

## REVIEW ON VITAMIN C SERIUM FOR THE HYPERPIGMENTATION

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### ABSTRACT

*Hyperpigmentation is a common skin condition characterized by darkened areas of the skin due to excess melanin production. Vitamin C, a potent antioxidant, is widely used in skincare for its ability to brighten the skin and reduce the appearance of hyperpigmentation. It works by inhibiting melanin production, promoting collagen synthesis, and neutralizing free radicals, which can contribute to skin damage. Vitamin C serums are popular for treating sunspots, melasma, and other forms of hyperpigmentation. However, while Vitamin C can significantly lighten dark spots and even skin tone, its effectiveness depends on the formulation, concentration, and consistent use. This abstract highlights the role of Vitamin C in addressing hyperpigmentation, its mechanisms of action, and factors that influence its efficacy in treating uneven skin tone.*

**KEYWORDS**-Here are some key terms related to hyperpigmentation and vitamin C serums:

1. Hyperpigmentation 2. Vitamin C serum 3. Post-inflammatory hyperpigmentation (PIH)  
4. Skin irritation 5. Melanin production

### INTRODUCTION

Hyperpigmentation is a common skin issue that arises when the skin produces an excess of melanin, the pigment responsible for skin color. This overproduction results in areas of skin that are darker than the surrounding areas.

#### Causes of Hyperpigmentation:

Here are some of the common factors that can cause hyperpigmentation:-

- **Sun Exposure:** Prolonged exposure to ultraviolet (UV) rays from the sun is a primary cause.

UV rays stimulate melanocytes, the cells that produce melanin, causing them to generate more pigment as a protective response.

- **Hormonal Changes:** Hormonal shifts, especially during pregnancy or from medications like birth control pills, can lead to hyperpigmentation. These changes can affect both the production and distribution of melanin.
- **Inflammation:** Skin inflammation from conditions like acne, eczema, or injuries can trigger melanocytes to increase melanin production.
- **Medications:** Some medications, including certain antibiotics and anti-seizure drugs, can increase photosensitivity, making the skin more vulnerable to sun damage and hyperpigmentation.
- **Genetic Predisposition:** People with darker skin tones may be more genetically inclined to develop hyperpigmentation.

#### Types of Hyperpigmentation

There are several forms of hyperpigmentation, including:

- **Melasma:** Often presenting as symmetrical brown patches on the face, melasma is commonly found in women and is often linked to hormonal changes.

- **Post-inflammatory Hyperpigmentation (PIH):** This type occurs after skin inflammation, such as acne or an injury, resulting in dark spots or patches that gradually fade over time.
- **Solar Lentigines (Age Spots):** These are flat, brown spots that typically appear on areas of the skin exposed to the sun, commonly in older individuals.
- **Laser Therapy:** Laser treatments target and break down excess melanin, lightening the skin over time.
- **Sun Protection:** Regular use of broad-spectrum sunscreen with SPF 30 or higher is crucial to prevent further darkening of the skin and avoid new hyperpigmentation.

**Treatment Options** There are a variety of treatments available to address hyperpigmentation, including:

- **Topical Treatments:**
  - **Hydroquinone:** A popular ingredient in skin lightening products, hydroquinone helps reduce melanin production.
  - **Retinoids:** Vitamin A derivatives that aid in exfoliating the skin and diminishing hyperpigmentation.
  - **Azelaic Acid:** Known for its exfoliating and anti-inflammatory benefits.
  - **Kojic Acid:** A mushroom-derived ingredient that inhibits tyrosinase, an enzyme involved in melanin production.
  - **Vitamin C:** This antioxidant brightens the skin and can help reduce hyperpigmentation.
- **Chemical Peels:** Chemical peels help exfoliate the skin, which can minimize the appearance of hyperpigmentation.

It's essential to consult a dermatologist to identify the most appropriate treatment for your specific type of hyperpigmentation and individual skin concerns.

**Serum:**

Serum are a type of skincare product applied directly to the skin. They are usually thick liquids or semi-solids made from a mix of oil and water, with the consistency depending on the amount of each used. Serums can serve various purposes, like cleansing, improving appearance, protecting the skin, and even treating skin conditions. They are designed to be applied topically to deliver active ingredients to specific areas of the skin, especially for treating skin problems. Serum are considered pharmaceutical products because they are made with methods developed in the pharmaceutical industry. Both medicated and non-medicated serums are commonly used to treat different skin issues. They are made by mixing one or more active ingredients into a base to create a smooth formula. There are different types of emulsions (mixtures of water and oil) used for skin treatments, with water-in-oil emulsions being especially good for dry skin.

**Types of Serum:**

1. **Oil Serum:** These contain only oils, often plant-based oils.

2. **Gel Serum:** These contain little to no oil and don't require emulsifiers.

3. **Moisturizing Serum:** These are light oil-in-water emulsions.

Common Types of Skin Serum

Hydrating Serum: Designed to provide extra moisture for dry skin.

- Anti-Aging Serum: Target signs of aging, like wrinkles.

- Brightening Serum: Help to brighten dull skin and reduce dark spots.

- Acne-Fighting Serum: Designed to treat and prevent acne.

- Exfoliating Serum: Help to remove dead skin cells and improve skin texture.

- Vitamin C Serum: Known for their brightening effects and protection against UV damage.

**Advantages of Serum as Drug Delivery Systems:**

-Target Specific Issues: Whether it's acne, wrinkles, dryness, or dullness, there's a serum for every skin concern.

- Deep Hydration: Serum penetrate deep into the skin to provide intense moisture.

- Smoother Skin: Serum can refine your skin's texture, making it feel soft and smooth.

- Quick Absorption: Their lightweight nature allows them to absorb quickly, so you can layer other products easily.

- Youthful Glow: Some serum boost collagen production, giving skin a youthful, radiant look.

- UV Protection: Certain serum, like those with vitamin C, help protect your skin from harmful UV rays.

- Brighter Skin Tone: Ingredients like licorice and niacinamide can lighten dark spots and even out your skin tone.

**Disadvantages of Serum as Drug Delivery Systems:**

- Skin Sensitivity: Some ingredients in serums can irritate sensitive skin, especially if you have conditions like eczema or rosacea.

- Overuse: Using too much serum can upset your skin's natural balance, leading to dryness or breakouts.

- Mixing Issues: Combining multiple serums or using them with products containing acids can cause negative reactions.

- Cost: Serum are often more expensive than other skincare products.

- Not Suitable for All: Serums may not be ideal for people with mature or very dry skin; a richer moisturizer might be a better option.

Method of preparation:-

Get Ready:

\* Before you begin, ensure your workspace, tools, and containers are clean and sanitized. This helps prevent contamination of your oil blend.

\* Put on protective gear like gloves to maintain hygiene and protect your skin.

Mix the Oils:

\* Base Oils: Carefully measure each base oil according to your recipe. Precision is important for the final product's quality.

\* Combine the measured base oils in a clean, appropriately sized bowl. Gently stir them together until they are thoroughly mixed.

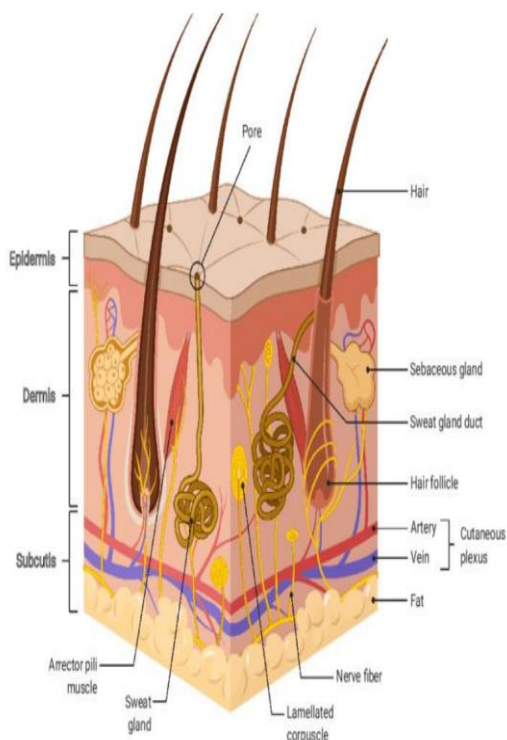
\* Vitamin C Powder: Measure the specified amount of Vitamin C powder and add it to the base oil mixture. Stir well to ensure the powder dissolves completely and is evenly distributed.

\* Essential Oils: Add the measured amounts of Manuka and marigold essential oils to the mixture. Stir gently yet thoroughly to incorporate the essential oils without compromising their properties.

Store the Oil:

\* Carefully pour the finished oil blend into a clean, dark glass bottle. Dark glass helps protect the oils from light degradation, which can affect their quality and shelf life. A bottle with a dropper or applicator makes it easier to use the oil later.

SKIN: -



The skin serves as the body's largest external defense system, with a range of essential functions including sensation, insulation, temperature regulation, vitamin D production, and maintaining vitamin B folate levels. As the primary interface between the body and the environment, the skin is involved in thermoregulation, protecting the body from physical, chemical, and microbial harm, and controlling water and chemical loss.

### Anatomy of the Skin

The skin consists of three main layers:

1. **Epidermis:** The outermost layer of the skin, composed of epithelial cells, contains both living and dead cells. The epidermis is devoid of blood vessels and nerve endings, but its deeper layers are nourished by interstitial fluid, which provides oxygen and nutrients while draining as lymph. The epidermis is made up of five layers, from the innermost to the outermost:

- **Stratum Germinativum (Basal Layer)**
- **Stratum Spinosum**
- **Stratum Granulosum**
- **Stratum Lucidum**
- **Stratum Corneum:** The outermost layer, which is about 10-20  $\mu\text{m}$  thick when dry and up to 40  $\mu\text{m}$  when hydrated, becoming swollen.

2. **Dermis:** Beneath the epidermis, the dermis is rich in elastin fibers that allow the skin to stretch and collagen fibers that provide strength. The dermis plays a crucial role in temperature regulation and is responsible for sensations of pressure and discomfort due to the presence of nerves. Collagen fibers bind with water to maintain skin elasticity, but this ability declines with age, leading to wrinkles. Key cell types in the dermis include:

- **Fibroblasts:** Cells that produce collagen.
- **Macrophages:** Also known as scavenger cells.
- **Mast Cells:** Involved in immune reactions and interact with eosinophils.

3. **Hypodermis:** The innermost layer of the skin, which houses sweat glands, sebaceous glands, and hair follicles. These structures are located in the epidermis but originate in the dermis.

**Functions of the Skin**

- **Protection:** Langerhans cells, part of the adaptive immune system, act as a barrier between the inner and outer environments, protecting the body from microorganisms and injury.
- **Sensation:** The skin contains nerve endings that respond to stimuli such as heat, cold, touch, pressure, vibration, and tissue injury, forming part of the somatosensory system.
- **Heat Regulation:** The skin has a large blood supply, allowing it to regulate heat through radiation, convection, and conduction. When blood vessels dilate, they improve blood flow and heat loss. Conversely, constricted blood vessels reduce blood flow, helping to retain heat within the body.

**MATERIALS :**

Formulation of serum: -

Sr.No.	Ingredients	Uses
1	Sesame seed oil	Antioxidant
2	Cotton seed oil	Moisturize skin
3	Aloe Vera	Treat acne
4	Saffron	Improve skin texture
5	Turmeric	Anti-inflammatory
6	Ghee	Smoothing agent
7	Glycerine and coconut oil	Emulsifying agent

8	Vitamin c	Brighting & sun protection
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**DRUGS AND EXCIPIENTS: -**

**1.Sesame seed oil:-**



• **Synonyms:** Teel oil, Benne oil.

**Use:** antioxidant

**Family:** Pedaliaceae

**2.cotton seed oil :**



• **Synonym :** Raw cotton or absorbent cotton, purified cotton.

**Uses :** protect and hydrate skin

**Family :** Malvaceae

**3 Aloe vera gel: -**



**Synonym :** Aloe barbadensis

**Family-** Liliaceae

**Uses :** Antiinflammatory

**5.4 Saffron: -**



**Synonyms:** - Saffron , kesar

**Use:** - Anti aging property, Brightens skin

**Family:** - Iridaceae



5.5

**Turmeric: -**

• **Synonyms :** indian haldi, Curcuma.

**Use :** Antioxidant, antimicrobial

**Family :** Zingiberaceae

**6. Ghee**



**Synonym :** Butter

**Uses :** Moisturizing agent

**Conclusion :**

People often prefer natural remedies because they believe they're safer and have fewer side effects than synthetic ones. Herbal products, including face serum, are becoming increasingly popular worldwide.

Herbal face serum is used to:

- Improve blood flow to the skin
- Rejuvenate the skin
- Maintain skin elasticity
- Remove dirt from pores

This study successfully created a face pack using natural ingredients like aloe vera, turmeric and cotton seed oil. This product is very stable and gives specific standards for a good skincare product.

**Acknowledgement**

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#### Reference :

**1.Authors: Shimada Y, Tai H, Tanak A, Suzuki I, Takagi K (Year: 2009)**

*The study investigated whether a gel containing ascorbic acid 2-glucoside (AS-G gel) could inhibit melanin pigmentation in the gums (gingiva).*

*In simpler terms: The researchers wanted to see if a special type of vitamin C gel could lighten dark spots on people's gums.*

**2. Researchers: Yussif NM, Zayed SO, Hasan SA, Sadek SS (Year: 2016)**

*Institution: Cairo University, Egypt*

*Study Focus: Evaluating the effectiveness of injectable Vitamin C as a depigmenting agent for physiologic gingival hyperpigmentation.*

**3.Ratnam AV, Sastry PB, Satyanarayana(BV) 1977 India**

*This is a clinical study published in 1977 in India. The authors aimed to compare the levels of ascorbic acid (vitamin C) in normal pigmented skin with depigmented skin in individuals with vitiligo.*

**Here are some references for hyperpigmentation and vitamin C serum:**

**4. Healthline:**  
<https://www.healthline.com/health/beauty-skin-care/vitamin-c-serum-benefits>

**5.Clinikally:**  
<https://www.instagram.com/clinikallyofficial/p/DECBYW5J4ec/>

**6.PMC:**  
<https://pubmed.ncbi.nlm.nih.gov/33456250/>

**7.Garnier:** <https://www.garnier.in/skin-care-tips/everything-you-need-to-know-about-using-vitamin-c-for-your-skin>

**8.PMC:**  
<https://pmc.ncbi.nlm.nih.gov/articles/PMC3673383/>

**9. A study published in the Journal of Clinical and Aesthetic Dermatology (2013):** This study confirmed that a stable, topical Vitamin C serum reduced hyperpigmentation and helped even out skin tone. The researchers found improvements in skin brightness and a reduction in the appearance of dark spots after 12 weeks of daily application.

**10.A study in the American Journal of Clinical Dermatology (2010):** This research highlights the potential of Vitamin C as a safe and effective treatment for hyperpigmentation, specifically for those dealing with sun spots and melasma.