RESEARCH PAPER

Development And Evaluation Of Liquorice Root Extract-Based Cream For The Management Of Hyperpigmentation

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ABSTRACT:

Hyperpigmentation is caused due to excess melanin production it was one of the frequent disorder ,it which often triggered by some factors are sun exposure, hormonal fluctuations or skin injury ,these which leads to an Hyperpigmentation.(1) This is also known as common dermatological disorders. A Conventional therapies , such as corticosteroids and hydroquinone these are linked to negative significant. So, increasing demand for some safer plant- based substituents.(3) A Licorice extract is an strong skin –lightening and some antioxidant qualities since it which contain glabridin,a natural tyrosine inhibitor. The other therapeutic benefit of an Licorice's (Glycyrrhiza.spp) are anti-androgenic, antibacterial, anti-inflammatory, antioxidant, depigmentation. (2)

KEY WORDS: Liquorice root, Cream, Hyperpigmentation, Nano-emulsion, skin brightening

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INTRODUCTION:

A Hyperpigmentation conditions are some areas of the skin are darker than the surrounding skin due to an increased production of melanin, the pigment responsible for skin color.[4] This can be occur when melanocytes become overactive in certain region , which leading to localized dark patches. Factors such as sun exposure, inflammation, hormonal changes, aging, acne, skin injury, drugs or illness. Hyperpigmentation is an often Harmless, but it cause lower a person's self esteem. The Hyperpigmentation is most prevalent in pregnancy women which is often caused due to Hormonal changes & the women who using oral contraceptives pills also can cause hyperpigmentation.[5] Skin injury , burns, cosmetic operation is known as PIH is also known as Post-inflammatory hyperpigmentation. The Age spots are brought due to buildup of melanin in the particular skin region exposure due to Ultraviolet (UV)radiation from the Sun.[6]

The Botanical Background of Licorice root (Glycyrrhiza glabra) plant found in Europe, Asia & Mediterranean it which has been used as an traditional medicine. These Licorice root has been treat Several illness, such as skin condition, respiratory difficulties & digestive problem.[7] Its roots which is well known of sweet taste and therapeutic effect. Licorice it contain two bioactive substance are: Glycyrrhizin and Glabridin. These two major substance which enables the anti- inflammatory , antioxidant, antibacterial and skin lightening qualities. Glycyrrhizin Z:a triterpenoid saponin compound responsible for anti- inflammatory, soothing and antioxidant effect

Glabridin:It block the action of the enzyme tyrosinase thereby reducing melanin production. It helps in treating hyperpigmentation, spot & improving overall skin tone due to antioxidant and anti-inflammatory properties.[1] Common treatment for hyperpigmentation is hydroquinone, arbutin and kojic acid and anti-oxidants like Vitamin C & Niacinamide and exfoliants. However, gabardine's antioxidant qualities which protect skin from oxidative stress and inflammation, it further act as pigmentation problem.[8] One of the major component of Licorice root, glycyrrhizin has anti- inflammatory qualities that may help to less the irritation and it is effective and safety, it which also increasing skin moisture, skin elasticity & overall appearance. Its principle of active constituent gabardine it inhibits the tyrosinase enzyme thereby reducing melanin synthesis. In addition, licorice exhibits potent antioxidant and anti inflammatory pigmentation. [9]

PRE-FORMULATORY STUDIES

1. Identification

- Licorice extract was obtained from the dried roots of Glycyrrhiza glabra.
- The extract was dark brown in color.
- It had a characteristic sweet odor.
- The extract was free from foreign particles.
- Organoleptic characters were noted.
- This confirmed the identity of licorice extract.[10]

2. Solubility

- Solubility of licorice extract was studied.
- The extract was tested in water and alcohol.
- It showed good solubility in water.
- Partial solubility was observed in alcohol.
- This helped in selecting aqueous phase.
- Hence, it was suitable for cream formulation.[9]
- **pH DeterminationThe pH of licorice extract was measured using pH meter.**
- A small quantity of extract was dissolved in water.
- The pH was found to be near neutral.
- It was within skin acceptable range.
- This ensures non-irritancy to skin.
- It is suitable for topical use.[11]

3. Compatibility studies

- Compatibility of extract with excipients was studied.
- The extract was mixed with formulation ingredients.
- The mixtures were observed visually.
- No color change or precipitation was seen.
- No physical incompatibility was observed.
- Thus, the extract was compatible with excipients.[13]

4. Stability Studies

- Stability of licorice extract was evaluated.
- The extract was stored at room temperature.
- It was observed for color and odor changes.
- No degradation was noticed during study period.
- The extract remained stable.
- It is suitable for formulation.[12]

5. Microbial Contamination

- Microbial contamination of licorice extract was determined.
- The extract process was tested by microbial contamination.
- Hence no bacterial or fungal growth was observed.
- The extract met microbial limit requirements.
- This ensures product safety.[14]

PREPARATIONS:

PREPARATION OF LIQURICE CREAM:

Liquorice is an herbal formulation for topical application these extract used as an active ingredient. It mainly used for anti-inflammatory, skin soothing, antimicrobial and depigmentation. The cream is prepared as oil-in-water(O/W) emulsion. Which the texture is non-greasy and suitable for application.[15]

Role of Liquorice in Cream

- Reduce skin inflammation
- Soothe irritation and itching
- Help in skin brightening
- Provide antimicrobial action[17]

PART I:

Extraction of Licorice Root Collection and

Identification

- Fresh or dried liquorice roots are collected.
- The roots are cleaned to remove dirt and foreign particles
- Then dried in Sun light and powdered
- Roots are shade dried to preserve active constituents.
- Dried roots are coarsely powdered using a grinder.[16]

Method of Maceration

1. Solvent Selection

Water or hydro-alcoholic solvent is commonly used, as glycyrrhizin is water soluble.[16]

2. Extraction Process

- Maceration method:
- The powdered root is placed in a closed container.
- Solvent is added in sufficient quantity.
- The mixture is kept atleast 72hrs without shaking.[17]

(Alternatively, Soxhlet extraction may be used for better yield.)Filtration

The mixture is filtered to get an extract.

3. Concentration

The filtrate is concentrated using a water bath at controlled temperature to obtain a thick extract.[18]

4. Drying and Storage

The extract is dried, weighed, and stored in an airtight container for formulation use.[18]

PART II:

Principle

Liquorice cream is prepared by emulsification method, where oil and aqueous phases are heated separately and mix at same temperature to form stable oil-in-water (o/w) emulsion.[19]

Composition

i. Liquorice root – Active ingredient (extract)
ii. Potassium hydroxide Stearic acid / Acetyl alcohol/ – Emulsifier
iii. Liquid paraffin – Oil phase
iv. Glycerin – Humectant
v. Purified water – Aqueous phase
vi. Methyl paraben/Prophyl paraben- Preservatives
vii. Perfume – Aesthetic purpose(Rose oil)[20]

S.NO	INGREDIENTS	QUANTITY FOR 20g
1.	Liquorice root extract	1g
2.	Stearic acid	3g
3.	Acetyl alcohol	1g
4.	Potassium Hydroxide	0.2g
5.	Glycerin	2g

6.	Methyl paraben	0.02g
7.	Propyl paraben	0.01g
8.	Purified Water	q.s to 20g

INGREDIENTS:

METHOD OF PREPARATION

1. **Preparation of Oil Phase**
   Stearic acid, acetyl alcohol, and liquid paraffin are weighed and heated to 70–75°C until melted.
2. **Preparation of Aqueous Phase**
   Purified water, glycerin, preservatives, and the Liquorice root extract are dissolved and heated to the same temperature.[19]
3. **Emulsification**
   The oil phase is slowly added to the aqueous phase with continuous stirring to form an O/W emulsion.
4. **Cooling and Stirring**
   Continuous stirring is done during cooling until a smooth cream is formed.[20]
5. **Addition of Perfume**
   Perfume is added below 40°C and mixed uniformly.
6. **Filling and Packing**
   The cream is filled into suitable containers or collapsible tubes, labeled, and stored.[18]

POST-FORMULATORY STUDIES

1. Physical Appearance

- The prepared liquorice cream was visually examined.
- The color of the cream was uniform.
- The cream had a pleasant odor.
- It showed smooth and glossy appearance.
- No grittiness was observed.
- The formulation was found to be elegant.[21]

2. pH Determination

- The pH of the cream was measured using a pH meter.
- A small quantity of cream was dispersed in water.
- The electrode was dipped into the dispersion.
- The pH was recorded accurately.
- The pH was within skin acceptable range.
- Hence, the cream is non-irritant.[24]

3. Spreadability

- Spread ability of the cream was evaluated.
- A small quantity of cream was placed between slides.
- A standard weight was applied.
- The time taken to spread was noted.
- The cream spread easily.[22]
- This indicates good spread ability.

4. Viscosity

- Viscosity of the cream was determined.
- A suitable viscometer was used.
- The measurement was done at room temperature.
- The cream showed uniform flow property.
- No sudden change in viscosity was observed.
- This indicates good consistency.[23]

5. Washability

- Washability of the cream was tested.
- The cream was applied on skin.
- It was washed with tap water.
- The cream was removed easily.
- No greasy residue was left behind.
- This confirms good washability.[25]

6. Irritancy Test

- The cream was applied on a small area of skin.
- The area was observed for 24 hours.
- No redness was observed.
- No itching or inflammation occurred.
- The cream showed no irritation.
- Hence, it is safe for topical use.[24]

7. Stability Studies

- The cream was stored at different temperatures.
- It was observed for color changes.

- The odor of the cream was checked.
- Phase separation was examined.
- No instability was observed.
- The formulate on was found to be stable.[26]

MECHANISM OF ACTION:

1. Liquorice inhibits the tyrosinase contain gabardine, it directly inhibits tyrosinase which then enzyme responsible for synthesis of melanocytes

2. So reduced Melanin formation – by blocking tyrosinase, licorice reduce Tyrosine to dihydroxyphenyl Nin and then to melanin, it decrease the overall pigmentation.[28]

3. Licorice flavonoids neutralize free radicals in the skin, prevent oxidative stress.

4. Glycyrrhizin and Galfridian reduce the inflammation it trigger post-inflammatory hyperpigmentation

5. Licorice compound inhibit UV –induce melanocytes.[19]

6. It reduce the Lipid peroxidation which worsen pigmentation.

7. By decreasing melanin deposition in the epidermis, then the skin improve skin tone and brightness.[27]

CONCLUSION:

Liquorice cream is an effective and natural opinion option for the major cause of hyperpigmentation. The Two important major components play an important role they are: Glycyrrhizin and Glabridin.[29] These two major substance which enables the anti- inflammatory, antioxidant, antibacterial and skin lightening qualities. Glycyrrhizin :a triterpenoid saponin compound responsible for anti-inflammatory, soothing and antioxidant effect Glabridin :Which block the action of the enzyme tyrosinase thereby reducing melanin production, There Liquorice have inhibiting activity of tyrosinase, thereby reducing the darkspot and uneven pigmentation. In licorice additionally having antioxidant and anti-inflammatory ,it protect the skin from oxidative stress and post inflammatory hyperpigmentation.(30) It provide UV protection. By supporting skin barrier function and promote even skin tone. Licorice cream which offers a safe multi- mechanistic and cosmetically appealing solution it manage melisma, sun spot and other hyperpigmentation.[30]

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