



# Formation and Evaluation of Anti-acne Cream

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## Abstract

All people experience pimples, acne, marks, and pigmentation at some point in their lives. Customers have started looking for products like anti-acne cream that may treat their skin problems and provide them a good, healthy complexion. The majority of anti-acne creams on the market are filled with chemicals that could have negative side effects on customers. The goal of the current study was to create and assess an anti-acne cream that contained papaya, neem, and tulsi extract. Every person experiences acne, pimples, sunburn marks, and pigmentation at some point in their lives. Customers have started looking for products like anti-acne cream that may treat their skin problems and provide them a good, healthy complexion. Acne treatment items are in high demand worldwide and make great presents. As a result, edible cream has been created using natural components such mung beans, olive oil, aloe vera, etc. These organic components not only benefit the skin but also have no negative side effects.

**Key words-** (Aloe Vera, Papaya, Neem, Tulsi , Anti-acne cream, Anti-aging)

## Introduction

### Cosmetic

Any product used to maintain, enhance, or modify the skin, hair, nails, or teeth is referred to as a "cosmetic." Cosmetics include skincare products (make-up, perfume, skin cream, nail polish, soap, shampoo, shaving cream, deodorant).

Ancient Egyptians and Sumerians both used cosmetics, which have been around for thousands of years. Although attitudes toward cosmetics have changed over time, with the use of cosmetics being openly frowned upon at numerous points in Western history, the use of cosmetics has persisted in Europe into the middle Ages where the face was whitened and the cheeks rouged. Despite the shifts in social perceptions about cosmetics, many people still occasionally used cosmetics to obtain their idealised appearance.



Figure1 Cosmetic Product

Despite the fact that there are many distinct types of cosmetics used for a wide range of various objectives, all cosmetics are normally administered externally. These items can be used on the body's skin, particularly the hands and nails, as well as the hair, as well as the face's skin, lips, brows, and eyes. The subset of cosmetics known as makeup primarily refers to products containing colour pigments intended for the purpose of altering the wearer's appearance. Some manufacturers will distinguish only between "decorative" cosmetics intended to alter the appearance and "care" cosmetics designed for skincare and personal care. These products may be intended for use as skincare, personal care, or to alter the appearance.

## Anti-acne

"A skin ailment marked by red bumps on the skin, particularly on the face, brought on by or resulting from infection."

Acne, sometimes referred to as acne vulgaris, is a chronic skin disorder that develops when oil and dead skin cells clog hair follicles. Blackheads or whiteheads, pimples, greasy skin, and potential scarring are typical symptoms of the illness. The face, upper half of the chest, and back are among the skin areas with a disproportionately high number of oil glands that are most commonly impacted. Lack of confidence, anxiety, low self-esteem, and, in severe cases, depression or suicidal thoughts, might ensue from the appearance.

## Cream

Creams are water and oil emulsions that are semi-solid. They can be further classified into two categories: creams that include small droplets of oil scattered in a continuous water phase (O/W) and creams that contain small droplets of water dispersed in a continuous oily phase (W/O).

## About skin

Human skin is the outer shell of the body and the largest internal organ. The skin has up to seven layers of ectodermal tissue that protect muscles, bones, ligaments and internal organs. Human skin and it is very similar to pig skin. Although almost all human skin is covered with hair, it can appear hairless. There are two general skin types, hairy and bald (hairless). The adjective skin literally means "of the skin" (from the Latin word cutis, skin).

As the skin interacts with the environment, it plays an important role in the immune system, protecting the body against pathogens and excessive water loss. Its other functions include insulation, temperature regulation, sensing, and synthesis of vitamin D and protection of the B vitamin folate. Severely damaged skin tries to heal itself by forming scar tissue. It is often discoloured and pigmented.

In humans, skin pigmentation (influenced by melanin) varies between different population groups, and skin types can vary from dry to non-dry and oily to non-oily. This diversity of skin provides a rich and varied habitat for approximately 1000 species of bacteria from 19 genera found on human skin.

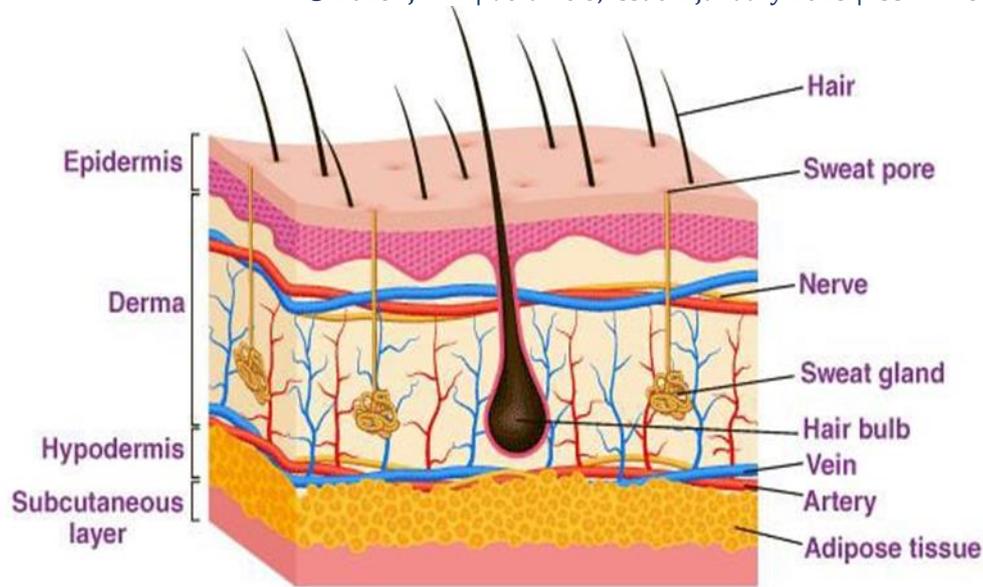


Figure 2 skin diagram.

## Study of ICH Guideline

- Purpose of stability testing is to provide evidence how quality varies with time under influence of.
- Temperature.
- Humidity.
- Light.
- Use to predict shelf-life of product.
- Also Stability studies should include testing of those attributes of the drug substance that are susceptible to change during storage and are likely to influence quality, safety, and/or efficacy.
- Analytical validation.
- Quality of biotechnological product.
- Specifications.
- Development and manufacturing of drug substance.
- Lifecycle management.
- Pharmaceutical quality system.
- Good manufacturing practices.
- Impurities.
- Test procedure acceptance criteria.
- Quality risk management.
- Pharmacopoeias.

## Selection of Ingredients

### 1. NEEM

**Synonym:** Neem tree, Margosa

**Biological source:** Neem consist of the fresh or dried leaves and seed oil of *Azadirachta Indica*.

**Family:** Meliaceae



Figure3 NEEM

#### Chemical constituent:

- I. Nimbosterol
- II. Quercetin
- III. Meliacin
- IV. Salannin
- V. Azadirachtin

#### Uses:

- I. Treatment of acne
- II. Treats uneven skin tone
- III. Lightning strike
- IV. Purifies the blood
- V. For oily skin

### 2. ALOE

**Synonyms:** korphad, Gritakumari

**Biological source:** Dried juice collected by incision from the bases of the leaves of various species of aloe.

**Family:** Liliaceae



Figure 4 ALOE

**Chemical constituents:**

- I. Aloinoside A
- II. Aloinoside B
- III. Capaloresinotannol with p coumaric acid
- IV. Resin of cuaco variety contain Barbaloresino tannol

**Uses:**

- I. It is used to treat painful inflammatory symptoms
- II. Skin wounds are treated wrinkles and aging
- III. It helps reduce wrinkles and aging
- IV. It is also used for acne

**3. Tulsi:**

**Synonyms:** Sacred basil, Kali-Tulsi, Veranda

**Biological source:** Tulsi consists of the fresh and dried leaves of *Ocimum* species like

*Ocimum sanctum L.* and *Ocimum basilicum L.*

**Family:** Lamiaceae



Figure 5 Tulsi

**Chemical Constituents:** Volatile oil (0.8%):

- i. Eugenol, nerol, eugenol methyl ether,
- ii. caryophyllene, terpinene-4-ol-decylaldehyde,
- iii.  $\alpha$ -selinene,  $\alpha$  and  $\beta$ -pinene,
- iv. Camphor and carvacrol
- v. Cineole, linalool.

**Uses:**

- I. Expectorant, bronchitis.
- II. Refrigerant.
- III. Stomachic.
- IV. Carminative.
- V. Spasmolytic Property.
- VI. Stimulant
- VII. Antifungal.

**4. HONEY**

**Synonym:** Madhu

**Biological source:** Honey is a sugary substance/secretion deposited in the honey comb by the hive bee *Apis mellifera* and other species of *Apis*

**Family:** Apidae



Figure 6 HONEY

**Chemical constituent:**

- I. 35% Glucose
- II. 45% Fructose
- III. 2% Sucrose
- IV. Dextrin
- V. Formic acid

**USES:**

- I. Deeply hydrates the skin
- II. Serve as pore cleaners
- III. Helpful for sunburn
- IV. Add a healthy glow
- V. Age reverse

**5. PAPAYA**

**Synonym:** Papain, Papayatin

**Biological source:** It is cultivated fruiting tree known as *Carica papaya*

**Family:** Caricaceae



Figure 7 PAPAYA

**Chemical constituent:**

- I. Papain
- II. Polypeptides
- III. Amides
- IV. Chymopapain

**USES:**

- I. Wrinkle removal
- II. Thoroughly cleans the skin
- III. Help with skin condition
- IV. Hydrates skin
- V. Treatment of facial hair
- VI. Assist in treating dark areas

## Synthetic Ingredient

**1) Glycerine:**

- Act as a humectant
- It is a type of moisturizer agent
- It is used in the skin care product

**2) Rose water:**

- Hydrate the skin
- It is act as a mild astringent
- Used as a toner

**3) Steric acid:**

- It is a emulsifier
- Act as a lunricant
- It is used in a sunscreen, moisturiser

**4) Slake lime:**

- Protects the skin from infections
- Also disinfects the skin

**5) Cetyl alcohol:**

- Helps to prevent creams from separating into oil and liquid
- Make a product thicker

## 6) Triethanol amine:

- Used as a stabilizer
- A viscous organic compound, is made by the reaction of aqueous ammonia and ethylene oxide

## 7) Borax:

- Prevent the bacterial growth
- It is also used as a buffering agent
- Act as a emulsifier

## 8) Propylene glycol:

- Act as a humectant
- Absorb extra water

## 9) Vitamin E:

- Act as a antioxidant
- Protects the skin from various deleterious effects due to solar radiation by acting as free radical scavenger

## Basic Techniques

### Instruments and equipment:

#### 1. Lab scale mixer:



Figure 8 LAB SCALE MIXER

- Adjustable speed control up to 12,500rpm
- Multi-function offers maximum flexibility: homogenise, mix, emulsify, and disintegrate
- Capacity is 1ml up to 12 liters and the ability to in line with flow rates up to 20 liters/min
- Excellent reproducibility when scaling up and accurate and easy

## 2) Cosmetic Cream filler



Figure 9 COSMETIC CREAM FILTER

- Container rim is waxed before filling to ensure a hygienic process
- Can be attached to a foil punching machine and a pre-sealing unit
- Servo motor ensures accurate and precise filling, thus preventing spillage.

## 3) Filling Machine:



Figure 10 FILLING MACHINE

- Can be specified built to GMP standards and suitable for pharmaceutical use
- Capping unit can process screw caps and pressure caps
- Flow meter equipped for sanitary use

## 4. Dispersing machine for emulsions and suspensions:



Figure 11 DIPERSING MACHINE

- During the full continuous process the components to be mixed are fed into the machine at an appropriate rate through various inlet connections.

- These components are then thoroughly mixed, dispersed or homogenized within the machine and discharged from the machine through the outlet.
- Thus, all particles or droplets are treated producing a narrow particle or droplet size distribution with minimal concentration/quality variations.
- The machines are designed for easy and reliable scale-up and sizes are available with throughput from 50 to 125.000 liters per hour.

## **Evaluation Tests:**

### **1) Physical Properties:**

The Cream was observed for colour, Odor and appearance.

### **2) Stability studies:**

Stability testing of drug products begins as a part of drug discovery and ends with the demise of the compound or commercial product. To assess the drug and formulation stability, stability studies were done according to ICH guidelines. The stability studies were carried out as per ICH guidelines. The cream filled in bottle and kept in humidity chamber maintained at  $30 \pm 2^\circ\text{C} / 65 \pm 5\% \text{ RH}$  and  $40 \pm 2^\circ\text{C} / 75 \pm 5\% \text{ RH}$  for a month. At the end of studies, samples were analyzed for the physical properties and viscosity.

### **3) Determination of pH:**

$0.5 \pm 0.01\text{g}$  of the Cream was weighed accurately in a 10ml test tube. 4.5ml of water was added & dispersed the Cream in it. The pH of the suspension was determined at  $27^\circ\text{C}$  using the pH meter.

### **4) Patch Test:**

About 1-3gm of material to be tested was placed on a piece of fabric or funnel and applied to the sensitive part of the skin e.g. skin behind ears. The cosmetic to be tested was applied to an area of 1sq.m. of the skin. Control patches were also applied. The site of patch is inspected after 24 hrs.

### **5) Content of uniformity:**

1 g of each formulation was taken in 100 ml of volumetric flask and diluted with methanol. The sample was shaken properly until the whole sample was dissolved and finally makes up the solution with methanol. The solution was filtered and the filtrate was pipette out and diluted to 10 ml with methanol. The sample was analyzed spectrophotometrically against a similarly treated blank at  $\lambda_{\text{max}} 262 \text{ nm}$ .

### **6) Penetration Test:**

A known weight of Cream is taken and assayed for amount of the drug. Penetration-A weighed quantity of Cream is rubbed over skin for a given period of time and unabsorbed Cream is collected and weighed. The differences in weights represent the amount absorbed.

### **7) Test for microbial growth in formulated creams:**

The formulated creams were inoculated on the plates of agar media by streak plate method and a control was prepared by omitting the cream. The plates were placed in to the incubator and are incubated at  $37^\circ\text{C}$  for 24hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.

### **8) Viscosity:**

The viscosity of cream was determined by Brookfield viscometer. The prepared formulation was poured into the adaptor of the viscometer and determined the viscosity of the test sample as per the standard operating

procedure of viscometer. The spindle was rotated at speeds of 0.5, 1, 5, 10, and 20 rpm. At each speed, the corresponding dial reading on the viscometer was noted. The spindle speed was consecutively lowered and the corresponding dial reading was noted.



Figure 11 Brookfield viscometer

### 9) Spreadability:

The spreadability of cream was determined by the apparatus, which consists of a wooden block, which was provided by a pulley at one end. By this method, spreadability was measured based on slip and drug characteristics of cream. About 2 g cream was placed on the ground slide. Another slide was placed on that slide which has a dimension of a fixed ground slide and provided with the hook. 1 kg weighted was placed on the top of the two slides to provide a uniform film of the cream between the slides. The top plate was then subjected to a pull of 30 gm. With the help of string attached to the hook and the time (in seconds) required by the top slide to cover a distance of 7.5 cm be noted. A shorter interval indicates better spreadability .

Spreadability was measured using the equation:

$$S = M \times L/T$$

Where, M = Weight (gm) taken, L = Length of the slide, T = Time (s) taken.

### 10) Determination of tube extrudability:

Crems were filled in a clean lacquered aluminum collapsible tube and pressed firmly at the crimped end. When the cap was removed, cream extruded until pressure dissipated. Weight in grams required to extrude a 0.5 cm ribbon of cream in 10 s was determined.

### 11) Appearance:

The appearance of the cream was judged by its colour, pearlescence and roughness and graded.

### 12) pH of the cream:

The pH meter was calibrated using standard buffer solution. About 0.5 g of the cream was weighed and dissolved in 50 ml of distilled water and its pH was measured.

### 13) After feel:

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream were checked.

### 14)Removal:

The ease of removal of the cream applied were examined by washing the applied part with tap water.

## CONCLUSION

From the present study it can be concluded that the use of the bioactive ingredients in cream. They provide good and healthy skin. The cream will be prepared with using extracts of papaya fruit neem leaves and tulsi leaves. Tulsi and neem are good source of medicinal properties. It helps in the elimination of acne, pimples and marks. Medicinal plant shows less side effect as compare to chemical compounds. Neem and tulsi shows better anti-inflammatory or anti-fungal effect.

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