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Formulation And Development Of Herbal Skin Whitening Cream

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INTRODUCTION :

Cosmetics are used to enhance the beauty of human beings. Herbal products are widely used in cosmetics. Cream is o/w or w/o emulsion which contain aqueous and oily. Cosmetics preparations are used to treat various types of skin disorders like skin pigmentation , skin ageing , acne. In recent years , the number of Asian women aspiring for a whiter skin complexion has increased dramatically. This is due partly to the discovery of many effective skin whitening agents , particularly those derived from plants. The skin colour is mainly determined by the epidermal pigment called melanin. It is secreted by melanocyte cells in the basal layer of the epidermis. Melanin may be over produced due to chronic sun exposure, melasma, reactive oxygen species (free radicals) or other hyperpigmentation diseases. The excessive melanin production is not desirable since it may cause a darker or uneven skin colour. Changes in colour are also desired for cosmetic reasons. The initial process of melanin production(melanogenesis) is controlled by tyrosinase, which is an enzyme catalysing the hydroxylation of tyrosine, the precursor of melanin, into dihydroxyphenylalanine and other intermediates. Thus, inhibition of tyrosinase activity or its production can prevent melanogenesis, and reducing the uneven skin colour. Hence the plants produces strong anti-tyrosinase activity is used for skin whitening agent in cosmetic preparations.

Benefits of Herbal whitening Cream :

The benefits of using herbal whitening cream are as follows :

• Assist in minimizing pigmentation and fine wrinkles.

• Nourishes skin and encourages immediate luminosity

• Optimises skin tone and hydration throughout the day.

• Shield the skin from damaging UV radiation.

Reduces the appearance of dark circles and age spots. Enhances the texture of the skin.

APPLICATION OF HERBAL CREAM :

Herbal whitening creams are topical products that aim to lighten and even out skin tone, reducing the appearance of dark spots, hyperpigmentation, and melanin content. The applications of herbal whitening creams include:

1. Skin lightening: Herbal whitening creams can help reduce melanin production, leading to a lighter and more even skin tone.

2.Hyperpigmentation treatment: These creams can be used to treat hyperpigmentation caused by sun exposure, hormonal changes, or skin injuries.

3. Dark spot reduction: Herbal whitening creams can help reduce the appearance of dark spots, freckles, and age spots.

4. Skin tone evening: These creams can help even out skin tone, reducing the appearance of uneven skin pigmentation.

5. Anti-aging: Herbal creams with antioxidants and essential oils can help reduce fine lines , wrinkles ,and age spots.

SKIN :

Skin is the largest organ of the body. The skin and its derivatives (hair, nails, sweat and oil glands) make up the integumentary system. One of the main functions of the skin is protection. It protects the body from external factors such as bacteria, chemicals, and temperature. The skin has 3 layers-the epidermis, dermis and hypodermis. Epidermis is the outermost layer of the skin. The dermis layer is beneath the epidermis of the skin. Hypodermis layer is not a part of the skin,but associated with reticular dermis.

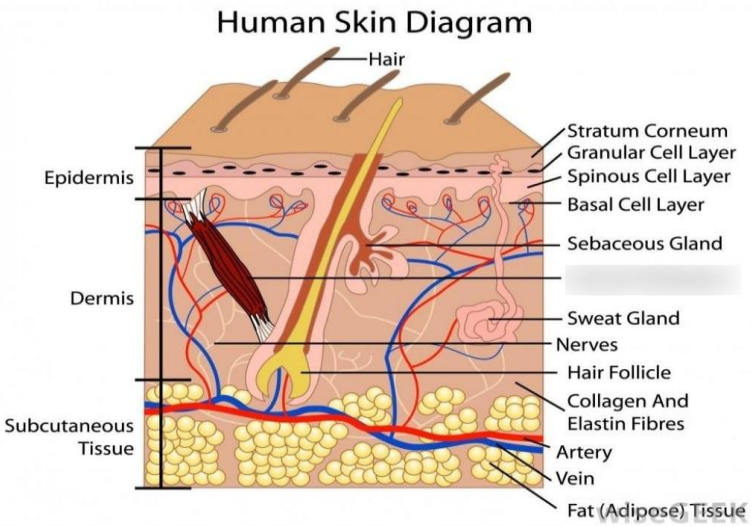

Fig No.1.Diagram of human skin

FACTORS CAUSING TANNING :

Melanin is a natural pigment produced by cells called melanocytes. Melanin protects the body by absorbing the ultraviolet radiation coming from the sun. Tanning can be triggered by natural sunlight. Although excessive UV radiation causes sunburn along with other direct and indirect DNA damage to the skin, the body however naturally combats and seeks to repair the damage and protect the skin by creating and releasing further melanin into the skin's cells. With the production of melanin, our skin color tends to darken, leading to an increase in dullness and an uneven skin tone. UVA radiation coming from the sun creates oxidative stress, which in turn oxidizes existing melanin and leads to rapid darkening of the melanin. Tan skin from UVA exposure does not lead to significantly increased production of melanin or

protection against sunburns. In the second process, triggered primarily by UVB radiation, there is an increase in production of melanin (melanogenesis), which is the body's reaction to direct DNA photodamage from UV radiation.

IMPORTANCE OF HERBAL WHITENING CREAM :

Here are 5 importance of herbal cream:

1. Natural Ingredients: Gentle and non-irritating.

2. Moisturizing: Hydrates and protects the skin.

3. Therapeutic Properties: Anti-inflammatory, antibacterial, or antioxidant.

4. Skin Concerns: Addresses acne, hyperpigmentation, or aging.

5. Fewer Side Effects: Compared to chemical-based products.

MATERIAL AND METHODS :

1.Aloevera gel :

Fig No.2.Aloevera gel

Taxonomical classification :

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Liliopsida
- **Order**: Asparagales
- **Family**: Asphodelaceae
- **Genus**: Aloe
- **Species**: Aloe vera
- **Uses -**Soothe skin irritation, Moisturize and hydrates, Skin healing

2.Turmeric

Fig No.3.Turmeric

Taxonomical classification : Plantae

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Liliopsida
- **Order**: Zingiberales
- **Family**: Zingiberaceae
- **Genus**: Curcuma
- **Species**: Curcuma longa
- **Uses**- Skin toning and brightening,Anti-aging , Soothing and calming

3.Potato Starch:

Fig No.4.Potato Starch

Taxonomical classification :

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Magnoliopsida
- **Order**: Solanales
- **Family**: Solanaceae
- **Genus**: Solanum
- **Species**: Solanum tuberosum
- **Uses**: Thickening agent , cosmetics ,absorbent properties , soothing and calming effect.

4.Tea tree oil :

Fig No.5.Tea tree oil

Taxonomical classification :

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Magnoliopsida
- **Order**: Myrtales
- **Family**: Myrtaceae
- **Genus**: Melaleuca
- **Species**: Melaleuca alternifolia
- **Uses**: Anti-bacterial and Anti-fungal properties , Anti-inflammatory properties .

5.Sandalwood oil :

Fig No.6.Sandalwood oil

Taxonomical classification :

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Magnoliopsida
- **Order**: Santalales
- **Family**: Santalaceae
- **Genus**: Santalum
- **Species**: *Santalum album*
- **Uses**:Reduces appearance of scars and blemishes , soothing sunburns and skin irritations , providing natural woody fragrance.

6.Jojoba oil :

Fig No.7.Jojoba oil

Taxonomical classification :

- **Kingdom**: Plantae
- **Phylum**: Tracheophyta
- **Class**: Magnoliopsida
- **Order**: Caryophyllales
- **Family:** Simmondsiaceae
- **Genus**: Simmondsia
- **Species**: *Simmondsia chinensis*
- **Uses**-sooth and calm irritated skin , Improve skin elasticity , Enhance overall skin health , Antio-oxidant properties .

7. Glycerin :

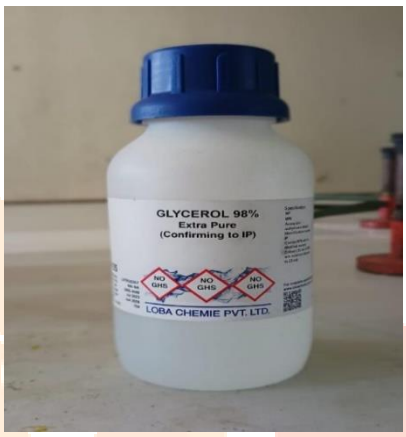

Fig No.8.Glycerin

Chemical Profile:

- **Chemical Name:** Glycerol
- **Chemical Formula:** $C_3H_8O_3$
- **Type:** Simple polyol (sugar alcohol) compound
- **Sources:**
  - **Natural:** Derived from plant oils (e.g., soy, palm, coconut) or animal fats via hydrolysis
  - **Synthetic:** Can also be produced from petrochemical sources
- **Uses**- Hydrates skin , soothes dryness, Improve skin texture.

8. Sodium Lauryl Sulphate:

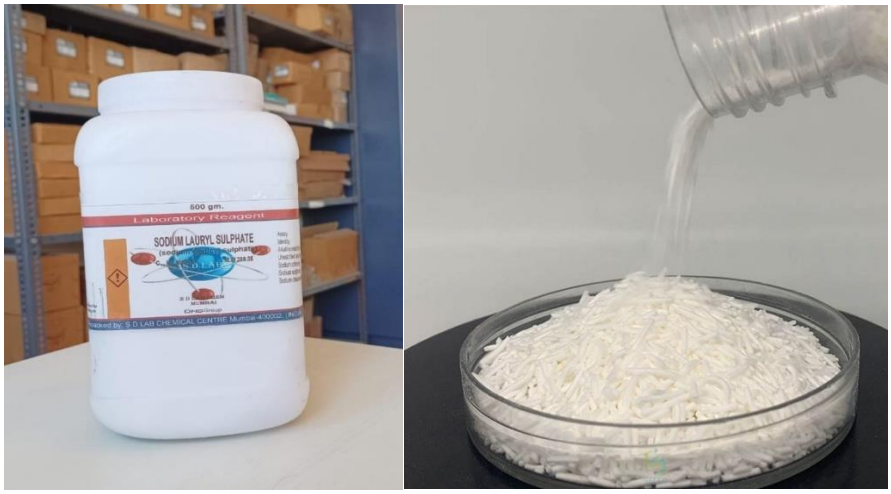

Fig No.9.Sodium lauryl sulphate

Chemical Profile:

- **Chemical Name**: Sodium Lauryl Sulfate
- **Chemical Formula**: $C_{12}H_{25}SO_4Na$
- **Type**: Anionic surfactant
- **Appearance**: White or yellowish powder or crystals, soluble in water
- **Uses:**Cleansing properties , Emulsifier , Remove dirt and oil .

9.Triethanolamine :

Fig No.10.Triethanolamine

Chemical Profile:

- **Chemical Name**: Sodium Lauryl Sulfate
- **Chemical Formula:** $C_{12}H_{25}SO_4Na$
- **Type:** Anionic surfactant
- **Appearance:** White or yellowish powder or crystals, soluble in water
- **Uses-** pH adjuster , Emulsifier , Moisturizer , Maintaining stability .

10. Methyl Paraben :

Fig No.11.Methyl paraben

Chemical Profile:

- **Chemical Name**: Methyl 4-hydroxybenzoate
- **Chemical Formula**: $C_8H_8O_3$
- **Type**: Synthetic paraben (a type of ester of p-hydroxybenzoic acid)
- **Appearance**: White, odorless crystalline powder or flakes
- **Solubility**: Slightly soluble in water, more soluble in alcohol
- **Uses**- Preservative , Anti-bacterial , Extent shelf life .

11.Stearic Acid :

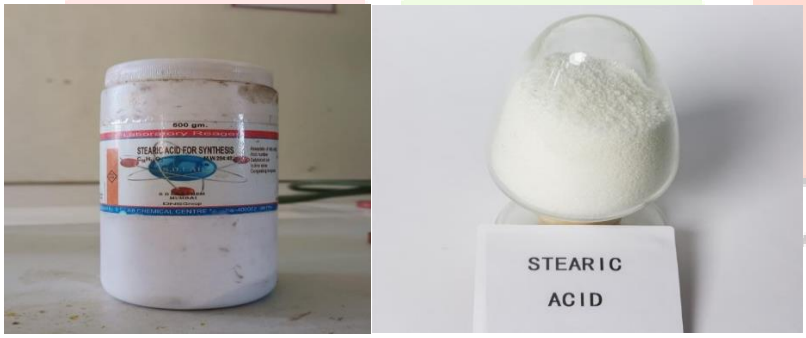

Fig No.12 Stearic Acid

Chemical Profile:

- **Chemical Name**: Octadecanoic acid
- **Chemical Formula**: $C_{18}H_{36}O_2$
- **Type**: Saturated long-chain fatty acid
- **Appearance**: Waxy, white, solid at room temperature
- **Solubility**: Insoluble in water; soluble in alcohol and oil
- **Uses**-Emollient and moisturizer , Thickening Agent , Stabilizer , Skin protectant.

12.Almond oil :

Fig No.13.Almond oil

Taxonomical Classification:

- **Kingdom**: Plantae
- **Phylum (Division)**: Tracheophyta (Angiosperms)
- **Class**: Magnoliopsida (Dicots)
- **Order**: Rosales
- **Family**: Rosaceae
- **Genus**: *Prunus*
- **Species**: *Prunus dulcis*
- **Uses**-Moisturizing ,Nourishing , Anti-inflammatory ,Skin tone evening .

13.Saffron :

Fig No.14.Saffron

Taxonomical Classification:

- **Kingdom**: Plantae
- **Phylum (Division)**: Tracheophyta (Angiosperms)
- **Class**: Liliopsida (Monocots)
- **Order**: Asparagales
- **Family**: Iridaceae
- **Genus**: *Crocus*
- **Species**: *Crocus sativus*
- **Uses:** Antioxidant,Antiinflammatory,Skin Brightening, Moisturizing, Antiaging agent

14.Lemon juice :

Fig No.15.Lemon juice

Taxonomical Classification:

- **Kingdom:** Plantae
- **Phylum :** Tracheophyta
- **Class:** Magnoliopsida
- **Order:** Sapindales
- **Family:** Rutaceae
- **Genus:** Citrus
- **Species:** Citrus limon
- **Uses:** Astringent, Antibacterial, Exfoliant

15.Vitamin E Capsule :

Fig No.16.Vitamin E capsule

Chemical Profile:

- **Chemical Name:** Alpha-tocopherol
- **Chemical Formula:** $C_{29}H_{50}O_2$
- **Type:** Fat-soluble vitamin
- **Sources**: Found naturally in vegetable oils, nuts, seeds, leafy greens, and fortified foods
- **Supplement Form:** Usually synthetic or naturally derived and encapsulated in soft gels
- **Uses:** Source Of vitamin E

Formulation Of Herbal Whitening Cream:

Formula

Sr. No.	Ingredients	F1	F2	F3	F4	Role of Ingredients
1.	Aloevera Gel(gm)	5	4	2	3	Antioxidants
2.	Turmeric(gm)	1	3	2	1	Antiinflammatory
3.	Potato Starch(gm)	25	23	20	22	Binder
4.	Tea tree oil(ml)	2	1	1	2	Antibacterial
5.	Sandalwood Oil(ml)	1	2	1	2	Prevent Pimples
6.	Jojoba oil(ml)	5	4	3	5	Brighten skin and Fade dark spots
7.	Glycerine(gm)	18	16	15	17	Soften The Skin
8.	SLS (gm)	1	3	2	1	Cleansing agent
9.	Triethanolamine(gm)	5	4	5	3	Emulsifying and Neutralising agent
10.	Methyl Paraben(gm)	0.02	0.01	0.04	0.03	Antimicrobial and increase product stability
11.	Stearic Acid(gm)	10	8	7	9	Antiinflammatory
12.	Almond oil(ml)	4	3	4	5	Breakdown excess sebum
13.	Saffron (ml)	1	2	1	2	Antioxidant,Antiaging
14.	Lemon Juice(ml)	5	3	4	2	Natural Bleaching Agent
15.	Vitamin E (ml)	2	3	1	2	Source Of VitaminE

Table No.1. Formulation of herbal whitening cream

PROCEDURE :

1) Weigh All The Ingredients.

2) Prepare Oil Phase and Aqueous Phase.

3) Add jojoba oil, sandalwood oil, tea tree oil, saffron. almond oil, Stearic acid in given quantity to prepare oil phase.

4) Add Turmeric in alcohol and mix well .Add this mixture in oil phase.

5) To prepare aqueous phase add potato starch in warm water then add aloevera gel into it.

6) Then add Almond oil, lemon juice, SLS, glycerine, into the above aqueous solution.

7) Add methyl paraben, triethanolamine and vitamin e in the aqueous solution.

8) Now Mix the aqueous phase properly.

9) Make temperature of oil and aqueous phase equal to approximately 40 degree

10) Now add oily phase into aqueous phase slowly and stir the mixture to make the final product.

Fig No.17. Herbal skin whitening cream

EVALUATION OF HERBAL WHITENING CREAM:

- **Appearance**: All the 6 batches of herbal cream are tested for appearance by visual observation.
- **Determination of pH**: The pH of herbal cream was determined by using a pH meter. The measurements was performed at 1, 30, 60, 90 days after preparation to detect any pH changes with time.
- **Viscosity:** The viscosity of the prepared herbal skin whitening cream was carried out by Brookfield viscometer (Model RVTDV). The readings were taken at 100 rpm using spindle no.6.
- **Drug diffusion**: The drug diffusion of all 6 batches are carried out by Franz diffusion cell using cellophane membrane. Franz diffusion cell consist of 2 compartments one is donor and other is receiver. And in between the 2 compartment cellophane membrane is placed.
- **Drug content**: For determination of drug content 1gm of cream was dissolved in 30 ml of methanol and kept for 1hour by continuous stirring. After 1 hour the solution was ultra-sonicated for 15 min to get uniform solution. And then absorbance of that sample was measured at 255nm by using UV spectrophotometer and drug content was calculated.
- **Centrifugation testing**: For centrifugation testing all 6 batches of cream are placed in centrifugation testing apparatus and the separation of two phases was observed.
- **Freeze thaw test**: In freeze thaw testing herbal creams is placed in freeze at low temperature and then cream was placed at room temperature. This cycle was repeated for 5 times and changes were observed by visual observation.
- **Sun exposure evaluation**: In the sun exposure evaluation cream was placed under sun light for 24 hours and the changes are observed by visual observation.
- **Homogeneity test**: All creams were tested for physical homogeneity by visual observation.

- **Stability study of herbal cream**: The stability study was performed as per ICH guidelines. The formulated herbal creams are filled in well closed containers and stored at different temperatures and humidity conditions, viz. 400 ± 20c and 75 ± 5% RH for period of 3 months. Samples were taken after 3 months and evaluated for appearance, pH, viscosity.

RESULT :

The formulated whitening cream exhibited no redness, edema, inflammation and irritation. The texture and the uniformity of the colour was checked. The emolliency, slipperiness and amount of residue not after the application of fixed amount of cream. The cream was easily removed by washing with tap water.

CONCLUSION :

Based on the discussion above, it can be inferred that blending extracts of ,sandalwood , and aloe vera gel in various ratios will have a multifunctional impact on the skin that includes sun protection, anti-aging, and whitening. As is well known, a single plant extract cannot be made more effective in terms of its medicinal and cosmetic qualities; nevertheless, combining plant extracts can make an extract more effective in this regard. We combine the extracts of rose petal powder, sandalwood, and aloe vera gel to enhance and harmonize the created product's aesthetic qualities in comparison to each extract alone. More study will be done to determine the precise scientific action of the chosen composition. The research indicates that the makeup of the extract of scientific activity of a chosen composition. According to studies, base cream extract composition is safer and more stable. It might have had a synergistic effect.

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