



Formulation and evaluation of herbal cream from Glycyrrhiza glabra for treatment of Anti-acne

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ABSTRACT:

Acne vulgaris is common dermatological condition that affects individual of various age groups, typified by the existence of skin cysts, blackheads, and pimples. Traditional treatments for acne often involve synthetic medications, which may come with side effects or may not be a suitable for long term use. In recent years, there has been growing interest in natural and herbal alternatives to treat acne.

That cause acne, its capacity to lessen inflammation, and its capacity to enhance the appearance of skin. Through efficacy, possible adverse effects, and a number of clinical trials and laboratory tests. According to the results, a cream based on Glycyrrhiza glabra may provide a safe, natural, and efficient substitute, showing promise in minimizing acne lesions and accelerating skin repair.

The results of this study encourage more research into the use of herbal formulations for acne therapy, providing a possible path toward the creation of non-synthetic dermatological treatments.[1]

KEYWORDS: Glycyrrhiza glabra, licorise extracts, Herbal anti-acne, treatment cream, antiinflammatory skincare, Anti -oxidant rich skincare.

INTRODUCTION:

Although it can appear at any age, acne vulgaris is a common skin condition that mainly affects teenagers and young adults. Acne is characterized by the formation of pimples, blackheads, cysts, and other lesions. It is caused by a confluence of factors, such as inflammation, bacterial infection, clogged hair follicles, and excessive sebum production. Topical antibiotics, retinoids, and oral medications are examples of convenient acne treatments that can be successful, but they frequently have negative side effects such dryness, irritation, and antibiotic resistance.

As a result, there is now more interest in natural, alternative acne treatments that are mild but efficient. Glycyrrhiza Glabra, or licorise, is one such herbal treatment. Traditional medicine has traditionally utilized Glycyrrhiza glabra for its anti-inflammatory, antibacterial, and antioxidant qualities. Glycyrrhizin and Liquiritin, two active compounds in licorice, are thought to have positive effects on the skin, especially in lowering inflammation, preventing the growth of bacteria that cause acne, and preventing light hyperpigmentation from acne scars.

Possibility of using an anti-acne cream based on Glycyrrhiza glabra as a less harmful and side-effect-prone alternative for treating acne vulgaris. Through this study, we will look into the cream's antimicrobial qualities, general effects on skin, and effectiveness in reducing acne lesions.[2]

OBJECTIVES:

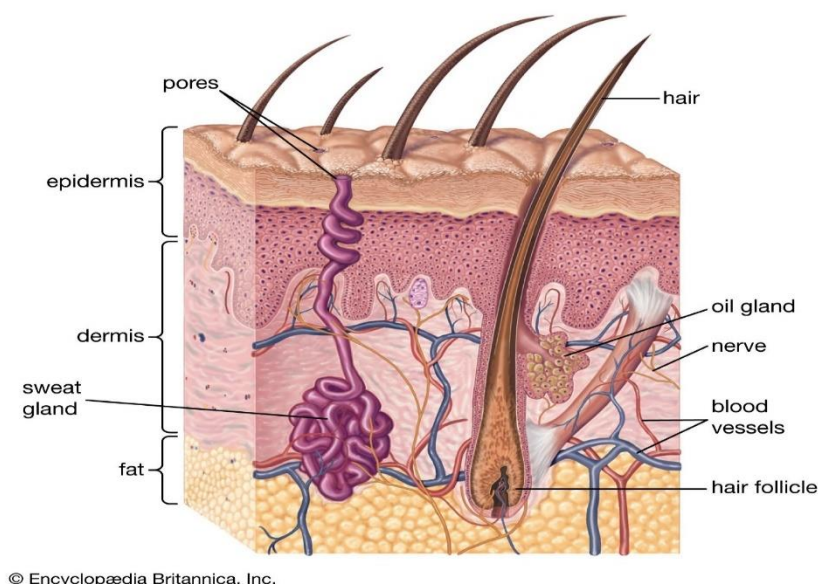
1. **Reduce acne inflammation:** Help reduce acne lesion redness, swelling, and irritation by using Glycyrrhiza glabra's anti-inflammatory properties.
2. **Control Acne causing bacteria:** To use licorise extracts' antibacterial qualities to target and lessen the presence of Propionibacterium acne (P. acne), the bacteria that causes acne in the first place.

3. **Prevent hyperpigmentation and post-acne scarring:** To promote uniform skin tone by preventing melanin formation using Glabridin, hence reducing the development of dark patches and hyperpigmentation (post-inflammatory hyperpigmentation).
4. **Improve skin hydration:** The moisturizing qualities of licorise extract are used to preserve and improve skin moisture levels, avoiding excessive dryness or oiliness, which can worsen acne.
5. **Strengthen the skin barrier:** To strengthen the skin's natural defenses against environmental aggressors and promote general skin health.
6. **Promote skin healing and regeneration:** To promote skin regeneration, lessen the development of long-lasting acne scars, and quicken the healing process of acne lesions and scars.
7. **Balance sebum production:** To lessen the likelihood of closed pores by regulating sebum.[3]

PHYSIOLOGY OF SKIN:

The active ingredient in the *Glycyrrhiza glabra* (licorise) anti-acne lotion works on several skin layers. This is an explanation of how each skin layer functions. Three layers make up the skin:

1. The outermost epidermis
2. The middle dermis
3. The deepest, or hypodermis



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Fig:1 skin diagram

1. Epidermis: (outer layer of skin)

•Anti-inflammatory:

Glycyrrhizin, in particular, is a licorice extract that penetrates the epidermis to relieve inflammation. Because it lowers the activity of inflammatory mediators in the skin, this is very helpful in reducing the redness and swelling linked to acne.

•**Antioxidant Action:** Environmental factors including pollution and UV rays can affect the epidermis. Which may result in damage from oxidation. Licorise's antioxidants, such as Glabridin, shield the epidermal cells from free radicals, halting more damage and promoting healthy skin.

•**Pigmentation reduction:** *Glycyrrhiza glabra* contains glabridin, which inhibits the tyrosinase enzyme, which is in charge of producing melanin. This promotes an even skin tone by reducing dark patches and post-acne hyperpigmentation on the epidermal layer.

2. Dermis (middle skin layer)

•**Sebum production:** Licorise extract has the ability to regulate sebum production, which takes place in the dermal sebaceous glands. Acne is largely caused by clogged pores, which can be avoided by balancing oil production.

•**Antibacterial action:** The bacteria that causes acne, *Propionibacterium acnes*, is the target of *Glycyrrhiza glabra*'s antibacterial qualities. It lessens the development of acne cysts and pustules by inhibiting bacterial growth in the dermis.

3. Hypodermis(deep skin layer)

•**Wound healing and skin repair:** By repairing deeper layers of the skin, it helps acne scars heal and keeps new ones from appearing. It promotes the synthesis of collagen and aids in skin cell regeneration.[4]

DRUG PROFILE:

1. Glycyrrhiza glabra:



Fig: 2 Glycyrrhiza Glabra root powder

The word “glycyrrhiza” comes from the ancient Greek word “glykos,” which means “sweet,” and “rhiza,” which means “root.” In northern India, Glycyrrhiza glabra is referred to as Mulethi. Glycyrrhiza glabra, commonly referred to as sweet wood and licorice, is indigenous to parts of Asia and the Mediterranean. Glycyrrhiza glabra, sometimes known as licorice and found in India, is a member of the genus Glycyrrhiza. According to certain traditional healers, the circumstances have cholaretic, diuretic, and insecticidal effects. They are also frequently utilized in skincare products with anti-acne qualities. [2].

Scientific Classification

- kingdom -Plantae
- Division -Angiospermae
- Class -Dicotyledoneae
- Order -Rosales
- Family -Leguminosae
- Genus -Glycyrrhiza
- Species -glabra Linn• Binomial name - Glycyrrhiza glabra L.[3]

2. Shea butter:



Fig: 3 Shea butter

Shea butter’s moisturizing qualities make it a popular ingredient in skincare treatments, notably those that cure acne. Within the framework of an anti-acne cream containing Glycyrrhiza glabra (licorise).

here's how shea butter can be beneficial:

- **Moisturising:** Shea butter, an emollient, helps to moisturize the face without blocking pores. This keeps the skin from getting too dry, which can lead to excessive oil production, a typical cause of acne.
- **Anti-inflammatory:** Certain chemicals included in shea butter, such as cinnamic acid, have anti-inflammatory qualities. This may lessen the redness, swelling, and irritation that acne frequently causes.
- **Healing properties:** Shea butter’s vitamins A and E can support skin regeneration and healing, helping to mend damaged skin and acne scars.
- **Balancing:** Shea butter can help regulate the amount of oil produced by the skin. When used sparingly, it can help oily and acne-prone skin since, despite its high fatty acid content, it doesn’t clog pores.

Shea butter can increase the anti-acne cream's overall efficacy when combined with licorise extract, also known as *Glycyrrhiza glabra*. Shea butter keeps the face hydrated and nourished throughout the treatment, while licorise extract helps lighten dark spots, soothe skin, and lessen germs that cause acne.

3. Lavender oil

Creams frequently contain lavender oil because of its many health benefits. Listed below are some of its main purposes.

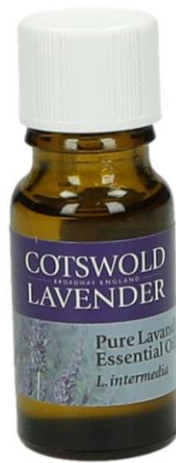


Fig:4 Lavender oil

- **Soothing and calming:** Lavender oil is perfect for dry or sensitive skin types because of its inherent relaxing qualities, which assist to calm irritated, inflamed skin.
- **Antioxidant:** It has antioxidants that help shield the skin from environmental aggressors, resulting in skin that looks healthier.
- **Moisturizing:** The skin will feel soft and hydrated after using lavender oil to help seal in moisture.

4. Almond oil



Fig:5 Almond oil

Almond oil's many advantages make it a popular ingredient in creams. It helps to smooth and soften the skin by acting as an emollient. It is high in vitamins A and E, which support healthy skin and have antioxidant qualities.

Almond oil can also help hydrate and nourish the skin, make it softer, and lessen irritation or inflammation. Because it also aids in moisture retention, it is ideal for dry or sensitive skin. The skin's texture can also be enhanced, becoming smoother and softer.

5. Aloe Vera gel



Fig:6 Aloe Vera gel

Aloe Vera gel's moisturizing, calming, and restorative qualities make it a prominent ingredient in lotions. In cream compositions, it serves the following crucial purposes:

- Cooling and soothing;
- Moisturization;
- Repair and healing
- Anti-inflammatory and antioxidant defense

6. Citric acid



Fig: 7 citric acid

Creams frequently contain citric acid for a number of reasons:

- **pH adjuster:** It aids in regulating and preserving the cream's pH level. For most cosmetic formulations to work well and maintain product stability, the pH must be slightly acidic.
- **Preservative:** Citric acid has antibacterial qualities and can help prolong the product's shelf life by inhibiting bacterial growth.
- **Alphahydroxy acid (AHA) :** is used for exfoliation. Citric acid can help exfoliate skin by promoting the removal of dead skin cells.

7. Xanthun gum

Fig:8 Xanthun gum



Xanthun gum is frequently used as an emulsifier, stabilizer, and thickening ingredient in creams. It works like this in creams:

- **Thickening:** Xanthun gum makes the creams more viscous, which gives them a creamy, smooth texture. This enhances the product's uniformity and facilitates application.
- **Stabilizing:** it keeps ingredients in an emulsion together and keeps the cream's consistency over time, preventing them from separating.
- **Improved spreadability:** The gum makes the cream feel smooth and non-greasy while also improving its ability to apply evenly to the skin.
- **Moisture retention:** It helps the cream retain moisture and improves skin hydration by taking on a gel-like consistency. Because of these advantageous qualities, xanthun gum is utilized in a variety of skincare .

8. Phenoxyethanol



Fig:9 phenoxyethanol

A common preservative in cosmetic compositions, such as creams, is phenoxyethanol. Its primary purpose is to prolong the product's shelf life and ensure its safety by inhibiting the growth of bacteria, fungi, and other microorganisms that could contaminate it. Additionally, it possesses modest antibacterial qualities that help maintain the cream's stability and hygienic qualities while in use. Phenoxyethanol also serves as a stabilizer in cosmetics, guaranteeing that the formulation will continue to work over time.

9.Emulsifying wax :



Fig 10 : Emulsifying wax

Emulsifying wax is essential to creams because it facilitates the blending of water-based and emulsifier, enabling the water (often aloe vera or water) and oils (such as butters or plant oils) to merge into a stable, smooth composition. This ensures that the cream remains emulsified without separating over time by improving the product's consistency and producing a uniform texture. Furthermore, it can improve the product's skin-feel, making it softer and easier to absorb.[5]

MATERIAL AND METHODS:

Extraction Process:

Drying and grinding the roots is usually the first step in extracting Glycyrrhiza Glabra (licorise) powder. The desired ingredient is then extracted using water or a water-alcohol combination, filtered, and concentrated.[1] ,105-11.

1. Preparation of licorise roots:

- **Harvesting and cleaning:** Gather the roots of Glycyrrhiza glabra and give them a good wash to get rid of any dirt or debris.
- **Drying:** To bring the moisture level down to about 10–12%, completely dry the roots in a shaded environment or with artificial heat.
- **Grinding:** Using a laboratory mill or comparable machinery, grind the dried roots into a fine powder.
- **Sieving:** To guarantee a consistent particle size for the best extraction, run the powder through a sieve (such as 80 mesh).[8]

2. Extraction of Glycyrrhiza glabra :

• **Maceration:** It involves soaking the licorice powder in a solvent (e.g., 1:5 powder to solvent) at a certain ratio. Give the combination a set amount of time (two hours, for example) to macerate. To separate the extract from the solid residue, filter the mixture.

• **Boiling/decoction:** Bring water or a water-alcohol mixture to a boil with the licorice powder. To get rid of any solid particles, filter the extract.[9]

• Concentration:

Evaporate the solvent under vacuum at a low temperature to concentrate the filtered extract.

• Storage:

Until the concentrated extract is ready to use, keep it in an airtight container.



Fig:11 Extraction of Glycyrrhiza glabra

FORMULATION TABLE:

Ingredients	Functions	Quantity
Glycyrrhiza glabra	Anti-inflammatory , anti-acne	2 ml
Shea butter	Moisturizer, anti-oxidant	3 gm
Lavender oil	Balance oil production, fragrance.	1 ml
Aloe- vera gel	Soothing and hydration	2 gm
Xanthun gum	Thickening agent, spreadability.	0.05 gm
Phenoxyethanol	Preservative	0.05 gm
Emulsifying wax	Surfactant that help to blend water and oil.	1 gm
Citric acid	PH adjustifier	0.05 gm
Water (base)	Vehicle	10 ml

FORMULATION OF CREAM:

1. Prepare the oil phase:

By combining the carrier oil (such as almond oil), emulsifying wax, and shea butter in a heat-resistant glass bowl or beaker. The beaker can be heated gradually in a water bath to roughly 70° C or placed in a double boiler. To ensure the wax melts fully, stir it occasionally.

2. Get the water phase:

It ready by measuring the floral or distilled water in a different container. Heat the water phase to about 70° C as well. You can use a water bath to heat this container. Glycerin should be added to the water phase after it has heated, and it should be thoroughly stirred to dissolve.

3. Mix the water and oil phases:

Slowly add the water phase to the oil phase while whisking or swirling constantly with an electric mixer or hand whisk. For improved emulsification, you can alternatively use an immersion blender. Keep stirring until the mixture begins to emulsify and thicken. Five to ten minutes should pass.

4. Add the active components:

When the liquid has cooled to between 40 and 50 degrees Celsius and thickened. Add the lavender oil and the extract from *Glycyrrhiza glabra*. To guarantee that these active components are dispersed equally throughout the cream, gently stir.

5. Add preservatives:

Usually 0.5–1% of the formula should contain preservatives such Phenoxylethanol. To make sure the preservative is well combined, give it a good stir.

6. Cool and store:

To keep the cream's consistency uniform, let it cool to room temperature while stirring from time to time. After cooling, pour the cream into a sterile, clean container. A pump bottle or airtight jar is ideal for convenient application and storage. [10, 11].

7. Storage:

Keep the cream somewhere dry and cool. Make sure it stays away from harsh sunlight.

8. Temperature:

Depending on the preservative used, it is advisable to use the cream within three to six months, though the preservatives will assist extend shelf life.

9. Use:

Once or twice a day, apply the *Glycyrrhiza glabra* cream to clean skin. It has hydrating properties, evens up skin tone, and calms inflamed skin.[9]

EVALUATION PARAMETER:

Physical Assessment:

The following physical parameters, including color, consistency, odor, and formulation state, were used to further assess the prepared herbal creams.[12].

1. Color:

The cream's color was determined by visual inspection.

2. Odor:

The cream's odor was deemed agreeable.

3. Consistency:

A manual examination of the rubbing cream's formulation. The cream's consistency is smooth.

4. PH:

Using a digital pH meter, the prepared herbal cream's pH was determined. Using 100 milliliters of distilled water, the cream solution was made and allowed to sit for two hours. Three measurements of the solution's pH were made, and the average was computed.

5. Spreadability:

To assess the cream's spreadability, a sample was sandwiched between two slides and compressed for a certain amount of time to achieve a uniform thickness. the amount of time allotted for separation. The two slides' spreadability was evaluated. Better spreadability was demonstrated by a shorter time required to separate the two slides.

6. Washability:

After applying formulation to the skin, the length of time it took to wash it with water was assessed.[6]

RESULT AND EVALUATION:

The herbal anti-acne cream including *Glycyrrhiza glabra* was tested in vitro. Was tested for its ability to prevent acne in the presence of common pathogens such as *Streptococcus pyrogens*, *Staphylococcus aureus*, *Staphylococcus epidermis*, and *Propionibacterium Acnes*. [6]



Fig11: Glycyrrhiza glabra Anti-acne cream

DISCUSSION:

The herbal remedy glycyrrhiza glabra's anti-acne properties are supported by the in vitro results. Cream. The compounds glycyrrhizin, glabridin, isoflavonoids, and Liquiritin found in Glycyrrhiza glabra are well renowned for their antibacterial and anti-inflammatory properties. The cream's potential to cure acne, hyperpigmentation, and other skin disorders when applied topically is suggested by its capacity to block the enzymetirosinase, which is involved in the Melanin synthesis under regulated laboratory conditions.

Sr. No	Evaluation test	Result
1.	Color	A very light pale yellowish color.
2.	Odour	Lavender-A sweet, floral and slightly Exotic fragrance.
3.	PH	Ranging between 5.5 to 6.
4.	Consistency	The cream having smooth consistency.
5.	Spreadability	Better spreadability- evenly spread on the glass slide.
6.	Washability	Better Washability-evenly spread on hand

CONCLUSION:

Glycyrrhiza glabra was included in the formulation of the herbal anti-acne cream, which has shown great promise as a natural and efficient acne treatment option.

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