## Original Research Article Formulation of lipstick from the Rhodamine B in cosmetic formulations

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## Abstract

Cosmetics are preparations used to enhance the arrival and cowl up flaws in the skin, which include blemishes on the pores and skin in order that the consumer looks more energizing. Examples of cosmetics include lipstick, blusher, eye shadow, and so forth, which might be usually given the addition of synthetic dyes including rhodamine B. Natural beauty is in growing demand within the world market as these are the priceless gift of nature with greater pastime and lesser or no aspect results. So, in gift research paintings this challenge changed into carried out for the education of natural lipstick. first of all, the extract of flower of Rhodamine B as a colorant, have been implemented for the formula of natural lipstick in combination with bees wax, Coconut oil, Acacia, Castor oil, Turmeric powder, Lemon juice. The formulated lipstick successfully evolved on the premise of melting factor, solubility, or consistency, pores and skin irritation. From the prevailing investigation it became found that that the Rhodamine B giving promising effects consisting of, melting point 210°C, Rhodamine b is soluble in water and the display absorbance at 555 nm. The results of the precision checking out indicated that the percentage RSD changed into less than two thirds. The take a look as it's qualitative evaluation found out that all of the samples examined negative for rhodamine B. in step with this take a look at, UV-visible spectrophotometry is a reliable technique for determining the amount of rhodamine B present in lipstick. The method developed changed into cost-effective solvent are précised, correct and may be applied to quantify rhodamine b in marketed lipstick formula. **Key words:** Natural beauty, lipstick, rhodamine B, Cosmetics.

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#### Introduction

Perfumes (which includes perfumes), Cosmetics for skin care (which includes face cream, skin lotions, skin milk, and cleansing creams), Hair care products (which includes hair dyes, shampoos, and hair treatment lotions), and makeup (which includes foundation creams, lipsticks, and eye makeup) are the categories into which cosmetics are divided[1]. There was a speedy extension of allopathic device of medical treatment in our use for the duration of the beyond century. However, those drugs have destructive effect and those are going back to nature with wish of protection and safety. Alternatively, herbs are secure, inexpensive, without difficulty to be had and without a fear of any aspect results. It is obtrusive that many valuable natural drugs were determined by knowing that precise plant became used by the ancient folk healers for the remedy of a few form of ailment. Moreover, the medicinal plant wealth is our national history and it appears to be the first and major line of defence for the treatment of various diseases primarily in tribal and rural groups[2].

Castor oil, paraffin wax, beeswax, beet root juice, ripe fruit powder of shikakai, lemon oil, orange essence, and vanilla essence are often used materials in the formulation of herbal lipsticks. Nonetheless, prior research suggests that there is a slight variation in the components utilized to make lipsticks[3]. The Ericaceae family tree genus Rhododendron, or *Rhododendron arboreum*, is commonly known as the "red tree" and serves as a home for both deciduous and evergreen trees. It is native of North Temperate Zone, grows especially in moist acidic soil of Himalayas and Southeast Asia and is also the state tree of Uttarakhand. Their flower are funnel shaped and occurs in wide range of colours like yellow, white, pink, scarlet, purple and blue[4]. It possesses various health benefits such as prevention and treatment of diseases associated with heart, dysentery, diarrhoea, detoxification, inflammation, fever, constipation,

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bronchitis, asthma, antioxidants and as an immunity booster[5]. Lipstick is one of the most well like cosmetic. It is a cosmetic product containing pigments, oils, waxes and emollients that apply colour, texture and protection to lips. It is essentially a dispersion of colouring material in a base made of an appropriate ratio of fats, oils, and waxes, together with appropriate flavours and scents, all moulded into the shape of a stick and sealed in a case[6].

#### Translabial drug delivery system

It describes the administration or absorption of medication through the labial or lip mucosa. This method offers the most direct access to target diseases as well as a variety of lip diseases and disorders, and it is also the most easy and painless. Longer-lasting localized and systemic medication activity in the oral cavity is made possible by this approach. The dosage may be significantly lowered; however, this will depend on the negative effects. It might result in a more consistent plasma level. This method's main benefit is that it avoids the liver's initial metabolism, which increases the medication's therapeutic efficacy. The labia mucosa offers greater drug permeability than skin because it is heavily perfused with blood vessels[7].

Lips: are fleshy folds covered externally with the aid of skin and internally by using mucus membrane and it bounds the oral fissure. The higher and decrease lips are known as the "Labium superius oris" and "Labium inferius oris" respectively. The junction where the lips meet the surrounding pores and skin of the Mouth vicinity is the vermilion border and the usually reddish vicinity in the borders is referred to as the vermilion region. The mucocutaneous junction lies at the threshold of lip are purple partially due to the fact. The pores and skin translucent and in part of the vascular papillae or thelia are surprisingly lengthy were the mucosal floor is visible. The vermilion border of the higher lip is called the cupids bow. The fleshy protuberance placed within the centre of the top lip is atubercle known through numerous terms which includes the procheilon (also spelled prochilon), the "tuberculum labii superioris", and the "labial tubercle". The vertical groove extending from the procheilon to the nasal septum is called the philtrum. The pores and skin of the lip, with three to 5 mobile layers, could be very thin in comparison to common face skin, which has up to 16 layers[8].

#### Signs of lip problems

Lip signs and symptoms encompass lip dryness, cracking, ache, numbness, sores and swelling. If lip pain is gift, it could be described as sharp, dull, stabbing, burning or throbbing. Also enjoy lip symptoms because of damage, consisting of biting your lips or burning them with hot meals. In different instances, your lip symptoms may be associated with a chronic scientific condition, such as anemia or infection with herpes simplex virus[9].

## Kinds of lipstick

Relying on the thickness of cosmetic merchandise, there may be many sorts including lipstick, lipstick, lipstick and liquid lipstick. By the wide variety of secondary capabilities lipsticks may be divided into:

- Matte Lipstick: gives a flat, non-bright end and has a tendency to be lengthy-lasting.
- Cream Lipstick: gives a creamy texture with a chunk of shine, providing hydration to the lips.
- Satin Lipstick: Combines the richness of matte with a subtle sheen, presenting a smooth end.
- Gloss Lipstick: offers a excessive-shine end for a moist appearance and is often extra sheer in coloration.
- Sheer Lipstick: gives a translucent coloration, permitting the herbal lip colour to expose through.
- Lip Stain: offers a long-lasting tint to the lips, giving a herbal and diffused look.
- Liquid Lipstick: is available in a liquid shape, drying to a matte or semi-matte end for long-lasting put on.
- Metallic Lipstick: incorporates metal pigments for a shimmery and reflective finish.
- Pearl/Frost Lipstick: gives a frosted or pearlized finish with a barely metallic shine.
- Hydrating Lipstick: Infused with moisturizing components to keep lips hydrated, often with a satin finish.
- Lengthy-wearing Lipstick: Formulated for extended wear, resisting smudging and fading during the day.
- Lip Crayon: A pencil-like lipstick that is simple to use and often provides a matte or satin finish.
- Two-Tone Lipstick: functions two complementary sun shades in a single bullet, growing a gradient or ombre impact.
- Colour-converting Lipstick: Reacts with the pH of your lips to create a custom coloration based for your pores and skin's chemistry.

Velvet Lipstick: gives a clean and gentle finish, sitting among matte and cream lipsticks in terms of texture[10].

## Method of preparation

Lipstick production varies very slightly depending on the type of ingredients used.

- a) The moulding technique: This may be recommended as a common practice for lipstick preparation. Phase A, B, and C ingredients are utilized in the manufacture of lipstick. Phase A consisted of waxes, Phase B included dyestuff and other oils, and Phase C included preservatives and other additives. After heating phase, A to 80 °C, phase A was gradually filled with each item from phase B. The Paraben was cleaned of the phase A and B mixture. After adding phase C and heating, the mixture was poured into the lipstick moulds
- b) To get ready gel lipstick: Heat phase A to 200 °C, heat phase B to 100 °C separately, and thoroughly disperse the pigment in phase B before adding it to phase A. In a water bath, the waxes are typically melted in decreasing order of melting point to produce the wax phase (phase A). Taking into consideration the melting points of such waxes, an appropriate temperature should be employed. The water bath temperature used in the lipstick preparation should be based on the greatest melting point of any wax component[11].
- c) Pigment premilling: step one involved in the components of herbal lipstick is pigment pre milling in which the agglomerates in the powder are broken down to provide the lipstick a homogeneous smoothness and even colour.
- d) Melting and mixing: the following step worried is the melting and mixing stage, considering waxes are stable at room temperature and can't be combined with different components to make the waxes melted simple to make this technique. Typically it can be combined with oil, and the pigment and other components are brought and combined to shape a homogeneous substance to the melted foundation.
- e) Flaming: is the ultimate level wherein the lipstick passes through the flame, is commonly held and twisted within the flame for as much as a 2nd after which removed to prevent melting and dropping. Form to acquire a sparkly end after which placed in the bottle. Unique formulations are made from test 1 to test five to discover the advanced lipstick with colorant and oil as variable parameter[12].



Figure 1: Procedure to formulate lipstick

## Materials and methods

Preparation of lipstick containing rhodamine B

	Table 1: List of ingredients					
S. No I		Ingredients	Role			
ſ	1	Bee's wax	Thickening agent			
ſ	2 Castor oil		Hydration			
ſ	3	Coconut oil	Moisturizing agent			
ſ	4	Acacia	Binder			
	5	Rhododendron extract	Colouring agent			

## Different ingredients used with there specific mode of action

- 1. **Rhodamine B:** The rhodamine B works as a colouring agent and gives a pleasant and attractive colour to lipstick. Which helps the lipstick to be picked easily in the market. The colour in the lipstick provides a shiny texture to the lips.
- 2. Castor oil: Castor oil is a humectant, which means it allows save you water loss from the skin's outer layer. This continues lips hydrated and soft.
- **3.** Coconut oil: Coconut oil's emollient properties assist keep lips tender and supple with the aid of locking in moisture.
- **4. Olive oil:** olive oil provides the glossy texture to the lips. It provide extra protection to dry and clapped lips.
- 5. Bee's wax: It helps the to provide the lipstick strenght. The bees wax use das a thickening agent for the lipstick.
- 6. Vanilla essence: It works as a flavouring agent for the lipstick. Which also helps to mask the unwanted odour of formulation.
- 7. Lemon juice: It works as a Anti-oxidant for the formulation. Antioxidants help guard skin cells from damage and getting old and might enhance pores and skin texture and look.

**8.** Liquid paraffin: It helps to harden the lipstick. Works as a hardner for the formulation[13].

## Method of formulation of lipstick containing rhododendron

- 1. In this procedure, Bee's wax was melted in a beaker on a heating mantle adjusted to 70  $^{\circ}$ C.
- 2. Almond oil and coconut oil (oil phase) was melted in a beaker placed on a heating mantle at a temperature of 70 °C.
- 3. After mixing of oil phase mixture is cooled and then acacia is added in oil phase and mixed properly.
- 4. Rhododendron extract (colouring pigment) were added to the oil phase until a uniform combination was achieved.
- 5. After that, it was combined with the wax phase during the same temperature.
- 6. The molten solution was placed into lipstick moulds once it had been prepared. After the process of solidification, it was removed from the moulds and placed in the lipstick case[14].

Table 2:	Formu	lation	Tabl	e
				-

Ingredients	F1	F2
Rhododendron	2ml	8ml
Bee's wax	1gm	1gm
Coconut oil	1.5ml	1.5ml
Acacia	-	1gm
Castor oil	1ml	1ml
Turmeric powder	2gm	2gm
Lemon juice	2ml	2ml

# Rhododendron flower anthocyanin extraction technique gathering of botanical specimens

- In March 2024 rhododendron blossom were picked. The bloom from Tungnath belt Uttarakhand.
  - Biological source: flowers of the rhododendron
- Ericaceae family
- The Uttarakhand region of the Tungnath belt is home to rhododendron. The whitening and softening properties of its plant extracts were utilized in the manufacture of herbal lipstick.

#### Method of extraction

- 1. The rhododendron flower was air dried for several days in the sun.
- 2. Dried flowers were put in the grinder and a fine powder was prepared.
- 3. After grinding, the powder was kept in a flask containing ethanol and water for 24 hrs.
- 4. The extract solution was filtered and evaporated and used to prepare lipstick.



Figure 2: Extract of rhododendron

#### **Determination of percentage of rhodamine B in marketed lipstick** Selection of solvent

- 10mg rhodamine is added in 100ml distilled water
- Rhodamine b is soluble in water and the show absorbance at 555 nm.

## Preparation of standard stock solution

- A 100 ml volumetric flask containing 10 mg of rhodamine B was used to make the stock solution.
- Make up the volume of volumetric flask with distilled water.

#### Solubility

The amount of a substance with the intention to dissolve in a given quantity of every other substance and is generally expressed as the number of elements by way of weight dissolved by way of one hundred elements of solvent at a special temperature and strain or as percent by means of weight or through volume[15].

Table 3: Solubility			
Name of Solvent Solubili			
Distilled water	Soluble		
Methanol	Soluble		

## Determination of 3 max

0.1N Acetic acid glacial	Soluble
0.1N Nitric acid	Soluble

#### **Results and discussion Preformulation studies**

Physical appearance: Reddish-violet in colour.

#### Melting point

The melting point of the drug rhodamine B was determined by capillary tube method and its melting point was found to be at 210°C, 211°C, 209°C.

## Solubility studies

The solubility profile of rhodamine B was detrmined in different solvent including distilled water, Methanol, 0.1N Acetic acid galcial, 0.1N Nitric acid. The observed solubility was similar to standard solubility as shown in table.

## Standard curve data of rhodamine B by uv- spectroscopy

The calibration curve rhodamine B was linearly regressed and equation for linearity was calculated by UV- spectroscopy. This reveals a positive correlation between concentartion and absorbance.



Figure 3: 1 max of Rhodamine B at 555 nm

Table 4: Linearity					
S. No	Conc (µg/ml)	Absorbance			
1	0.0	0			
2	0.2	0.1583			
3	0.4	0.383			
4	0.6	0.5613			
5	0.8	0.7611			
6	1.0	0.9304			



Precision

Table 5: Precision						
Conc.	Absorbance			Mean ± SD	%RSD	
(µg/ml)	0 hrs	3 hrs	6 hrs			
2	0.3252	0.3345	0.3578	$0.3392 \pm 0.0137$	0.04695	
3	0.4467	0.4566	0.4687	$0.6328 \pm 0.00954$	0.01197	
4	0.6612	0.6634	0.6756	$0.8771 \pm 0.00906$	0.05452	
				Mean	0.0378	

## Inter day Precision

- The interday precision was also evaluated through repli-1.
- cate analysis of the pure drug samples for Dve consecutive 2.
- 3. days at the same concentration levels as used in within
- 4. day prec

## **Table 6: Inter day Precision**

Conc.	Absorbance		Mean ± SD	%RSD	
(µg/ml)	0 hrs	24 hrs	48 hrs		
2	0.4820	0.4823	0.4828	$0.48237 \pm 0.0033$	0.684
3	0.6682	0.6688	0.6698	$0.66893 \pm 0.0066$	0.121
4	0.8684	0.8726	0.8802	$0.87373 \pm 0.0488$	0.684
				Mean	0.4963

## Repeatability

Table 7: Repeatability					
Nominal value Conc. (µg/ml)	Absorbance	Mean ± SD	%RSD		
	0.3462				
	0.3863				
2	0.3511	$0.3687 \pm 0.0222$	0.0207		
	0.3382				
	0.3895				
	0.3907				

## Steps for preparing lipstick containing rhodamine

The final product is prepared using the different ingredients which shows different properties. In which the rhodamine B is used as the A. colouring agent. The product is placed inside the plastic lipstick cage which is reliable to use and make the final prepared product easy to carry and use. The lipstick inside the cage may be used and then the plastic lid again covers the lipstick to provide the lipstick mold a proper shape as shown in below figure.



Figure 5: Prepared lipstick containing rhodamine B

B. The prepared lipstick is placed on a butter paper before transferring the molded lipstick in plastic shell. The extra quantity of water gets absorbed. It requires a carefull handling because the prepared mold is soft and easily breakable. As shown in the following figure.



Figure 6: (a)

C. The lipstick mold is placed in a china dish and also the cold water is added so that the lipstick gets to cool at the room temperature and gets a desired shape so that is can be easily used and the mold gets hardened to be easily handling. As shown in the given figure.



Figure 6: (b)

D. Lipstick mold is dried and hardened at room temperature and shows a stable formulation without getting any change in the shape as shown in the below figure.



Figure 6: (c)

E. In oil phase the rhododendron extract is added in a beaker which is placed on a heating mental. The heat is provided so that the oil phase and the rhododendron phase get mixed properly. The precautions were taken such as hand gloves and face mask because the rhododendron can shows the allergic and harmful effects to the body.



Figure 7: Adding Rhododendron extract in oil phase

F. On a another beaker the bees wax is melted so that it can also become in oily phase and can be easily gets mixed with the rhododendron. It works as a Thickening agent provides the lipstick a hardening texture.



Figure 8: Melting Bees wax in beaker

G. Acacia is mixed with oil phase the oil phase provides the glossy texture to the lips and also helps to hold the moisture to the lips. And Acacia is a safe and natural stabilizer and thickener in cosmetics. From mascaras to skin lotions, including hair products, eye-liners and lipsticks, Acacia gum is a safe and natural ingredient that will bring stabilization and texture to cosmetics.



Figure 9: Mixing oil phase +acacia in beaker

H. The oil phase contained in the beaker gets cooled and then the material is added in a molding frame. Which provide the lipstick the desired shape.



Figure 10: Prepared lipstick after solidification

Table 8: Valuation parameters of lipstick					
Sr. no.	Parameter	Inference			
1	Colour	Colourless			
2	Texture	Smooth			
3	Smell	Aromatic			
4	P <sup>H</sup>	$6.2{\pm}0.5$			
5	Solubility test	Partially Soluble in Ethanol			
6	Melting point	67-69°C			
7	Breaking point	30 gm			
8	Surface anomalies	No			
9	Fragrance stability	Good			
10	Skin irritation	No irritation			
11	Aging stability	Smooth			
12	Force of application/ Spreadability test	Good			
13	Acceptance	+++			

#### Conclusion

The methodology for this study was quantitative, and the sample strategy used was purposive sampling. Rhodamine B was tested using a UV-visible spectrophotometer to validate the method.

A linear regression equation of y=0.0963x-0.0123 with a correlation value (r2) of 0.9979 is produced by the method's validation, and an instrument validation reveals a limit of detection (LOQ) of 1.3270484 ppmand 4.42686 ppm as the limit of quantitation (LOQ). According to this study, UV-Visible spectrophotometry is a reliable technique for determining the amount of rhodamine B present in lipstick. The method developed was economical solvent are précised, accurate and can be utilized to quantify rhodamine b in marketed lipstick formulation.

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