



## Development and Assessment of an Herbal Cream Incorporating *Nyctanthes arbor-tristis*

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### ABSTRACT

The purpose of this study was to create and evaluate a herbal cosmetic cream that improves the skin while nourishing, moisturizing, and lightening it. In India, the use of herbs for beauty treatments comes from traditional medicine like Ayurveda. The herbal cream was made using extracts from *Nyctanthes Arbor-tristis* (night jasmine) and *Myristica fragrans* (nutmeg). It also contains a high amount of vitamin E, which helps treat dry skin. The cream includes *Santalum album* (red sandalwood), which is known for its anti-aging properties, acne treatment, and scar removal. Various tests were done to ensure the stability of the cream. The pH of the cream is 6.5, meaning it is neither too acidic nor too basic. This semi-solid cream is stable and shows no signs of problems like cracking or separation. The cream has good physical and sensory qualities, and it has been proven to be safe for use as a protective barrier for the skin.

**Keywords:-** Herbal cosmetics, *Nyctanthes Arbor-tristis*, *Myristica fragrans*, *Santalum album*, Nutmeg

### INTRODUCTION:-

Nowadays, herbal cosmetics are more popular than synthetic ones. Herbal cosmetics, also called "natural cosmetics," are made with various cosmetic ingredients, but they include one or more herbal ingredients to provide specific beauty benefits. These products are in high demand because they usually don't have side effects. Cosmetics are used to protect the skin from harmful elements and improve its appearance. They can help reduce wrinkles, treat acne, and control oily skin. Different products are created for various skin issues, such as protecting the skin, providing sun protection, and reducing signs of aging, using both natural and synthetic ingredients. Cosmetic products that contain water, oils, and substances like proteins or polysaccharides need preservatives because they can easily promote germ growth. According to the 7th amendment of the Cosmetic Guideline 76/768/EEC, the shelf life of cosmetics must be stated if it is less than 30 months. Plant extracts are different from purified medicines. They are usually more diluted and often contain extra active ingredients that may be related to the main compound responsible for their effects. The skin is the outermost layer of the body and is always exposed to environmental factors. Both external and internal factors can affect its balance. Using soaps, detergents, alcohol, and hot water often can remove the skin's natural oils. When the skin barrier is damaged, it can cause various skin problems, with the most common being water loss, leading to dryness. This results in roughness, scaling, cracks, redness, and a tight, uncomfortable feeling, sometimes with itching and stinging. Moisturizers help keep the skin healthy and provide a better appearance. Many moisturizers are available as natural, safe, organic, or herbal, but their main purpose is to retain moisture. Most of the available moisturizers use synthetic adhesives, emulsifiers, perfuming agents, pigments, surfactants, and thickeners to form the base. There is an extensive need to replace toxic synthetic agents from the base using natural agents. They were typically produced by female slaves known as "cosmetics" which is where the word "cosmetics" stemmed from. Cosmetics are used to enhance appearance. Makeup has been around for many centuries. The first known people who used cosmetics to enhance their beauty were the Egyptians. Makeup in those days was just simple eye coloring or some material for the body.



**Fig 1: Nyctanthes arbortristis**

**OBJECTIVE :**

To develop and assess a herbal cream incorporating Nyctanthes arbortristis for the following purposes.

- 1) To formulate a stable and effective cream that leverages the plant's beneficial properties.
- 2) To evaluate the therapeutic effects on various skin conditions, such as inflammation and irritation.
- 3) Safety assessments should be conducted to ensure the cream is suitable for topical use.
- 4) To test the efficacy through clinical or laboratory trials.
- 5) To assess user acceptance in terms of texture, absorption, and overall experience.
- 6) To compare the cream's performance with existing commercial products. Ultimately, to create a safe and effective herbal solution for enhancing skin health.

**TOPICAL DRUG DELIVERY**

In recent decades, illnesses have been treated by giving drugs to the body through various methods like oral, sublingual, rectal, parenteral, topical, and inhalation routes. Topical delivery means applying a drug directly to the skin to treat skin disorders or skin symptoms of a general disease, like psoriasis. The goal is to keep the drug's effect on the surface or within the skin. Semisolid formulations, such as creams and ointments, are commonly used for topical delivery, but foams, sprays, medicated powders, solutions, and adhesive patches are also used.

**Advantages of topical drug delivery systems:**

- It avoids the first-pass metabolism.
- It is convenient and easy to use.
- Reduces the risks associated with drug delivery.
- Eliminates the issues related to intravenous therapy and varying absorption conditions, such as pH changes, enzymes, and gastric emptying time.



- Allows for better effectiveness with a lower daily dose due to continuous drug release.
- Reduces fluctuations in drug levels between and within patients.
- However, skin irritation or dermatitis may occur due to the drug or added ingredients.
- Many drugs have high molecular weight and are not easily absorbed through the skin or mucous membranes because they are poorly lipid-soluble.
- The absorption process is often very slow.

*Nyctanthes arbor-tristis* Linn. (Oleaceae), commonly known as 'Night Jasmine' or 'Harsinghar' (Hindi), is named for its flowers that emit a strong, pleasant fragrance throughout the night. The flowers begin to fall after midnight, and by daybreak, the plant appears dull. The genus name 'Nyctanthus' comes from the Greek words 'Nykhta' (Night) and 'anthos' (flower), while the specific name 'arbor-tristis,' meaning 'the sad tree,' refers to its dull appearance during the day. This terrestrial, woody perennial has a lifespan of 5 to 20 years and can grow up to 10 meters in height. Its simple, opposite leaves are 6-12 cm long and 2-6.5 cm wide with entire margins. The fragrant flowers have a corolla with five to eight lobes and an orange-red center, often seen in clusters of 2 to 7. The fruit is a flat, brown, heart-shaped to rounded capsule, approximately 2 cm in diameter, with two sections, each containing a single seed.

#### Taxonomical classification

- Plantae Division:** Magnoliophyta
- Class:** Magnoliopsida
- Order:** Lamiales
- Family:** Oleaceae
- Genus:** *Nyctanthes*
- Species:** *arbor-tristis*
- Binomial name:** *Nyctanthes arbor-tristis*

#### The plant is named in different vernacular languages.

- Unani:** Harasingaar.
- Sanskrit:** Parijatha.
- Siddha:** Pavazha motif.
- Hindi:** Harsingar.
- Ayurvedic:** Paarijaata, Shephaali, Shephaalika, Mandaara.

#### PHYTOCHEMISTRY OF PLANT

Leaves of *N. arbor-tristis* contain an alkaloidal principle named acanthine, they also contain mannitol, astringent principles, resinous substances, ascorbic acid, alkaloids (nystatin), coloring matters, sugar and traces of an oily substance, tannic acid, methyl salicylate, carotene, an amorphous resin and trace of volatile oil. Seed kernels yield 12-16% of the pale yellow-brown fixed oil, which consists of contain fixed oil containing glucosides of linoleic, oleic, lignoceric, stearic, palmitic acid, and  $\beta$ -sitosterol (4-9). On keeping the oil for several weeks at 0o, a tetracyclic triterpenoid acid named nyctanthic acid is deposited (6). Flowers contain essential oils, coloring matter (nystatin), mannitol, tannin, and glucose. Its roots are composed of alkaloids, tannins, and glucosides (4-8). The bark contains a glycoside and two alkaloids, one soluble in water and the other in chloroform. The glycoside increases the amplitude of the frog's heart in small doses, but in large doses, the diastolic period is decreased till the heart stops with the A-V block, it also



depresses the CNS. The water-soluble alkaloid stimulates the ciliary motility of the esophagus; the chloroform-soluble alkaloid has no such action.

## Chemical constituents of *Nyctanthes arborists* Linn

### 1. Phyto-constituents from leaves

Leaves contain D-mannitol,  $\beta$ -sitosterole, Flavanol glycosides, Astragaline, Nicotiflorin, Oleanolic acid, Nyctanthic acid, Tannic acid, Ascorbic acid, Methyl salicylate, resinous substances, Amorphous glycoside, Amorphous resin, Trace of volatile oil, Carotene, Friedeline, Lupeol, Mannitol, Glucose, Fructose, Iridoid glycosides, Benzoic acid. All the important phytoconstituents are being used in Ayurvedic medication and reported for sciatica, arthritis, fevers, various painful conditions, and as a laxative.

### 2. Phyto-constituents from flowers

Flowers contain modified diterpenoid nystatin, flavonoids, anthocyanins, and an essential oil that is related to that of jasmine. Flowers have modified essential oil, Nyctanthin, dmannitol, Tannin, Glucose, Carotenoid, Glycosides,  $\beta$ monogentiobioside ester of  $\alpha$ -crocetin (or crossing-3),  $\beta$ monogentiobioside,  $\beta$ -D monoglucoside ester of  $\alpha$ -Christian,  $\beta$ -digenitiobioside ester of  $\alpha$ -crocetin (or crossing-1). 1, anthocyanins and essential oil which is similar to jasmine<sup>19</sup>Nyctanthin, tannin and glucose, carotenoid, glycosides viz.  $\beta$ monogentiobioside ester of  $\alpha$ -crocetin (or crossing-3),  $\beta$ monogentiobioside - $\beta$ -D monoglucoside ester of  $\alpha$ crocetin,  $\beta$ -digenitiobioside ester of  $\alpha$ -crocetin.

### 3. Phyto-constituents from seeds

Seeds contain Arbortristosite A & B, Glycerides of linoleic acid, oleic acid, lignoceric acid, stearic acid, palmitic and myristic acids, nyctanthic acid, 3-4 secotriterpene acid, a water-soluble polysaccharide tranquil of D-glucose and D mannose. The seed of *Nyctanthes arborists* contains 15% pale yellow-brown oil, nyctanthic acid, nucleoside A,  $\beta$ -sitosterol, arbortristosite A & B, glycerides of linoleic oleic, lignoceric, stearic, palmitic and myristic acids, 3-4 secotriterpene acid and A water-soluble polysaccharide composed of Dglucose and D mammals and used as an immunostimulant and hepatoprotective.

### 4. Phyto-constituents from stem

Stem contains  $\beta$ -sitosterol, Glycoside-naringenin-4-0- $\beta$ -glucapyranosylaxylopyranoside, and Flower oil Flower oil contains p-cymene  $\alpha$ -pinene, 1- hexanol methyl heptanone, phenyl acetaldehyde, 1-deconol and anisaldehyde. B-Amyrin, arbortristosite-a, oleanolic acid, nyctoside-a, nyctantic acid, and 6-  $\beta$ - hydroxyloganin.

### 5. Phyto-constituents from the Roots

The root part of the plant is composed of alkaloids, tannins, and glucosides. From the chloroform extract of the root  $\beta$ -Sitosterol and oleanolic acid have been isolated.

## PHARMACOLOGICAL ACTIVITY OF PLANT:

*Nyctanthes arbor-tristis*, or night-flowering jasmine, exhibits several pharmacological activities, including:

- 1) Anti-inflammatory: It helps reduce inflammation and may be useful in treating conditions like arthritis.
- 2) Antioxidant: The plant contains compounds that protect against oxidative stress, contributing to cellular health.
- 3) Antimicrobial: It demonstrates activity against various bacteria and fungi, aiding in infection prevention.
- 4) Wound healing: Extracts can promote tissue regeneration and healing of cuts and wounds.
- 5) Analgesic: Traditionally used for pain relief, it may alleviate headaches and body aches.
- 6) Antipyretic:
- 7) It has been used to reduce fever in traditional medicine.



- 8) Hepatoprotective: Some studies suggest it may protect the liver from damage.
- 9) Antidiabetic: Preliminary research indicates potential in lowering blood sugar levels.

These activities make *Nyctanthes arbor-tristis* a valuable plant in traditional and herbal medicine. However, further research is necessary to understand its mechanisms and therapeutic potential.

#### **PHARMACOLOGICAL ACTIVITY OF CREAM :**

*Nyctanthes arbor-tristis*, also known as Night Jasmine or Parijat, has been reported to possess various pharmacological activities, including:

##### 1) Anti-inflammatory:

- Inhibits inflammation and edema in carrageenan-induced paw edema model.
- Reduces pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ ) and increases anti-inflammatory cytokines (IL-10)

##### 2) Antimicrobial:

- Exhibits antibacterial activity against *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*.
- Shows antifungal activity against *Candida albicans* and *Aspergillus niger*.

##### 3) Antioxidant:

- Scavenges free radicals and reduces oxidative stress.
- Inhibits lipid peroxidation and increases antioxidant enzymes (SOD, CAT).

##### 4) Anticancer:

- Inhibits cancer cell growth and induces apoptosis in human cancer cell lines (e.g., MCF-7, A549).
- Suppresses tumor growth and angiogenesis in vivo.

##### 5) Immunomodulatory:

- Enhances immune response by activating macrophages and increasing antibody production.
- Regulates immune cytokines (IL-2, IFN- $\gamma$ ).

##### 6) Analgesic and anti-nociceptive:

- Reduces pain perception in hot plate and tail flick tests.
- Inhibits pain mediators (PGE<sub>2</sub>, substance P).

##### 7) Cardiovascular:

- Exhibits vasodilatory effects and reduces blood pressure.
- Inhibits platelet aggregation and thrombosis.

##### 8) Neuroprotective:

- Protects against neurodegeneration in Alzheimer's and Parkinson's disease models.



- Inhibits neuroinflammation and oxidative stress.
- 9) Antidiabetic:
- Reduces blood glucose levels and improves insulin sensitivity.
  - Inhibits  $\alpha$ -glucosidase and aldose reductase.
- 10) Wound healing:
- Enhances wound closure and tissue repair.
  - Increases collagen synthesis and improves tissue strength.

These pharmacological activities are attributed to the presence of bioactive compounds, including:

- Flavonoids (e.g., kaempferol, quercetin)
- Alkaloids (e.g., nystatin)
- Glycosides (e.g., nyctanthoside)
- Terpenoids (e.g.,  $\beta$ -sitosterol)

Further research is needed to fully explore the potential therapeutic applications of *Nyctanthes arborists*. Would you like me to elaborate on any specific activity or provide additional information?

#### **Preparation of cream from *Nyctanthes arborist's* flower**

**Cream:** Creams are products you can apply to your skin. They are thick or viscous liquids or semi-solid mixtures made of oil and water. Creams can be used for various reasons, like cleansing, improving appearance, protecting the skin, or treating skin issues.

#### **Types of skin cream**




Skin creams can be categorized into two main types:

- 1. Oil-in-Water (O/W):** These creams contain small droplets of oil mixed into water. In this type, the oil is spread throughout the watery part.
- 2. Water-in-Oil (W/O):** These creams have small droplets of water mixed into the oil. Here, water is the dispersed part, and oil makes up the main portion.





#### **Moisturizing Creams:**

Moisturizers, also called emollients, are products used to protect and hydrate the skin. They help add moisture back to the outer layer of skin, known as the stratum corneum. When this layer loses water faster than it can be replenished, the skin becomes dry and rough, losing its softness and flexibility. Moisturizing creams help restore that moisture, making the skin flexible and soft again.

**1. Plant profile:**

Sr.No.	Picture	Ingredients Name	Properties
1		<p><b>Night Jasmine Flower</b></p>	<p><b>Antioxidants, Antibacterial, Antifungal</b></p>
2		<p><b>Nutmeg (Myristica Fragrans)</b></p>	<p><b>Anti-inflammatory properties will help reduce the sight of pimples. Antispots</b></p>
3		<p><b>Red Sandalwood (Santalum album Family Santalaceae)</b></p>	<p><b>It has an essential oil that help to dampen and hydrate the dry and aging skin. It also relieves the irritation and itching for some greasy skin Condition</b></p>



4		<b>Petroleum Jelly</b>	<b>Moisturizer, Relieve dry skin, Including your lips.</b>
5		<b>Rose water</b>	<b>Helps to tone the skin. Naturally moisturizing, Hydrating, and colling the face.</b>
6		<b>Vitamin E</b>	<b>Protect from U.V. radiation, Antioxidant, Anti wrinkles.</b>
7		<b>Acacia</b>	<b>Thickening agent.</b>





## 2. MATERIAL AND METHOD

### □ MATERIAL:

Flowers were collected from the medicinal plant garden of RJS College of Pharmacy, Jonathan. Rose water, Petroleum jelly, and vitamin E were taken from the lab and other chemicals such as Nutmeg and red Sandalwood powder were purchased from the shop. All other chemicals used were of suitable and analytical grade.

### Experimental work

#### Preparation of Night jasmine extraction:

1. Firstly take 5g of accurately weighed night jasmine and dry it.
2. After drying the jasmine flower, 0.5g of dried flower is added to 5 ml of water and boiled in a water bath at 100°C up to 2 ml extract.
3. Filter the extract using filter paper.

#### Nutmeg Extraction Preparation:

1. Take a nutmeg and grind it into a fine powder.
2. Weigh out 0.5 grams of this nutmeg powder.
3. Boil the 0.5 grams of nutmeg powder with 5 ml of water in a water bath at 100°C until you have about 2 ml of liquid extract.
4. Filter the extract using filter paper.

#### Preparation method :

The emulsifier and oil soluble components (petroleum jelly, vitamin E) were dissolved in the oil phase and heated to 80°-100°C and other which is water soluble compounds (night jasmine extract, nutmeg extract, rose water) were dissolved and heated up to 80-100°C. There are two phases phase A which is oil soluble and phase B which is water soluble. The aqueous phase is slowly added into the oil phase with continued stirring in one direction. Then add a measured amount of sandalwood and stir vigorously until it forms a smooth cream. Then add a few drops of rose oil as a fragrance. Then all ingredients are properly mixed. Stop stirring when it seems to be partly solid.

#### Evaluation of cream:

##### Physical properties:

Formulated herbal cream was further evaluated by using the following physical parameters:

Color, Odour, Consistency, and state of the formulation.

**a) Colour:** The color of the cream was observed by visual examination.

**b) Odour:** The odor of cream was found to be characteristic.

**c) Consistency:** The formulation was examined by rubbing cream on hand manually. The cream has a smooth consistency. The cream did not leave greasy substances on the skin surface after application.

**d) State:** The state of the cream was examined visually. The cream has a semisolid state.



#### PH of Herbal cream:

The pH of the prepared cream is 6.9. PH of formulated cream is determined by using pH paper. The pH between 4.5 to 7 is suitable for the skin. Due to the neutral pH, herbal cream has the properties of anti-irritant and anti-fungal.

**Determination of Wash ability:** The removal of the cream applied on the skin was done by washing under tap water with minimal force to remove the cream.

#### Determination of homogeneity:

The formulation was tested for homogeneity by visual appearance and touch. [2]

#### Determination of Irritancy:

On the dorsal surface of the left hand, mark a square centimeter. The designated area was covered with the cream, and the time was recorded. For a full day, any erythema, edema, or irritability was noted and recorded at regular intervals.

**Conclusion:** In conclusion, herbal cosmetic products are a great choice for addressing skin issues like pigmentation, wrinkles, aging, and rough texture. They are cost-effective, have no harmful side effects, are environmentally friendly, and are safe to use. These creams not only smooth and moisturize the skin but also enhance its appearance. They help maintain the skin's protective barrier and keep it hydrated. Night jasmine protects the skin from environmental damage, while nutmeg offers antioxidant benefits. Vitamin E helps shield the skin from UV radiation.

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