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# Formulation and evaluation of herbal lipstick from pigment of *Nyctanthes arbor-tristis*

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The Herbal lipsticks are composed of natural colourants and compounds to protect the lips. The market place for organic products in various fields extends throughout the world on account of increased awareness among consumers of side effects related to protracted use of some synthetic colouring compounds, and therefore the current trend towards healthful biomaterials in products. This work aimed to formulate a natural lipstick from coloured pigments of *Nyctanthes arbor-tristis* (Night flowering jasmine*)* flowers. The use of natural colouring pigments in the product would minimize the side effects. This study focused on the extraction of colourant from *N. arbor-tristis* flowers and optimizing the formula for the preparation of lipstick and evaluating it. The results indicate that the prepared formulation was good and had minimal or no side effects on the lips.

**Keywords:** Natural lipstick, *Nyctanthes arbor-tristis*, Organic, Pigments, Wax.

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## Introduction

Cosmetics have become a regular part of our lives since they provide a sense of aesthetic improvement and satisfaction. There has been a growing demand for cosmetics in the recent times, which has caused an increase in the creation of numerous cosmetic industries that manufacture a variety of cosmetics for maintenance and enhancement[1]. However, these products frequently include dangerous substances that will be toxic to humans. Additionally, these cosmetics are regularly used, the presence of such substances may have a cumulative effect. Heavy metals have been found in certain cosmetics recently, which have caused customers great concern[2].

This has caused customers to gradually turn away from cosmetic products with chemical bases and toward those with natural ingredients. Lipstick is a type of cosmetic product that is applied to the lips for colour, texture and protection[3]. It generally contains oil, waxes, emollients and pigments. The pigments frequently used in lipsticks are synthetic chemicals that act as a source of heavy metals. These heavy metals may be present in relatively small amounts, but their presence in the cosmetics formulation can induce hazardous conditions because the heavy metals are absorbed through the skin. It may also cause adverse effects such as allergy, dermatitis, skin discolouration and drying of lips[4]. The problem gets even worse when a woman applies lipstick for her whole lifetime. In some cases, they are carcinogenic and fatal too[1]. This limitation thus leads the use of natural colourants as an alternative in lipstick.

Lipsticks containing natural colourants are termed "Natural lipsticks". It is also termed as "Herbal lipstick" as it derived from medicinal herbs and possesses pharmacological properties like antioxidant, antimicrobial, anti-inflammatory, and cytostatic effects. It is natural, safe, skin-friendly, non-toxic and has no side effects for humans[5]. In comparison to synthetic lipstick, it provides proper nutrients, improves health, and ensures user satisfaction[6,7].

One of the natural sources that can be used as a natural colouring agent is *Nyctanthes arbor-tristis* flower. It contains nyctanthin or α-crocin, as a secondary metabolite belonging to the family of carotenoids, which can be used as natural colouring agent[8]. *N. arbor-tristis* commonly known as Harsinghar or Night jasmine, is a well-documented medicinal plant[9]. It also termed as Parijat, Coral jasmine, Queen of night and Night flowering jasmine.

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This Night jasmine belongs to the family Oleaceae. The plant grows in tropical and subtropical region. It is a native of India, distributed wild in sub-himalayan region and also found in Indian garden as ornamental plant. The generic name 'Nyctanthes' has been coined from two greek words 'Nykhta' (night), 'anthos' (flower). It is a shrub or a small tree growing to 10 m tall, with flaky grey bark having brilliant, highly fragrant flowers, which bloom at night and fall off before sunrise, giving the ground underneath a pleasing blend of white and red. This tree grows well in a wide variety of loamy soils and in soils found in average garden situations, with pH 5.6–7.5. The plant requires conditions varying from full sunlight to partial shade. It is a terrestrial woody perennial having life span of 5-20 years[10].

*N. arbor-tristis* flowers have white petals with an orange corolla tube. It arranged at the tips of branches terminally or in the axils of leaves and are small, often seen in clusters of two to seven together. Calyx is 6-8 mm long, hairy on the outside and glabrous on the inside. The corolla is globrous, 13 mm long with a tube 6-8 mm long and orange in colour. Nyctanthin or α-crocin a colouring component found in the flower's bright orange corolla tubes. This colouring component is the same as the alpha crocetin found in saffron[10]. The flower's orange corolla tubes are also rich in antioxidants. This flower's coloured component works well as food colouring in industrial food applications[11]. Mannitol, tannin, glucose, carotenoid and glycosides are found in the flowers in addition to nyctanthin. The flower's medicinal benefits include the ability to treat mouth ulcers, scabies, gout and other skin disease[12]. Decoction of the flower will stimulate the gastric secretions and improve expectoration of lungs[13]. Therefore, we are the first to study the herbal lipstick using coloured pigment from *N. arbor-tristis* flower.

## Materials and Methods

### Sample collection and identification

The flowers of *N. arbor-tristis* L. were collected in the month of November'18 from Avinashi (11.1730° N, 77.2686° E) Tamil Nadu, India. The plant was authenticated at BSI (Botanical Survey of India), Tamil Nadu, Coimbatore, India, reference number: (BSI/SRC/5/23/2018/Tech-2264)

### Extraction of pigment

The fresh *N. arbor-tristis* flowers were collected and it stalk part was separated for the study. The stalk was divided into two sets. One set of fresh stalk part was directly used in the extraction process. And another set, was subjected to shade dry for a week and used in the extraction process. Extraction carried out with two solvents, (Distilled water and 50% Ethanol) at 10 g in 100 mL. After incubating mixtures for 24 h, the extract was filtered through whatman filter paper and distillated using a rotatory evaporator (concentrated as 1/10). The extract was stored in an airtight container for implementation in lipstick production[14].

### Determination of free radical scavenging activity

DPPH (2,2-diphenyl-1-picrylhydrazyl) assay method was used to determine the antioxidant activity. The reaction mixture was incubated for 30 minutes in the dark and the absorbance of the samples was determined using a UV spectrometer at 517 nm[15]. The standard antioxidant compound used was ascorbic acid. The 0.1 mM DPPH radical solution served as control. The antioxidant activity was calculated by using the formula,

$$\text{Scavenging activity } (\%) = \frac{A_{[\text{sample}]} - A_{[\text{control}]}}{A_{[\text{control}]}} \times 100$$

### Formulation of lipstick

The lipstick is formulated by primarily melting the waxes in a separate glass container. At the same time, the concentrated colour with oil is heated in other glass container. Once the wax reaches the stage of being completely melted, the colour phases are added and blended well. For improved lipstick quality, the appropriate amount of flavouring agent, preservative, antioxidant, and surfactant was added. Then the composite was put into a lipstick tube and placed for an hour to cool down. After an hour, the natural lipstick is utilized for further evaluation[16]. Table 1 shows the

Table 1 — Composition of herbal lipstick

| S. No | Ingredients | F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|---|---|
| 1 | Coconut oil | 3 mL | 10 mL | 15 mL | 13 mL | 12 mL | 12 mL |
| 2 | Paraffin wax | 3 g | 2.0 g | 1.4 g | 1.2 g | 1.4 g | 1.2 g |
| 3 | Bees wax | 7 g | 4.2 g | 4 g | 4.2 g | 4 g | 4 g |
| 4 | Acacia | 0.5 g | 0.5 g | 0.2 g | 0.1 g | 0.1 g | 0.1 g |
| 5 | Extract | 1 mL | 1.7 mL | 2.5 mL | 3 mL | 2.5 mL | 3.0 mL |
| 6 | Vanilla essence | 0.1 mL | 0.1 mL | 0.1 mL | 0.1 mL | 0.1 mL | 0.1 mL |

ingredients used in the preparation of natural lipstick. Fig. 1 shows the schematic representation of herbal lipstick from *N. arbor-tristis* plant flower pigment extract.

**Evaluation of natural lipstick**

The formulated natural lipsticks were evaluated (Table 2) on the parameters such as melting point, breaking point, surface anomalies, solubility, aging stability, pH, and hedonic test[17].

**Melting point**

The lipstick's safe storage period depends on the test of its melting point. The melting point of lipstick was determined by the capillary tube method. In this, one end of the capillary tube was sealed by heating and the other end was filled with lipstick, it was tied with a thermometer placed in a beaker containing water and it was kept on a hot plate. The primary observations of lipstick slowly melting to completely melting and the readings were noted. The calculation of two mean temperatures gives the correct melting rate of a substance[18].

**Breaking point**

It was to observe the strength of formulated lipstick. A lipstick was initially horizontally hung with a subjected value of the load, the value gradually increased from 10 to 50 g, and the weight at which it broke was investigated as the breaking point.

**Surface anomalies**

The surface defects like contamination and crystal formation on the surface of lipstick were investigated to determine the quality of lipstick.

**pH**

By using a pH meter, the formulated natural lipsticks pH was measured for safer use on lips.

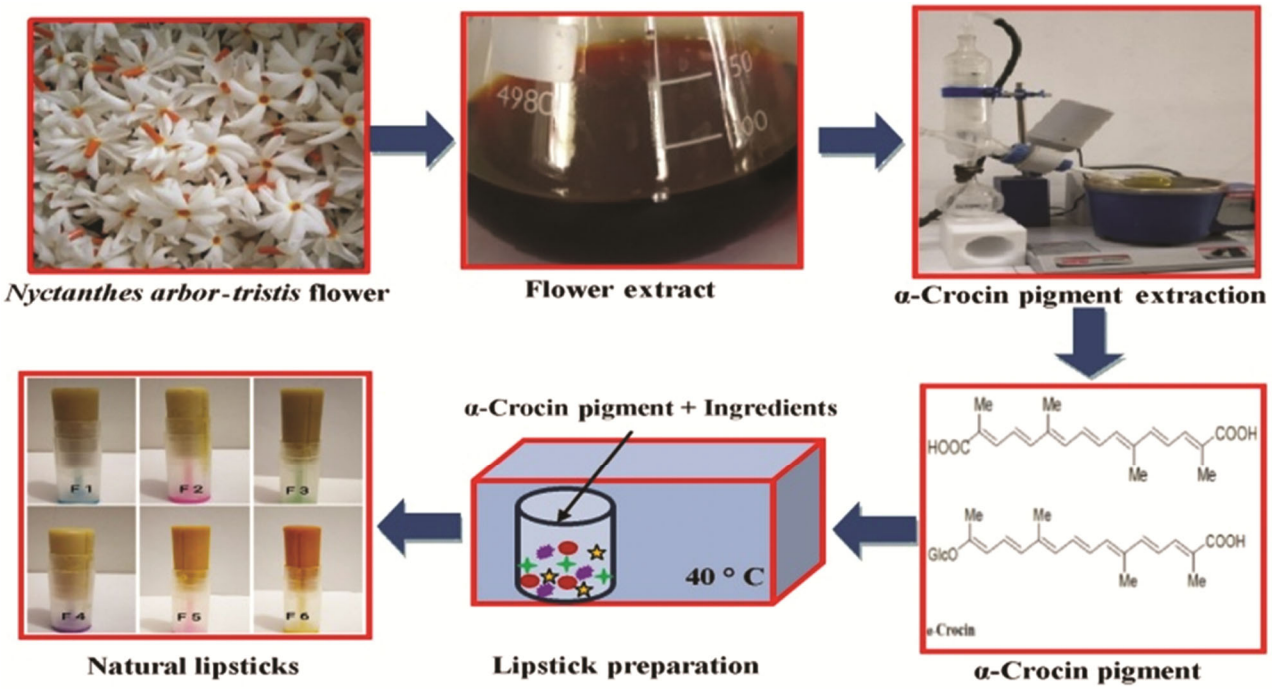


Fig. 1 — Schematic representation of natural lipstick from *N. arbor-tristis* plant flower pigment extract.

Table 2 — Evaluation of formulated natural lipstick

| S. No | Parameter | F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|---|---|
| 1 | Colour | Colour less | Mild yellow | Colour less | Yellow | Mild orange | Orange |
| 2 | Melting point ($^{o}$C) | 67 | 65 | 65 | 65 | 65 | 65 |
| 3 | Breaking point (g) | 40 | 35 | 30 | 35 | 30 | 35 |
| 4 | pH | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| 5 | Ageing stability | Smooth | Smooth | Smooth | Smooth | Smooth | Smooth |
| 6 | Surface anomalies | No | No | No | No | No | No |

**Ageing stability**

The ageing stability of herbal lipsticks was evaluated by observing parameters such as bleeding, streaking, and blooming by placing the lipstick at three different temperatures (4, 25, and 35°C) for a time period of one hour to ensure safe storage.

## Results and Discussion

A diverse formula was used to successfully formulate natural lipstick by using natural colourants from flowers of *N. arbor-tristis* and the various parameters were investigated for a fine product. Table 1 shows the various quantities of ingredients used in the preparation of lipstick in order to obtain a good shade and consistency.

The shade-dried flower extract shows high antioxidant activity of 75% compared to the fresh flower extract (Table 3) and also, the shade-dried flower extract shows rich colour. Then, for each prepared lipsticks (Fig. 2), evaluation was carried out to determine the effect of natural ingredients and colourants (Table 2).

The formulations F1 to F4 were carried out by using water solvent pigment extract and F5, F6 by 50% ethanol solvent pigment extract. From the prepared formulation, F6 from the 50% of ethanol extract, showed good colour and quality in the formulation compared to the water solvent extract. The lipstick had a high melting point (65°C) and breaking point (30 g), which shows it is capable of long-term storage. The pH range of lipstick indicates in it being safer to apply on the lips. The smooth consistency and good stability of the lipstick were noticed by ageing stability.

Table 3 — Antioxidant activity for extracts of fresh and old flowers

| | DPPH assay (%) | |
|---|---|---|
| Standard | 85 | |
| Samples | Fresh | Old |
| Flowers | 42 | 75 |
| Stalks | 57 | 72 |

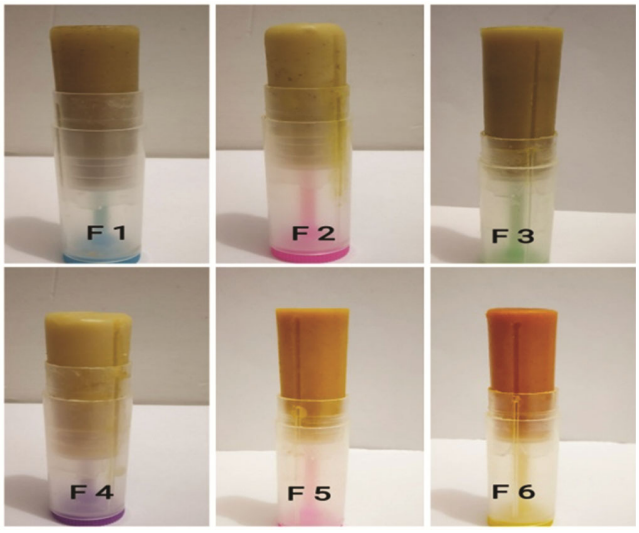


Fig. 2 — Representing the formulated lipstick using *N. arbor tristis* flower pigment (F1-F6).

According to literature survey of previous investigation, the herbal colourants minimize the side effects produced by the available synthetic ones. Different natural colourants were used for formulating natural lipsticks that contain colouring agents obtained from plant materials. It include *Punica granatum* (Pomegranate) fruit[6], *Bixa orellana* seed (annatto)[19], *Solanum lycopersicum* fruit (tomato)[20], *Beta vulgaris* (beetroot) fruit[21], *Brassica oleracea* L. var. *Capitata* fruit (red cabbage)[22], *Tectonae grandis* (Jati leaf)[23], *Daucus carrota* (carrot)[24], *Hylocereus polirhizus* (dragon fruit)[25], *Nephelium lappaceum* L. (rambutan) fruit[4]. In some cases, two or more nature colourants were also used to explore new shades of natural lipstick. It includes combination of source like cinnamon bark powder with turmeric and cocoa powder extract[26] and rhizomes of turmeric (*Curcuma longa*) with fruits of sweet paprika (*Capsicum annuum*) and roots of *D. carota* extract[27].

*N. arbour-tristis* flower colourants made natural lipstick a unique shade compared to the previous natural lipstick made, and it was good enough to meet the general characteristic of ideal lipstick. The properties of natural lipstick made from *N. arbour-tristis* flower were similar to other natural lipstick properties. Thus, the present investigation determined that natural lipstick made from *N. arbour tristis* flower pigment is a safer and convenient product for woman.

## Conclusion

Herbal cosmetics offer the benefits of natural replacements with their herbal moral, when synthetic and chemical ingredients are sold in cosmetics for expensive prices with several undesirable effects. Natural plant extracts are used to make this herbal, eco-friendly lipstick which promises to give the skin a fresh look. The aim of the current study was to create a natural lipstick with natural colourants and elements. This present investigation provides

guidelines for the extraction of natural pigments from *N. arbor-tristis* flower and preparation of a natural lipstick. The natural ingredients like coconut oil, acacia, beeswax, paraffin wax were used in the preparation of natural lipsticks along with *N. arbor-tristis* flower colouring pigment, which are beneficial to the lips. Out of all lipsticks formulation, F6 formulation showed characteristic of good colour and quality. To ensure the safety of these formulations, it is advised to do further studies through a clinical trial.

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**Conflict of interest**

The authors declare that they have no conflict of interest.

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