

(RESEARCH ARTICLE)



## Formulation of tinted lip gloss from lotus flower and date seed oil

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### Abstract

In the past few decades, there is a large emergence in usage of natural dyes and scents. With the purpose of reducing extreme damage caused to human body due to synthetic substances, most ingredients in cosmetics have been lately shifted to those obtained from natural sources. This ensures maximum efficacy with minimum side effects. In addition to the fragrance and colors, medicinal properties (anti-oxidant property of Neem/Aloe-vera, anti-wrinkle property of Amla, anti-inflammatory property of Turmeric) can also be included in lipsticks and lip glosses to enhance quality and variability. The aim of this study is to formulate tinted lip gloss with subtle colors in addition to the moisturizing effect obtained from natural sources of *Nelumbo nucifera* (Lotus flower petals) and date seed oil respectively. Such a formulation caters to the practical requirement of a wide population of women in general obtaining color, fragrance and moisturizing property, all in one. The formulated product was evaluated and reported herewith. It gave tinted glossy formulation with a smooth consistency excluding the side effects of beeswax and parabens. The formula produced a beautiful light pink natural color as well as a pleasant scent.

**Keywords:** Lotus; Date Seed Oil; Color; Fragrance; Moisturizing Property; Natural Source

### 1. Introduction

Syrians, Persians, Greeks, and Romans employed lip cosmetics for aesthetic, medicinal, and ritualistic purposes [1]. Lip gloss dates back to its first commercial product in 1932. Max Factor, a pioneer in the field of beauty, contributed to the invention for the major purpose in cinematic industry [2].

According to D & C Act 1940 and the Rule in 1945 "Cosmetic is defined as the means any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance, and includes any article intended for use as a component of cosmetic" [3].

Lip glosses are compositions that comprises of oil or wax base to give the lips a moist and alluring look providing gloss and color. Lip gloss bases are classified according to their chemical composition (organic, silicone), source (natural, synthetic), and function (moisturizing, contouring) [1].

Common ingredients in a lip gloss include Beeswax, Ozokerite wax, Shea butter, Polybutene, Ascorbyl Palmitate, Tocopheryl acetate, Corn starch, Oil (Castor oil, mineral oil), Synthetic preservatives (Propylparaben), Colorants (Iron oxide, titanium dioxide, Organic pigments and their lakes), Flavour (Vanilla, chocolate, etc.) [1].

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Soft and easy to use, spreads smoothly, is comfortable and supple, protects against cracking and drying, imparts greater cushion, provides moisturizing effect, and is portable are just a few of the benefits[1].

High metal contents like Cd, Ni, Fe, Mg occurred in beeswax[4]. Due to chronic exposure and their neurotoxic nature, harmful chemicals such as lead should not be ignored[5]. The adulteration of beeswax is an emerging issue that was reported lately at several occasions in the scientific literature[6]. Parabens are the maximum broadly used preservatives within side the artificial and industrial main merchandise and are effortlessly absorbed through the human body. Thus, it is important to review about their safety with respect to human physiology. There are literatures which classifies parabens as a group of endocrine disrupting chemicals (EDCs). Disruption of the endocrine homoeostasis might lead to multidirectional implications causing disruption of fitness and functions of the body[7].

In the emerging growth of industries and commercialization, synthetic dyes gained more importance due to their long-lasting effects and low cost. Dyes can be classified in groups according to their chemical structures namely azoic, triarylmethane, xanthenes, indigoid and quinoline. Their characteristic chromophoric azo group, under determined conditions that can take place in intestinal bacteria, liver cells, and skin surface micro flora, may be reduced to aromatic amines suspected to cause mutagenic, genotoxic and carcinogenic effects. Another study pointed out genotoxic effects caused by the absorption through the skin of Quinoline Yellow. Xanthenes dyes such as Acid Red 92, Erythrosine, or Rose Bengal, which are very popular in cosmetics due to the red shade formed, have been identified as responsible for the formation of difficult pores and skin via way of means of reacting proteins at the pores and skin[8].

Fragrance is a crucial factor of cosmetics and is regularly used as a figuring out component in patron beauty purchases. Fragrances also help to disguise unpleasant odours caused by fatty acids, oils, and surfactants, which are typically found in cosmetic compositions. Essential oils are valuable assets in the cosmetic industry because, in addition to contributing attractive smells to various products, they may also work as preservatives and active agents while providing a variety of skin advantages. Citrus, lavender, eucalyptus, tea tree, and different flower oils are a few of the high valued vital oils used as perfumes, whilst linalool, geraniol, limonene, citronellol, and citral are famous heady fragrance components used in various cosmetics. Essential oils, which are complex combinations of terpenes and other aromatic or aliphatic chemicals produced as secondary metabolites in aromatic plants' specialized secretory tissues, are the most popular natural fragrances. Examples of essential oil-bearing plants include Cedarwood, Ginger, Cardamom, Camomile, Lavender, Camphor, Clove, Rose, Sandalwood, Vetiver, Mint, Oregano, Star anise, etc[9].

Hence, herbal cosmetics are preferred nowadays over the synthetic ingredients providing health benefits and nutritive value. Herbal cosmetics, also known as natural cosmetics, are the modern trend which encircles both health and beauty care[5].

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## 2. Date Seed

Date palm (*Phoenix dactylifera*) is a flowering plant species in the palm family Aracaceae that is farmed for its edible sweet fruit called dates[10].

### 2.1. Chemical constituents

The seeds' average oil content is around 7%. The most abundant fatty acid is oleic acid (48.67%), followed by lauric acid (17.26%), stearic acid (10.74%), palmitic acid (9.88%), and linolenic acid (9.88%). (8.13 percent). Free fatty acid concentration was found to be 0.5 percent on average. A mean tocol concentration of 70.75 mg/100 g was likewise found in *P. dactylifera* seed oil. The most common isomer was  $\alpha$ -tocotrienol (30.19%), followed by  $\gamma$ -tocopherol (23.61%),  $\gamma$ -tocotrienol (19.07%), and  $\alpha$ -tocopherol (17.52%). Thermal and oxidative stability of the oils were excellent. According to the findings, date seed oil has the potential to replace palm olein in the food business[11].

### 2.2. Applications

Date Palm seed oil is widely used in a variety of industries, including cosmetics, manufacturing, and pharmaceuticals (Figure 1) [11]. Date seed oil has been found to be a good source of  $\alpha$ -tocotrienol in studies. As a natural preservative, it is employed. Reduced agro-industrial waste and low environmental toxicity are two main benefits. According to recent studies, date pit powder can be used in cosmetic products like eyeliner because it has no adverse effects on the eyes. It emphasizes the need of trash recycling and serves as a rich source of bioactive compounds. Date seed powder is frequently used in coffee drinks as a coffee substitute and as a beneficial element in human and animal nutrition. Date fruit is used in a variety of industrial applications, including puddings, jellies, jams, syrups, and other confections[11].

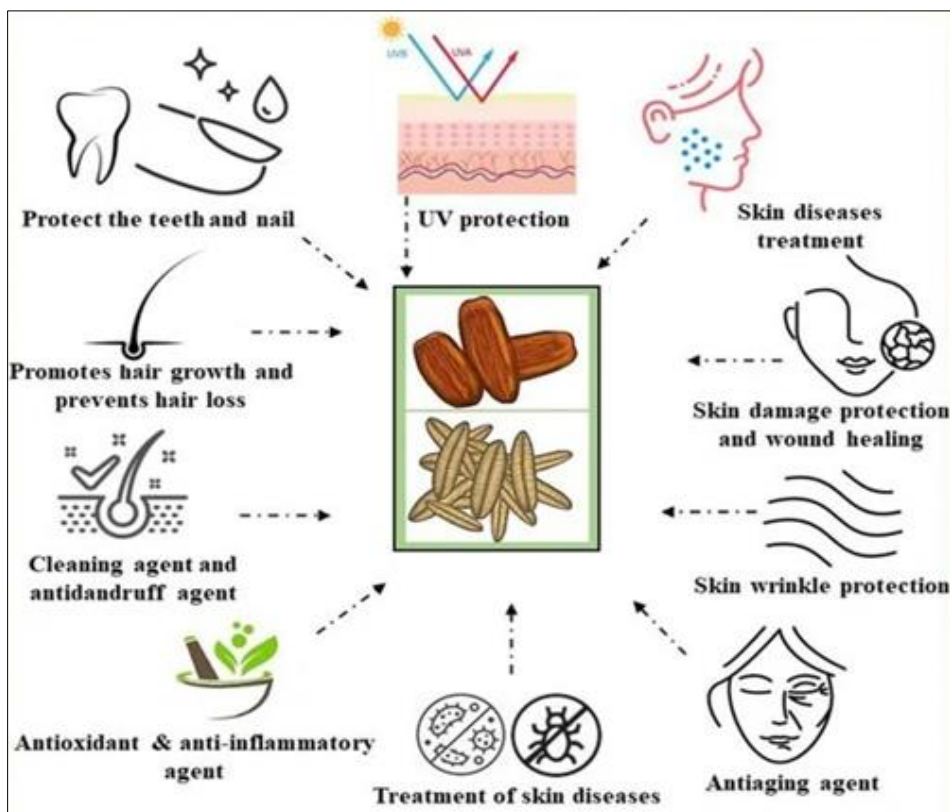


Figure 1 Various uses of dates and date seeds

### 3. Lotus

- Genus: *Nelumbo*
- Species: *Nelumbo nucifera* Gaertn (Asian Lotus)
- *Nelumbo lutea* Pear (American Lotus)
- Family: Nelumbonaceae [12]

#### 3.1. Chemical constituents

Quercetin, Luteolin, Luteolin glucoside, Kaempferol, Kaempferol 3-O-glucoside, Isoquercitrin[13].

An overall of 20 flavonoids belonging to six groups (myricetin, quercetin, kaempferol, isohamnetin, and diosmetin derivatives) had been separated and identified. Lotus was the first to report myricetin 3-O-galactoside, myricetin 3-O-glucuronide, isorhamnetin 3-O-glucuronide, and free aglycone diosmetin (3',5,7-trihydroxy-4'-methoxyflavone)[14].

Palmitic acid methyl ester (22.66 percent), linoleic acid methyl ester (11.16 percent), palmitoleic acid methyl ester (7.55 percent), and linolenic acid methyl ester were found in the essential oil of lotus (5.16 percent ) [15].

#### 3.2. Significance

Even though there are two major species (Asian and American Lotus), abundant and multiple germplasms exist all over the world that display different genetic material, especially in Asia. According to the climatic regions, Asian Lotus can be divided and classified into two ecotypes namely Temperate Lotus and Tropical Lotus. Asian lotus is also used as famous ornamental plant since it holds a significant place in the religions of Hinduism and Buddhism. Hence, it is also rightly termed as 'Sacred Lotus.' This flower has historical and national importance and is the National flower of India and Vietnam. With a long history of cultivation, China is the largest center in cultivation and breeding of Lotus.

#### 3.3. Applications

Lotus is not just an aquatic plant but has some special features like seed longevity, leaf ultra-hydrophobicity and floral thermoregulation[12]. Constant and continuous efforts by researchers have claimed lotus having numerous

pharmacological activities like anti-inflammatory, antifungal, antibacterial, anti-diarrheal, antipyretic, anti-ischaemic, antiviral, antioxidant, hypoglycemic, hepatoprotective, anti-cancer, anti-obesity, antipyretic and diuretic activities[16].

Due to the diversified form, beautiful colours, shape, pleasant aroma and appealing value, breeding and artificial selection is carried out for cultivation and production(Figure 2) [12]. The three major colours of the lotus plant found are white, red and yellow. The first two occurs in the Asian Lotus species whereas yellow in the American Lotus species[12].



**Figure 2** Various shades of Lotus flower

The color and fragrance of the flower petals is used in perfumery and fabric industries. The essential oil obtained from the petals and stamens showed to increase melanin synthesis. In a dose depended way, it stimulates tyrosinase activity too[15]. Additionally, due to the contents present in the oil, it is concluded that the oil is capable of preventing the growth of grey hair and can act as tanning agents. Pigments are extracted from lotus leaves and is used as a method for dyeing wool and wool fabrics. Along with the dyeing property, it enhances the quality, stability of dyeing processes with reduced damage[17]. There are inventions to the methods and preparation of natural lotus receptacle pigment used as a dye for fixing a textile industry as well as having antiseptic action. It has its application in industries of goggles, socks, pyjamas, domestic textiles, etc. Since it has excellent UV protection, it can be incorporated in summer clothes and summer sun-shield coats and clothes for babies[18].

Due to such an evolving importance of *Nelumbo nucifera* in horticulture, medicinal use and plant phytochemistry, this plant being conventional, traditional and a developing hope for the investigational community, is undoubtedly economic, herbal and safe[12].

## 4. Material and methods

### 4.1. Chemicals, Reagents and Equipments

Cholesterol, Lecithin, Mannitol, Microcrystalline Cellulose (MCC), Date Seed oil, Olive oil, Linseed oil, Rose oil, Chloroform, Ethanol, Lotus colour extract, Lotus scent, grinder, Agitator, Distillation apparatus, Water bath, Citric acid, Benzoin, Glycerine, Ultrasonicator, Freeze Dryer.

### 4.2. Plant material procurement

Lotus flower petals were obtained from the local market vendors. Date seeds were procured from used domestic dates.

### 4.3. Preparation

The Lotus flower petals were sun dried to evaporate moisture. The Date palm seeds were roasted and finely powdered for efficient extraction.

#### 4.4. Extraction



**Figure 3** Distillation process for extraction of oil

##### 4.4.1. Extraction of Date Seed Oil

To extract oil from date palm seeds, the seeds were roasted to black and grinded. From it, 20 g was weighed and 250 ml rose oil (essential oil) was added. The mixture was agitated for 6hrs at 45°C and filtered. An equal amount of water was added to the filtrate and was further extracted by simple distillation process, pale yellow color oil was obtained [19] (Figure 3). The result of pre-formulation studies was evaluated (Table 4).

##### 4.4.2. Extraction of Lotus colour



**Figure 4** Colour obtained from Lotus flower

Fresh pink sacred lotus petals of species *Nelumbo nucifera* were collected from local vendors and sun-dried to evaporate moisture. To a preheated mixture of alcohol:water [18], in a ratio of 30:70, dried petals were added and reddish pink pigment was obtained in a few minutes. A pinch of citric acid was added to intensify colour (Figure 4). So as to fix the colour obtained, benzoin and glycerine were added.

##### 4.4.3. Extraction of Lotus Scent

Fresh and moist pink sacred lotus petals of species *Nelumbo nucifera* were collected from local vendors and added to a pre-heated mixture of alcohol: water (70:30). The soaked petals were added in a closed container and left for an hour. The de-pigmented petals were filtered and the filtrate was separated. So as to fix the fragrance obtained, benzoin and glycerine were added.

#### 4.4.4. Note Development

From the fixed fragrance dilutions of 0.1 ml, 0.2 ml, 0.3 ml, 0.4 ml, 0.5 ml were prepared. The observations of the dilutions are as follows (Table 1):

**Table 1** Note development based on dilutions

Dilutions	Observation
0.1 ml	Pleasant
0.2 ml	No significant fragrance
0.3 ml	Highly Pleasant, optimum
0.4 ml	Agreeable
0.5 ml	Agreeable

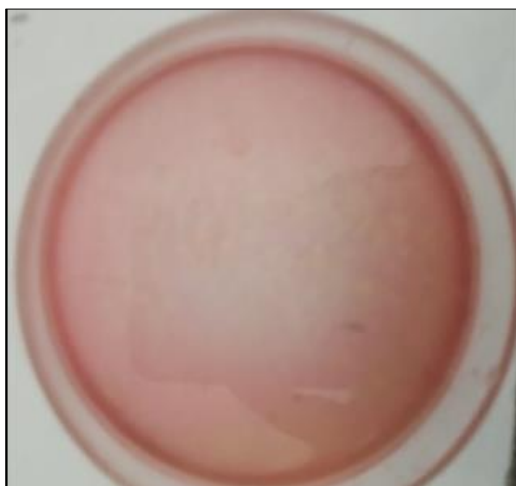
From the observations, 0.3 ml dilution was highly pleasant and optimum. Hence it was selected for the final formulation.

#### 4.5. Formulation

The formulation of tinted lip gloss using the colorant from natural source was prepared in liposomal form.

Cholesterol and mannitol (pre-treated in ultrasonicator to remove moisture) was accurately weighed and added to a round bottom flask. Drops of liquid lecithin was added. Date seed oil and olive oil was added. The mixture was slightly heated in water bath to prevent coagulation of lecithin. Chloroform was added as a solvent. The RBF was placed onto an agitator for approximately an hour and a layer was formed. A mixture of specific ratio of alcohol:fragrance:colour was added. The RBF was again kept for agitation and removed after an hour. The contents were poured into a petri plate and kept and stored in freeze dryer for more than 10 days.

According to the above-mentioned method, two formulations (A and B) were prepared and kept for freeze drying (Table 2) (Figure 5 and 6).



**Figure 5** Formulation A



**Figure 6** Formulation B

**Table 2** Ingredients with their quantities according to formulation

Ingredients	Quantity in Formulation A	Quantity in Formulation B
Cholesterol	0.32 g	0.32 g
Lecithin	3 drops	3 drops
Mannitol	0.15 g	0.15 g
Chloroform	2 ml	2 ml
Date seed oil	0.2 ml	-
Linseed oil	-	0.5 ml
Olive oil	0.2 ml	0.5 ml
Ethanol	1 ml	1 ml
Lotus Colour extract	4 ml	6 ml
Lotus essence	3 ml	3 ml

(1gram =  $10^{-3}$  kilogram, 1millilitre =  $10^{-3}$  litre)

#### 4.6. Evaluation

##### 4.6.1. Organoleptic Properties

The prepared lip product was evaluated for organoleptic properties such as colour, odour and texture.

##### 4.6.2. Determination of pH

The pH of the formulated lip product was analyzed by using pH paper.

##### 4.6.3. Solubility test

Solubility test of the prepared formulations were carried out in water, ethanol and acetone.

##### 4.6.4. Spreadability test

The assessment of spreadability consisted of making use of the products (at room temperature) time and again onto a glass slide to visually examine the uniformity in the formation of the layer.

#### 4.6.5. Skin irritation

The tinted lip gloss formulation A and B were evaluated for skin irritation test by applying the product on the skin for about 15 mins.

#### 4.6.6. Perfume Stability

These studies were conducted on the formulations for 15 days to record the fragrance.

#### 4.6.7. Storage Stability

The products were tested for stability according to ICH guidelines and were found to be stable on refrigeration and in room temperature too.

## 5. Results and discussion

The prepared formulation was evaluated and found that composition and formulation was ideal, showing promising results. With the exemption of beeswax and synthetic dyes, the aim to minimize the side effects was achieved. The formulation evaluation of lip colorant was conducted and the results can be seen in the table below (Table 3):

**Table 3** Result of Evaluation of tinted gloss formulations

Properties	Formulation A	Formulation B
Colour	Baby Pink	Pink
Odour	Highly Pleasant	Pleasant
Texture	Smooth	Smooth
pH	Near to 5	2
Solubility		
Water	Sparingly soluble	Sparingly soluble
Ethanol	Sparingly soluble	Soluble
Acetone	Sparingly soluble	Completely Soluble
Spreadability	Good	Excellent
Skin irritation	No	No
Perfume Stability	+++	+
Storage Stability	Good	Good

\*+ = Good, ++ = Very Good, +++ = Excellent; \*Good spreadability- Uniform, leaves few fragments, appropriate application, Excellent spreadability- Uniform, no fragments, smooth application[20].

**Table 4** Result of Pre-formulation

	Date Seed Oil	Lotus colour extract	Lotus Fragrance	0.3 ml note developed
Colour	Pale Yellow	Reddish pink	Pink	Pink
Odour	Characteristic odour	Unpleasant	Distinct alcoholic odour	Highly Pleasant
Characteristics	Clear and oily	Clear and aqueous	Clear and aqueous	Clear and aqueous
Solubility in Alcohol	Partially soluble	Soluble	Soluble	Soluble
Solubility in Petroleum Ether	Completely miscible	-	-	-



## 6. Conclusion

The formulation of tinted lip gloss was prepared in liposomal formulation and was having a glossy and smooth consistency upon adsorption of mannitol. It gives fairly a glossy formulation which on application to skin was able to spread uniformly. Further, it gave reasonably good stability as far as the formulation and the colour tint is concerned.

The formulation was successful in preparing entirely safe and without the side effects of beeswax and synthetic dyes, as the dangerous adverse effect and carcinogenic impact of beeswax, which can cause breast and uterus cancer, will be avoided if this formulation is commercialized. Moreover, the heart strengthening effects of Lotus flower are well known. Even if the small quantity of lip gloss is ingested accidentally, will not cause harm but will give the health benefits to the user.

The formula produced a beautiful light pink natural colour as well as a pleasant scent.

Lotus, being a symbol of beauty is very well used in this formulation as lip tint.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

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