



FORMULATION AND EVALUATION OF ANTI-HYPERPIGMENTATION CREAM USING TERMINALIA CHEBULA

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Abstract: Skin is the largest organ of the human body and barrier for external environments including pollution, sunlight, radiation, harmful microbes, and chemicals. Skincare products are medicinal formulations prepared to be used on external parts of the human body to produce therapeutic topical effects and shield the deteriorated skin. Herbal skincare creams have been widely used by many generations for centuries for the purpose of skincare. Nowadays, these herbal skincare creams are becoming more popular and prevalent among people due to their mindset and concerns about synthetic or chemical substances that may lead to adverse effect. The Demand of herbal cosmetics due to the availability of new ingredients the financial rewards for developing successful products and maintained of quality standard. Herbal skin clarifying and UV protection cream is a herbal cream which was formulated for the purpose of moisturizing, hydrating, making skin supple, anti-aging, anti-wrinkle, depigmentation, anti-oxidant, maintaining skin pH, nourishing, UV protection and treatment of various skin diseases like hyperpigmentation, wrinkles, acne, skin aging, photo aging, tanning. Herbal cream was formulated by using crude drugs like Terminalia chebula. The prepared cream was evaluated for various parameters like physical evaluation, washability, pH, irritancy, phase separation, greasiness. Thus the cream proved to be safely used on skin which provides a protection from hyperpigmentation and UV rays.

Keywords: Anti-Hyperpigmentation, Terminalia Chebula, Depigmentation.

Introduction:

1.1 Skin:

Skin is the largest organ of the human body which has been outlined to have more than 20 vital physiological functions. Skin acts as a protective barrier against pressure and trauma. It also acts as a barrier for external environments including pollution, sunlight, radiation, harmful microbes, and chemical. ^[1] The skin is composed of three layers: the epidermis, the dermis, and subcutaneous tissue. The outermost level, the epidermis, consists of a

specific constellation of cells known as keratinocytes, which function to synthesize keratin, a long, thread like protein with a protective role. The middle layer, the dermis, is fundamentally made up of the fibrillar structural protein known as collagen. The dermis lies on the subcutaneous tissue, or panniculus, which contains small lobes of fat cells known as lipocytes.^[2]

The epidermis can be further subdivided into four layers, beginning with the outermost layer; stratum corneum, granular cell layer, prickle cell layer and basal cell layer.^[3]

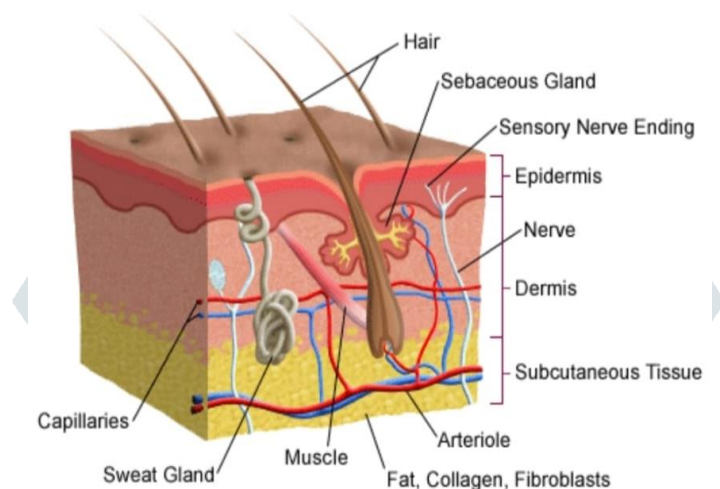


Fig.No.01: Cross section of skin

1.2 Topical Drug Delivery

Topical delivery can be defined as the application of a drug containing formulation to the skin to directly treat cutaneous disorder or the cutaneous manifestations of a general disease.^[4]

1.3 Cream

Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application^[5]. Creams are semisolid dosage forms containing more than 20% water or volatile components and typically less than 50% hydrocarbons, waxes, or polyols as vehicles

1.4 Classification of creams:

All the skin creams can be classified on different basis:

1. According to function, e.g. foundation, massage, cleansing, etc.
2. According to characteristics properties, e.g. cold creams, vanishing creams, etc.
3. According to the nature or type of emulsion:
 - Make-up cream (o/w emulsion): a) Vanishing creams. b) Foundation creams.
 - Cleansing cream, Cleansing milk, Cleansing lotion (w/o emulsion)
 - Winter cream (w/o emulsion): a) Cold cream or moisturizing creams.

- All-purpose cream and general creams.
- Skin protective cream.
- Hand and body creams.
- Night cream and massage creams.^[6]

1.5 Herbal Cream

Herbal Creams are the cosmetics which are prepared using plant products having cosmetic actions.

In cosmetics, both natural and Phyto-ingredients are used. Natural products include oils, extracts, secretions etc.

Herbal cosmetic have growing demand in the world market and is an invaluable gift of nature. Herbal formulations always have attracted considerable attention because of their good activity and comparatively lesser or nil side effects with synthetic drugs.^[5]

1.6 Hyperpigmentation

Hyperpigmentation of the skin is a common dermatological condition in which the color of the skin generally becomes darker. These changes in skin coloration can be a result of various internal and external factors including hormonal changes, inflammation, injury, acne, eczema, certain medication, UV exposure, etc.^[7]

Melanin is a pigment which is responsible for the color of the human skin. Hyper pigmentation is a situation in which large amount of melanin is synthesized. This generally happens due to excess exposure of the skin to the sun. In reaction to UV rays in sunbeams, the skin cells called melanocytes initiate to synthesize melanin. This increased synthesis of melanin is responsible for the emergence of darkened patches on the skin. Terminilia chebula has the property of diminishing the pigmentation and dark spots on the face.^[8]

In melanogenesis, the enzyme tyrosinase plays a crucial role in the conversion of L-dopa to melanin via tyrosinase activity. This activity is a rate-limiting process which regulates the production of melanin. Phytochemicals which can inhibit the actions of tyrosinase can help to reduce the rate of melanin production and thus produces skin whitening effects.^[5]

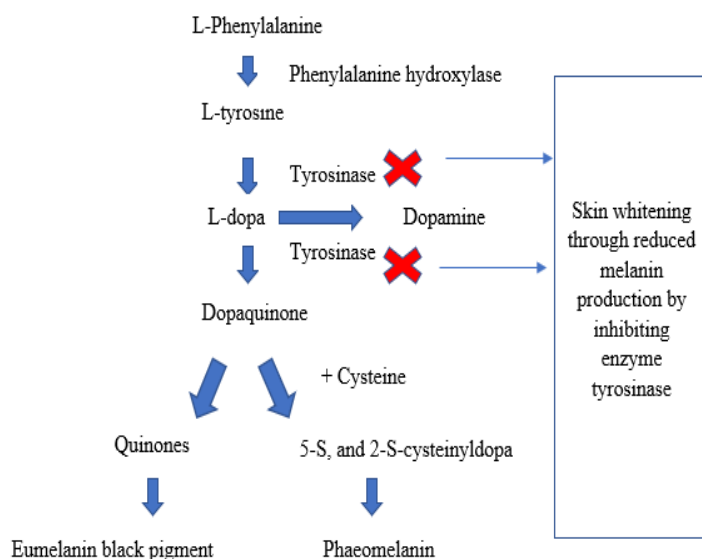


Fig.No.02. Mechanism of hyperpigmentation

1.10 Causes of Skin Pigmentation

Skin pigmentation is a common condition that can be triggered by various factors. The leading causes of skin pigmentation are:

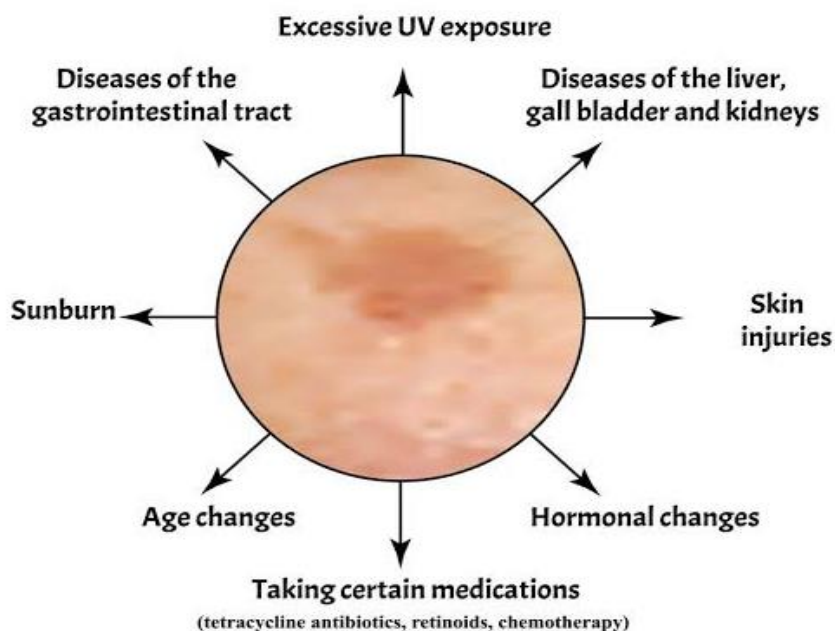


Fig.No.03. Causes of pigmentation

2. Drug Profile:

2.1 Terminilia chebula:








FIG NO:04: Terminilia chebula

- **Common name:** Myrobalan
- **Family:** Combretacea
- **Chemical constituents:** Chebulinic acid, Chebulic acid
- **Uses:** 1] Used to reduce pigmentation.

- 2] Improves appearance of skin.
- 3] It hydrates the skin.
- 4] Improves skin texture ^[9].

2.2. Excipients profile:

S.no	Ingredients	Use	Figure
1.	Petroleum jelly	Patch test instrument, moisturizer, nonflammable, noncomedogenic, smoothing.	
2.	Cetyl alcohol	Emollient, emulsifier, thickener, moisturizing agent	
3.	Glyceryl monostearate	skin care, cosmetic, moisturizer prevent dehydration and damage emulsifier.	
4.	Methylparaben	Preservatives, antibacterial, antimicrobial, antifungal.	
5.	Propylparaben	Preservatives, skin cleansing, moisturizer, antimicrobial	


6.	Rose water	Perfuming agent, improve complexion, antibacterial, acne.	
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Table no.1: Excipients used for the cream preparation.

3. Material and Method

3.1. Material:

The Terminalia Chebula fruit powder was procured from Biotic nature products.

3.2 Extraction of Terminalia Chebula:

The Aqueous extract was prepared by maceration process as follows: 100 gm of Terminalia Chebula powder was weighed and put in a conical flask. Distilled water was added. Few drops of chloroform were added. The mix was kept in the conical flask for a period of 7 days with intermittent shaking of the mix. After 7 days, the mass obtained was filtered through a muslin cloth. The filtrate obtained was then placed in a China dish on a water bath with a conical flask inverted over it, and the mass was then dehydrated. The opening of the conical flask was plugged with cotton to avoid external contamination. A semisolid mass was obtained, which was stored in an air tight container [10].

3.3 Method of preparation:

The emulsifier (glycerol monostearate) and other oil soluble components (petroleum jelly, Cetyl alcohol) were dissolved in the oil phase (Part A) and heated up to 80° C.

Extract and water soluble components (Methyl paraban, Propyl paraben, Rose water) were dissolved in (Part B) and heated up to 80° C.

After heating, the aqueous phase was added in portions to the oil phase with constant stirring until cream is formed, and cream was formulated having superb color i.e. Lemon yellow. All the formulation of Batches are given in table no.2.

S. No.	Ingredients	F1	F2	F3	F4
1	Terminilia Chebula	6 gm	7gm	8gm	5gm
2	Petrolium jelly	6 gm	5gm	4gm	7.4gm
3	Cetyl alcohol	1.7gm	1.8gm	2.0gm	2.1gm
4	Glyceryl monostearate	1.3gm	1.7gm	1.6gm	1.0gm
5	Propylparaben	0.9gm	0.9gm	0.9gm	1.2gm
6	Methylparaben	1.2gm	1.2gm	1.2gm	1.0gm
7	Rose water	7.9 ml	7.4 ml	7.3ml	7.3 ml

Table no.02: Composition of anti-hyperpigmentation cream

4. Evaluation:

4.1 Organoleptic evaluation:

In this test, the cream was observed for color, odor, and texture by physically.

4.2 Irritancy:

Mark the area 1 cm² he left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported.

4.3 Washability:

A small amount of cream was applied on the hand and it is then washed with tap water

4.4 pH:

PH 0.5 g cream was taken and dispersed in 50 ml distilled water and then pH was measured by using digital PH.

4.5 Phase separation:

Prepared cream was kept in a closed container at a temperature of 25-100 °C away from light. Then phase separation was checked for 24 h for 30 d. Any change in the phase separation was observed.

4.6 Greasiness:

Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like.

5. Result and Discussion:

5.1 Organoleptic Evaluation: Cream was evaluated for organoleptic parameters showed in the following table. The different formulation of cream were prepared and evaluated for physical parameters. The colours of formulations were different due to variation in composition of contents. Formulation F1 has creamy white, F2and F3 has pale

yellow in colour and formulation F4 showed white. The texture of formulations is fine and smooth are acceptable. The odour of prepared formulations was good, acceptable which is desirable as cosmetic formulations.

S.NO.	Parameters	Observations			
		F1	F2	F3	F4
1	Color	Creamy white	Pale yellow	Pale yellow	White
2	Odor	Pleasant	Pleasant	Pleasant	Pleasant
3	Texture	Smooth	Smooth	Smooth	Smooth
4	State	Semisolid	Semisolid	Semisolid	Semisolid
5.	Appearance	Creamy	Creamy	Creamy	Creamy

Table no.03: Organoleptic evaluation results

5.2 Washability, pH and Irritancy results: This parameters refers to table no.05. The different formulation of cream were prepared and evaluated for washability, pH, and irritancy. The formulations are easily washable after applying to the skin. The pH of formulations are according to the all skin types. The Formulations does not show any Irritation on applying. The summary of results are shown in the table below:

S.NO.	Parameters	Observations			
		F1	F2	F3	F4
1	washability	Easily washable	Easily washable	Easily washable	Easily washable
2	Irritancy	Nil	Nil	Nil	Nil
3	pH	5.8	5.9	5.7	5.8

Table no.04: Washability, pH and Irritancy results

5.3 phase separation and Greasiness results: According to the results, no phase separation and non-greasiness was observed. The summary of results are shown in the table below:

S.NO.	Parameters	Observations			
		F1	F2	F3	F4

1	Phase separation	No phase separation	No phase separation	No phase separation	No phase separation
2	Greasiness	Non-greasy	Non-greasy	Non-greasy	Non-greasy

Table no.05: phase separation and Greasiness results

6. Conclusion:

In this present study are conclude that the prepared formulation of anti-hyperpigmentation cream complies all the evaluation parameters which are tested. It proved that the cream was prepared is effective for reducing hyperpigmentation, cleansing, moisturizing, smoothing effect on the skin. The formulation is beneficial for easy application and no side effects and are mostly preferred by the peoples. Due to antibacterial, anti tyrosinase and anti-inflammatory properties of Terminalia chebula it prevents skin related disorders also improves skin tone, protects from damaging UV rays. By this study, using Terminalia chebula achieved more effective and quality product to improve skin tone, and beautifying skin. After the evaluation of prepared formulation it suggested that the prepared formulation was physico-chemically stable and possessed characteristics of standard topical formulation.

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