and it may comprise 0.02% w/w of an appropriate antioxidant and not more than 0.25% w/w of water.

Characteristics:

- Lanolin is a waxy material that is unctuous, pale yellow in color, and unremarkable in scent.
- Melted lanolin is a transparent to nearly clear liquid that is yellow.

Oils:

Castor oil

Molecular Formula: $C_{57}09H_{110}$(939.50).

This oil is made from the Euphorbiaceae family member Ricinus communis seeds.

Being one of the most useful oils and a key component of many contemporary lipsticks, castor oil stands out among vegetable oils due to its high viscosity, the presence of a hydroxyl group in the acid portion, and its solvent powder for bromo acid.

Castor oil's high viscosity helps to delay the dispersal of pigments from molten lipstick mass and reduce the potential for applied lipstick to spread and run off. It has drawbacks since they slow down oil absorption into lumps of dry pigment during mixing and give the lipstick a drag-like sensation when applied.

COCONUT OIL

The dried kernel of copra, which contains 60–65% oil, is crushed to create it. Lower chain fatty acid glycerides are abundant in coconut oil. Coconut oil is made from the fruit or seed of the Arecaceae-family coconut palm tree Cocos nucifera. Since coconut oil is easily usable in liquid or solid form and has a melting point of 24 to 25°C (75-76°f), it is frequently used in baking and cooking. Coconut oil does wonders to soften and hydrate the skin. It is a white solid with a consistency similar to butter that is used in the production of soap, as a cosmetic, and as a butter substitute.

Glycerin

Numerous pharmaceutical formulations, including those for oral, ocular, topical, and parenteral use, contain glycerin. Additionally, it is a food additive and is used in cosmetics. Glycerin is largely utilized for its humectant and emollient qualities in topical medicinal formulations and cosmetics.

Characteristics:

- Pure glycerin decomposes on heating with the evolution of poisonous acrolein, however under normal storage circumstances it is not susceptible to oxidation by the atmosphere. Chemical stability exists in glycerin and water, ethanol, and propylene glycol mixtures.
- If glycerin is kept at low temperatures, it can crystallize; the crystals won't melt until the temperature is raised to 20°C.
- Glycerin needs to be kept dry and refrigerated while being stored in an airtight container[4].

Propylene Glycol

Source: C_3H_{802} (76.1)

The purity of propylene glycol (PG), also known as monopropylene glycol, is stated as being at least 99.8%. PG serves a range of functions and is a crucial excipient utilized in numerous formulations. It is tasteless, odorless, and has a very faint, unobtrusive distinctive taste. Due to these characteristics, propylene glycol excels as a flavoring and dye solvent in cosmetics, toothpaste, shampoo, and mouthwash. It serves as a wetting agent for natural gums and a solvent for aromatics in the flavor concentrate industry. It serves as a solvent and is a crucial component in the compounding of citric and other emulsified flavors in pharmaceutical preparations such elixirs, lotions, shampoos, creams, and other like products. As a solvent, it is employed. It is utilized as an emulsifier in cosmetic and pharmaceutical creams because it is a highly effective humectant, preservative, and stabilizer.

Characteristics:

- Propylene glycol is stable at cool temperatures in a tightly closed container, but at high temperatures, out in the open, it has a tendency to oxidise and produce compounds such propionaldehyde, lactic acid, pyruvic acid, and acetic acid.
- When combined with ethanol (95%), glycerin, or water, propylene glycol is chemically stable. Aqueous solutions can be autoclaved to kill bacteria.
- Because propylene glycol is hygroscopic, it should be kept in a tightly closed container that is shielded from light and kept in a cool, dry location[4]

Coloring agents:

Cosmetic coloring ingredients must deliver the desired tone and intensity. Strong coloring effects are advantageous because they enable the achievement of the desired outcome with the least amount of dye. The preparation should aim for maximum tone and intensity. The color is applied to the lips in two ways: first, by staining the skin with a dye solution that can penetrate the lip's outer layer of skin, and second, by coating the lips with a colored layer that serves to disguise any roughness in the skin and provide the appearance of smoothness. Soluble dyes satisfy the first condition, whereas insoluble dyes and pigments, which increase or decrease the film's opaqueness, satisfy the second. The colors must come from the certified dyes list under the Drug and Cosmetic Act. The soluble dyes (soluble in alcohol, water, or oil) and the insoluble pigments are the two categories of coloring compounds used in cosmetics.

Figure 2. Color palette of lipstick

METHODOLOGY

Plant material:

Beta vulgaris, also referred to as beetroot, is a plant that was obtained at a local market in Rangpo, East Sikkim, India and used in the formulation of lip balm. The primary component of the red colorants obtained from common beet is betaine. The roots are normally deep red-purple, but there are many other colors available, including golden yellow and red and white striped. To get rid of any traces and impurities, the beetroot sample was washed under running water. To prepare it for use later, the clean sample was dried using cloth paper.

Preparation of beetroot extract:

By macerating 250 grammes of beetroot in 1000 mL of n-hexane for three days, an extraction was produced. The solvent was evaporated in the following step using a standard evaporator at 40 to 50°C for 75 minutes. The extract was then concentrated for 15 hours at a temperature of 400°C in an oven. Beetroot extract weighing 1.2 grammes was obtained for use as a coloring agent.

Preparation of lip balm:

The lipstick was created using the standard procedure. In a nutshell, all waxes, including beeswax, hard paraffin, and cetostearyl alcohol, were heated together in a porcelain dish over a water bath in sequence of decreasing melting point. Castor oil and coconut oil were then added, combined, and cooked. Lanolin was heated in a separate porcelain dish until it melted and became pourable, and it was then added to the mixture of melted waxes and oils. Finally, the necessary amounts of coloring and flavor were added and carefully blended. The excess mixture was then put into a lipstick mold, which was then maintained in an ice bath. After solidification, the excess was removed with a knife. Lipstick was taken out of the mold and used for additional assessment.

Evaluation of lipstick:

1) Melting Point: The limit of safe storage is indicated by the melting point, which must be determined. The capillary tube method was used to determine the melting point of lipstick formulation. On a water bath with an adjustable temperature, the capillary tube was filled and submerged. The temperature at which the substance slowly melts out of the tube is known as the melting point. To determine the average and consistency, this process was repeated three times.
2) pH parameter: The permitted ranges of the products to be applied safely on the lips are determined by the pH stability profile and the safe pH range for lipsticks. The solubility of components is influenced by pH, and this can change a product's physical and microbiological stability. Using a pH meter, the pH of the lipstick formulation was identified. Three times were used to perform it. The skin barrier can be damaged by extreme pH. Lips in good health have an average pH of 4.7.
3) Skin Irritation Test: To evaluate the safety of the formulation and base, the lipstick formulation was applied to human skin and left on for 10 minutes. Itching, irritability, and redness were all noted as symptoms.
4) Rancidity Test: The process of rancidity is the oxidation of oils and fats that occurs when they are exposed to moisture, air, or even light. It serves as a sign of the reliability and quality of the product.

   Kries Test ingredients include concentrated HCL, chloroform, 30% solution of TCA in glacial acetic acid, ethanol, and 0.1% phloroglucinol solution (0.1gm in 150ml of diethyl ether, newly made).

   - Qualitative Shake 5ml of the oil, 5ml of a 0.1% phloroglucinol solution in diethyl ether, and 5ml of the concentrated HCL vigorously for the test. Give the food 10 minutes to stand. A pink hue denotes the beginning of rancidities.
5) Microbiological Test: A conical flask containing 200 mL of distilled water and 4.5 grammes of agar was autoclaved for 15 lbs. at 121 °C. A petri plate containing 20mL was filled and incubated for 20–30 minutes. The para flame was then applied, and it was stored for 24 hours. Following that, the lipstick was applied, and after being left outside for 7 days, microbial development was noticed.
6) Homogeneity test: To perform a homogeneity test, apply lip balm to a piece of flat, clear glass.
7) Test Appearance: the color, texture, and smell of each lipstick dosage during storage at room temperature on days 1, 5, 10, 15, and 20 was used as the organoleptic test.

RESULTS AND DISCUSSION

Table 1: Melting point

Formulation	Melting point (°C)	Time
F1	60.5	4 min 30 sec
F2	61	4 min 1 sec
F3	53.5	2 min
F4	57.5	2 min 56 sec
F5	56.5	2 min 43 sec
F6	58	2 min 15 sec
F7	53.5	2 min 27 sec
F8	54.5	2 min 14 sec
F9	53	1 min 59 sec

Comparatively F1 F2 melting time as well as temperature is more than others because beeswax used in this two is more than others and coconut oil and hard paraffin is not used ,In F3 F4 F5 F6 F7 F8 melting time somehow near about 2 to 3 mins but temperature variation is there for F4 and F6 ,its found that beeswax and hard paraffin ratio is more than others formulation whereas coconut oil, castor oil and glycerin ration is lesser than other formulation and in F9 coconut oil, castor oil, glycerin ratio is more than others and hard paraffin and beeswax ratio is lesser than other so melting point and time both is lesser than other formulation so after study it shows different melting point and time depending upon the characteristics of different ingredients .

Before preparation rancidity test performed for the oils and it passed, after making the formulations it gives homogeneous texture and passed the microbial test as well. Ph is also observed optimum for use and it shows no side effect like rash, itchiness, red patch after use.

CONCLUSION

In numerous lipstick formulations, the colorful pigment from Beta vulgaris' beetroot extract can be employed successfully as a natural colorant. The main goal of the formulation, according to the comparison study that has been conducted, is to achieve a combined effect of both tint and moisturizing effect in a single preparation. It was discovered that adding more oil increases the formulation's moisturizing properties, but adding too much oil can cause the formulation to break down. Therefore, for a superior lipstick formulation that can provide an attractive color while having a desired moisturizing effect, the quantity of oil and waxes should be utilized in the right ratio.

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