

## Formulation and evaluation of anti-acne face cream

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### Abstract

Now a day's the majority of Indians are affected by the persistent skin illness known as acne vulgaris. Sebaceous glands are involved in the chronic inflammatory skin condition known as acne. *Propionibacterium acnes* (P. acne), altered follicular keratinization, inflammation, and androgen-induced enhanced sebum hyper-production are four primary pathophysiology. Due to their minimal adverse effects, many now prefer using herbal products over synthetic ones. We create the anti-acne face cream using ingredients like Manjishtha, Aloe Vera, and almond oil. Indian madder, also known as *Rubia cordifolia*, is found close to streams and rivers. It contains additional qualities including anti-ageing, anti-inflammatory, antibacterial, etc. and is typically used to treat acne. Almond oil is filled with vitamin E, and aloe vera is advantageous and mostly used to cure skin conditions. Certain evaluation test are performed to check whether cream suitable for human skin, its checks whether cream cause the irritancy after applying to skin or not.

**Keywords:** *Propionibacterium Acnes*; Adverse Effect; Manjishtha; Skin Conditions.

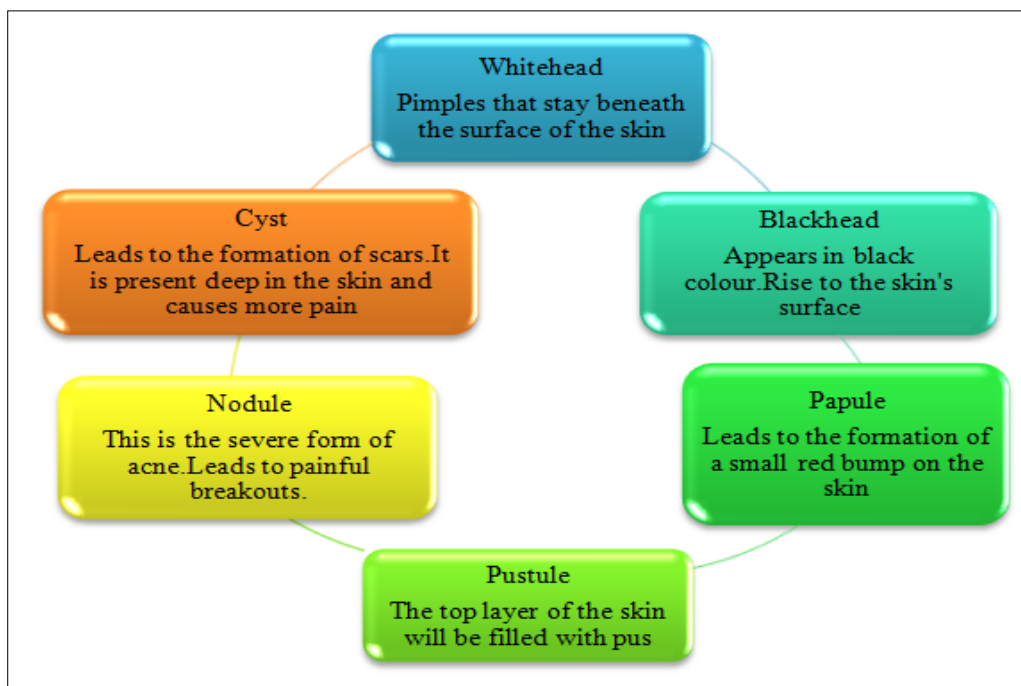
### 1. Introduction

Many people refer the herbal product over the synthetic one, synthetic product produce several harmful side effects compare to the herbal product they have minimal side effect. Acne becomes the major problem now a day's in adults, it affect both the gender (male, female). There are two types of acne disorder which affect the individual. i.e Acne rosacea and Acne vulgaris.

Acne rosacea is a typical, constant, and medically treatable skin disorder that resembles adult acne. Acne rosacea typically affects the middle third of the face, particularly the nose, causing temporary aggravation and temporary relief. The signs may appear and disappear, and the skin may remain clear for several weeks, months, or even years before they reappear. Symptoms and indications of rosacea are: Redness of the face, tiny red pimples and fine red lines on the facial skin. An enormous, bulbous red nose, Eye problems, include puffy, red eyelids and conjunctivitis.

Acne vulgaris, often known as acne, is a common skin ailment brought on by changes in the pilosebaceous units, which are skin structures made up of a hair follicle and the sebaceous gland that lies adjacent to it.[1] Acne symptoms can be divided into three categories: mild, moderate, and severe. Open comedons, also known as blackheads, and closed comedons, sometimes known as white heads, are two types of non-inflammatory lesions. Papules, pustules, cysts, and nodules are all examples of inflammatory lesions. Seborrhea, comedones, inflammatory lesions, the presence of bacteria in the follicular canal, and sebum production are the main characteristics of acne vulgaris.[2-4]

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**Figure 1** Types of acne

### 1.1. Factors responsible for acne:[5]

- *Propionibacterium acnes* (P. acne)
- Altered follicular keratinization
- Inflammation
- Androgen-induced enhanced sebum hyper-production
- Medications.
- Due to the Cosmetics Used
- Stress
- Hormonal Changes and Menstruation
- Squeezing the Pimples.
- Diet
- Genetics
- Over Washing the Face with Cleansers

### 1.2. Treatment of acne

- Mild acne: Benzoyl peroxide
- Moderate acne: Topical retinoids/ antibiotics
- Severe acne: Hormonal therapy

To overcome this problem there are several medications prepared by the Pharmaceutical Industry like, anti acne pills, lotion, moisturizer, creams etc. Cream is a type of semisolid emulsion that is either oil in water (o/w) or water in oil (w/o), and both of these semisolid emulsions are meant to be applied externally.

Cream is categorized as an emulsion of water and oil. It is applied to the outermost or most superficial layer of the skin, and its main benefit is that it lasts longer at the application site. The cream's role is to soothe the skin, heal infections, remove tans and acne, and protect the skin from various environmental conditions.[6] The cream is applied on the skin which have topical drug delivery system.

There are two different kinds of cream.

- **Oil-in-Water (O/W):** An oil-in-water (O/W) emulsion is one in which the oil is spread as droplets throughout the aqueous phase. Oil-in-Water (O/W) creams are formed of minute droplets of oil dispersed in a continuous phase.
- **Water-in-Oil (W/O):** Creams that are made of tiny water droplets scattered throughout an ongoing oily phase are known as "water-in-oil" (W/O) products. The water-in-oil (W/O) kind of emulsion is created when an oil serves as both the dispersion medium and the dispersed phase.[7-9,15]

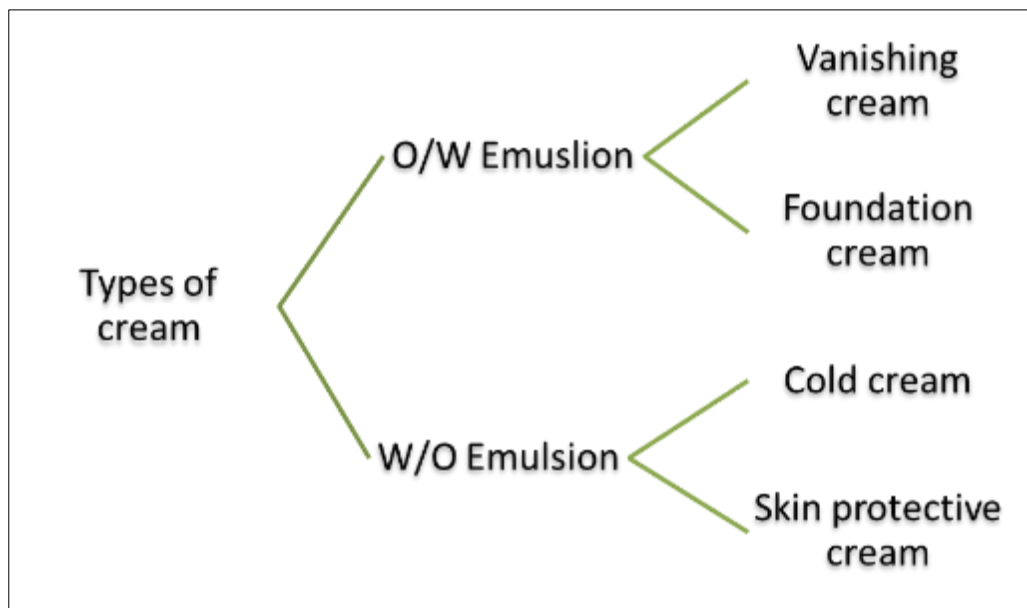


Figure 2 Types of cream

### 1.3. Benefits of topical drug delivery system:[10]




- Preventing first-pass metabolism.
- The ability to quickly stop taking the drugs if necessary.
- A rather broad application area when compared to the nasal or buccal cavities.
- The ability to more precisely target a specific spot for medicine delivery.
- Utilizing medications with a brief biological half-life and enhancing pharmacological and physiological response.
- Patient compliance will be improved.
- Offer suitable self-medication options

### 1.4. Drawbacks of topical drug delivery system:

- The possibility of skin irritation or contact dermatitis as a result of the medication or its excipients.
- Poor skin absorption of several medications.
- The potential for allergic responses.
- Only for medications whose function depends on very low plasma concentrations
- Drugs may be denatured by enzyme epidermis
- Bigger-particle drugs are more difficult to absorb via the skin.

**Table 1** Plant profile

Sr.no	Plant name	Botanical name and family	Chemical constituents	Uses & purpose in cream
1.	<b>Manjishtha</b> [11,24,25]	Botanical name: <i>Rubia cordifolia</i> Family: <i>Rubiaceae</i>	rubiadin, rubiprasin, alizarin, garancin, mollugin, and furomollugin, purpurin, munjistin, xanthopurpurin, and pseudopurpurin.	<b>Uses:-</b> have anti-inflammatory, bronchodilator, pain-relieving, and anti-microbial activities, cure skin infections <b>Purpose:-</b> Make your skin free from the acne and further allergic reaction.
2.	<b>Aloe vera</b> [12,22,23]	Botanical name: <i>Aloe barbadensis</i> Family: Asphodelaceae (Liliaceae)	Aloin, emodin, auxins and gibberellins.	<b>Uses:</b> Soothes Burns and Heals Wounds. Eases Intestinal Problems. Reduces Arthritic Swelling. Heals Psoriasis Lesions. Gum Infections. <b>Purpose:</b> The aloe vera is used as the skin glowing agents and soothing effects. Also has antioxidant activity and anti-inflammatory activity.
3.	<b>Almond oil</b> [13,21]	Botanical name: <i>Prunus dulcis</i> Family– Rosaceae	Almonds contain about 49% oil, which has been reported to include diolein (62%) and triolein (24%).	<b>Uses:-</b> Used for healing wounds, anaemia, sleeplessness, headache, sore throat, brain infections, renal diseases, urinary infections, uteralgia, pityriasis, hysteria. <b>Purpose:</b> It provides skin vitamin E. It gives the skin glowing effects. It has anti-ageing property. Good for skin whitening.

		
<b>Figure 3</b> Manjishtha	<b>Figure 4</b> Aloe vera	<b>Figure 5</b> Almond oil

**Table 2** Excipients profile

Sr.no	Excipients	Category	Properties	Uses
1.	Methyl Paraben	Preservative, carbocyclic benzene derivative	Colourless, odourless ,slightly soluble in water	In cosmetics and eye products, it serves as a preservative.[14]
2.	Bees wax	Emulsifying agent	Yellowish in colour	Beeswax preserves the skin's surface and holds water.[15,16]
3.	Borax	Emulsifying agent	White in colour, non greasy	Responsible for whitening of cream.
4.	Liquid paraffin	Emollient	Yellowish in colour	Lock moisture and prevent skin itching.

## 2. Method of preparation of cream:[6]

- Use two borosilicate beakers. Add liquid paraffin and beeswax, in one beaker, and heat the mixture to 75 degrees Celsius (oil phase).
- Then after add manjishtha oil and almond oil in oil phase beaker.
- Take borax and rose water are dissolved in distilled water and heated to a temperature of 75 degrees Celsius in another beaker (aqueous phase).
- After that, measure the aloe vera gel and add it in aqueous phase.
- Slowly add the aqueous phase and the oil phase.
- Stir it vigorously until it forms a smooth cream.
- Add methyl paraben as a preservative.
- Then pour the cream into the container.

**Table 3** Formula

Sr.no.	Ingredients	F1	F2
1.	Methyl paraben	0.01 g	0.01 g
2.	Borax	0.08 g	0.08 g
3.	Beeswax	1.6 g	1.6 g
4.	Liquid paraffin	5 ml	5 ml
5.	Rose water	q.s.	q.s.
6.	Almond oil	1 ml	1 ml
7.	Manjishtha oil	1 ml	1.5 ml
8.	Aloevera	1 g	1 g

9.	Distilled water	q.s	q.s.
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**Figure 6 Cream**

### 3. Evaluation test

- **PHYSICAL EVALUATION:** - The physical parameters of cream like colour, odour, consistency, and state of formulation were used to further evaluate the formulation.[17]
- **WASHABILITY:** - On the hand, a little amount of cream was applied and washing it with tap water.[15]
- **IRRITANCY:** - These tests are used to determine the quality of the material and the chemicals, as well as whether or not they are damaging to the skin. The cream is initially applied to the hand and left on for a while so that we can check for irritation.[19,20]
- **PHASE SEPARATION:** - Generally, this test is checked every 24 to 30 hours. Put the cream into the container at room temperature and protect the formulation from light for these.[19]
- **HOMOGENEITY:** - The visual appearance and test were used to evaluate uniformity.[19]
- **GREASINESS:** - This test is mostly used to determine whether cream is greasy or oily.[19]
- **pH OF CREAM:** - The pH of the cream should be in range of 5.6-5.8, to avoid irritancy to the skin.[20]
- **VISCOSITY:** - Viscosity of cream is measured by the Brookfield viscometer at room temperature.[15]

### 4. Results

**Table 4** Results of evaluation test

Sr.no	Evaluation test	Formulation 1 [f1]	Formulation 2 [f2]
1.	Physical evaluation		
	Colour	Peach colour	Peach colour
	Odour	Pleasant smell	Pleasant smell
	Texture	smooth	smooth
	State	Semisolid in nature	Semisolid in nature
2.	Washability	Protective film is formed	Protective film is formed
3.	Irritability	No irritancy	No irritancy
4.	Phase separation	Phase separation	No phase inversion
5.	Homogeneity	Positive	Positive
6.	Greasiness	Positive	Positive

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## 5. Conclusion

The globe is shifting towards the traditional use of safer, natural products. In the current study, a formulation of herbal anti-acne face cream that contains a combination of anti-inflammatory herbal plant material that is useful for preventing acne formation is evaluated. This mixture, which combines herbal components with oil- and water-based materials, is extremely environmentally friendly. Thus, we succeeded in

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to disclosed.

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