

# Anti-aging Beta-carotene Face Serum A Potential Cosmesetical

**Kartik V. Jadhao<sup>1</sup>, Aishwarya D. Ghuge<sup>2</sup>, Dr Swati Deshmukh<sup>3</sup>,  
Krushna P. Jadhav<sup>4</sup>, Mahesh S. Bhandurje<sup>5</sup>**

<sup>1,4,5</sup>Student, Shraddha Institute of Pharmacy, Washim

<sup>2</sup>Assistant Professor, Shraddha Institute of Pharmacy, Washim

<sup>3</sup>HOD, Shraddha Institute of Pharmacy, Washim.

## Abstract

Facial wrinkles and skin aging are undesirable outcome of photo damage and ultraviolet (UV) rays. Currently no effective strategies are available to delay skin aging process. Carrots containing Beta-Carotene. By using Carrots powder containing beta-carotene we get not only a quick cosmetic effects but also psychological satisfactions, serum has a property of rapid absorption and ability to penetrate into deeper layer of the skin. Beta-Carotene is commonly used to Anti-Aging, Anti-Acne, wound healing, anti-inflammatory, anti-bacterial and anti-fungal effect. Carrot powder has been used over from a generations, is becoming more and more well-known daily as people learn about its remarkable skincare benefits. They include proteins, iron, magnesium, vitamin A, vitamin B6, vitamin B12, and vitamin E. Let's learn about this powder's advantages for our skin and how to apply it.

**Keywords: Beta-Carotene, Anti-Aging, Anti-Acne, Anti-inflammatory.**

## INTRODUCTION

Face serum is a targeted response to the needs of the epidermis. A serum is a skin care treatment for the face, whose intensive formula was developed especially for the deep-down treatment of various skin problems like: wrinkles. Laxity in the shape of your face, eyes or lips. Loss of hydration. Study of human skin represents an important area of research and development in dermatology, toxicology, pharmacology, and cosmetology, in order to assess the effects of exogenous agents, their interaction, their absorption mechanism, and/or their toxicity towards the different cutaneous structures. The importance of beautification to the mankind has been known since the prehistoric time and the desire to look beautiful and healthy has been developing in the society. Cosmetic is a Greek word which means to 'adorn' (addition of something decorative to a person or a thing). Cosmetology is the study and application of beauty treatment. It's an art or science of beautifying and improving the skin, nails and hair and the study of cosmetics and their application. A skin care formulation must be able to deliver the powerful agent into the skin to fulfill the intended objective. Face serum is the answer to deliver the precious active ingredient into the skin thus eliminating the use of hazardous chemicals in giving instant results. Serum is a concentrated product which is widely used in Cosmetology. The name comes from itself in professional cosmetology. The cosmetic serum is as concentrated in water or oil as any other cream. Serums are defined as concentrated product that contains ten times more organic matter than cream. Therefore, deals with the cosmetic problem quickly and effectively [10,12].

Face serum is a highly concentrated emulsion which is available in water based and oil based. Serums or defined a concentrate, contain approximately ten times more of biologically active substances than creams, therefore allows better skin problems treatment. Incorporating a few drops of face serum with daily skin care routine will deliver noticeable results within a month or less. This is because face serums are made of very small molecules that help it to penetrate deep into the skin quickly. Serum is packed with a bunch of beneficiary active components and nutrients such as antioxidants, ceramides, amino acids and others. This explains why face serum always being the costliest item in a skin care set. Whether it is moisturizer, anti-wrinkle or anti-aging product or skin serum, all these products should contain antioxidants, cell-

communicating ingredients and skin-identical ingredients. All skin type needs these ingredients to be as healthy as possible. Gel and liquids preparations are best for oily and combination skin, serums and light lotions are best for normal to dry skin, more emollient lotions and moisturizing creams are best for dry to very dry skin. Texture is all about skin type- but the brilliant ingredients for healthy skin the same for everyone, regardless of product, texture, or personal preference. Skin is a protective and largest organ of body which is struggles to heal and repair itself 24 hours, but sometimes skin can develop dry patches for many reasons like UV rays, pollutants, makeup left on overnight can cause irritation or allergic reactions. The facial serum includes several ingredients associated with improvement in the appearance of fine lines and wrinkles and increased barrier function including a neuro peptide. The facial serum also contains AP-8, a neuropeptide associated with muscle contraction, beta-glucan, a cell turnover and regenerative extract that is believed to support healthy immune surveillance ; sodium hyaluronate, a humectant and nascent to extracellular matrix and vitamin C&E formulations and green tea, both of which are antioxidants including polyphenols. The biggest difference between a serum and a cream or lotion is what the formulation doesn't include. They also contain fewer lubricating and thickening agents, like nut or seed oils. Most serums are water-based, eliminating oils altogether [12].

### Ideal Qualities of Face Serum

The ideal qualities of a face serum can vary depending on individual skin concerns, preferences, and needs. However, there are several key qualities that are generally considered desirable in a high-quality face serum:

- 1) Effective Active Ingredients:** A good face serum should contain potent active ingredients that target specific skincare concerns such as hydration, brightening, anti-aging, or acne treatment. These ingredients may include antioxidants like vitamin C and E, hyaluronic acid for hydration, retinoids for anti-aging, niacinamide for brightening, and peptides for collagen production.
- 2) Stability and Formulation:** The formulation of the serum should ensure the stability and efficacy of its active ingredients. This includes proper packaging to protect the serum from light and air, as well as a well-balanced combination of ingredients that work synergistically to deliver optimal results without causing irritation or sensitivity.
- 3) Lightweight and Absorbable Texture:** A good face serum should have a lightweight, non-greasy texture that absorbs quickly into the skin without leaving a residue. This allows for easy layering with other skincare products and makeup, making it suitable for use in both morning and evening routines.
- 4) Hydration and Moisture Retention:** Hydration is key for maintaining healthy and radiant skin. An ideal face serum should provide ample hydration to the skin, helping to plump and smooth the complexion while also supporting the skin's natural moisture barrier to prevent water loss throughout the day.
- 5) Gentle and Non-Irritating:** A high-quality face serum should be gentle and non-irritating, even for sensitive skin types. It should be free from harsh ingredients such as alcohol, artificial fragrances, and dyes, which can cause irritation and inflammation.
- 6) Visible Results:** Ultimately, a good face serum should deliver visible results over time, effectively addressing the targeted skincare concerns and improving the overall appearance and health of the skin. This may include reducing the appearance of fine lines and wrinkles, evening out skin tone, minimizing pores, and enhancing radiance.
- 7) Suitability for All Skin Types:** An ideal face serum should be suitable for all skin types, including dry, oily, combination, sensitive, and acne-prone skin. It should be formulated with ingredients that are non-comedogenic and non-acnegenic, meaning they won't clog pores or exacerbate acne.
- 8) Ethical and Sustainable Practices:** Many consumers also consider the ethical and sustainable practices of the brand when choosing a face serum. This may include factors such as cruelty-free testing, environmentally friendly packaging, and sourcing of ingredients from sustainable and ethical suppliers.

### 3. AIM & OBJECTIVE

**Aim-** To evaluate and formulate anti-aging beta-carotene face serum.

#### Objective

- 1) Beta-carotene for the skin is its role as a precursor to vitamin A, Beta-carotene face serum which is essential for maintaining healthy skin.

- 2) Beta-carotene face serum acts as an antioxidant, helping to protect skin cells from damage caused by free radicals, UV radiation, and environmental pollutants.
- 3) It contributes to skin health by promoting cell turnover and repair, thus helping to maintain a youthful appearance and overall skin vitality.
- 4) Consuming foods rich in beta-carotene or using skincare products containing it can help support skin health and appearance.

## PLAN OF WORK

- Collect the fresh carrots from the market and wash with water.
- Take 8 to 12 carrots, then keep it in the sunlight for 7 to 8 days. Then triturate the carrots to make a fine powder.
- These fine powder are pass from the sieve no 20.
- The powder are use as beta-carotene and prepare the anti-aging beta-carotene face serum.

## 5. PLANT / DRUG PROFILE

### 1) Carrots Powder

**Ingredient Name:** Carrots Powder.

**Therapeutic Class:** Beta-Carotene, Skin care ingredient.



### 2) Glycerin

**Ingredient Name:** Glycerin

**Therapeutic Class:** Humectant, Skin Care ingredient



### 3) Coconut oil:

It contains nourishing fatty acids and linoleic acid which help retain the moisture in the skin and help protect and hydrate your skin.



### Almond oil

To use almond oil for your skin, simply apply a small amount to clean, damp skin and massage it in gently until absorbed. You can use it on its own or mix it with your favorite moisturizer or essential oils for added benefits.



### Rose Water

Rose water is said to be a natural skin toner due to this amazing pH- balancing properties.



## MATERIAL AND METHOD

### Material

- 1) Carrots Powder
- 2) Glycerin
- 3) Almond Oil
- 4) Coconut Oil
- 5) Rose Water

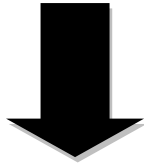
### Method

#### Formulation Table:

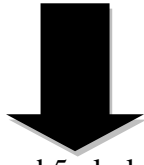
Ingredients	Standard Formula (100 ml)	Working Formula (30 ml)
Carrots Powder	50gm	10gm
Almond Oil	9ml	1.8ml
Glycerin	25ml	5ml
Coconut oil	2ml	0.4ml
Rose water	Qs to 100 ml	Qs to 30ml

Following steps involved in preparation of Anti-aging Beta-carotene Face serum.

Collect the carrots and wash with water.



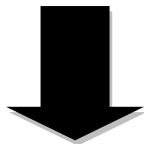
Take 8 to 12 carrots, then keep it in the sunlight for 7 to 8 days. Then grind the carrots to make a fine powder.



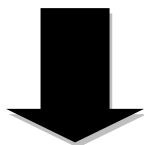
Take 10gm carrot powder and 5ml glycerin, then add small amount of rose water uniformly.



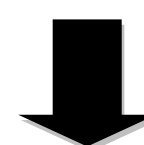
Then add the 0.02ml almond oil in this solution



Then add the 0.4ml of coconut



Keep the solution into mechanical shaker at 250rpm for 15 min



Beta-carotene face serum is prepared transfer to them air tight container.

## EVALUATION OF FACE SERUM

### Physical Evaluation :

The Colour and appearance of the formulation was observed visually. The formulation procedure uniform distribution of extracts [39]. This test was confirmed by visual appearance and by touch.

### pH Value :

A pH meter was calibrated using a standard buffer solution. Nearly 1 ml of the face serum was properly weighed and dissolve in 50 ml of distilled water and finally its pH was calculated.

The skin has an acidic range and the pH of the skin serum should be in the range of 4.1-6.7. The pH of formulation was found to be 6.4. As the skin having an acidic pH around 4.1-6.7, this range of formulation is suitable for skin [89].

### Determination of Spreadability :

2 gm of serum sample was placed on a surface. A slide was attached to a pan to which 20 gm weight was added [36]. The time (seconds) required to separate the upper slide from surface was taken as a measure of Spreadability.

**Microbial Examination of the Product :**

In this method, the mixed culture is diluted directly in tubes of liquid agar medium. The medium is maintained in a liquid state at a temperature of 45°C to allow thorough distribution of the inoculum. The inoculated agar medium is transferred into petri plates, allowed to solidify and incubated. In the series dilution technique, the original inoculum may be diluted by using sterile water or saline solution so that the concentration of the microbes gradually become less. Mix 1 ml dilute in 20 ml of liquid nutrient agar medium at 45°C [13]. Shake the liquid agar nutrient agar medium & pour in a sterile petri plate, solidify and incubate it.

**Stability Studies :**

Formulation and development of a pharmaceutical product is not complete without proper stability analysis carried out on it to determine physical and chemical stability and thus safety of the product. The stability studies is carried out as per ICH guidelines. Short term accelerated stability study was carried out for the period of few months for the prepared formulation [90].

The samples were stored at different storage conditions of temperatures such as 3-5oC, 25oC  
RH=60% and 40oC±2% RH=75%.

**Cyclical Temperature :**

Test These test is not carried out at any fixed temperature and humidity. In this test, temperature was changed cyclically every day [109]. At room temperature and frizzing temperature to stimulates the changes in temperature.

**RESULT & DISCUSSION**

Physical Evaluation :-

Parameter	F1	F2
Colour	Faint orange translucent	Dark Orange translucent
Tast	Sweet	Subtile and Pleasant
Homogenecity	Good	Excellent
Apperance	Good	Smooth
Washability	Washable	Washable

PH Test :-

Sr.no	Formulation	PH
1	F1	6.8
2	F2	6.4

Speradibility Test :-

Sr.no	Formulation	Speradibility
1	F1	4.8cm
2	F2	5.3cm

Microbial Examination of the Product :-

The formulation was free from microbes as they do not show zone of inhibition, when they got inoculated in the agar.

Stability Studies :-

The formulation was undertaken stability studies for physical and chemical changes. No considerable variations in properties of the formulation were observed.

Parameter	F1	F2
Visual Apperance	Faint orange translucent	Dark orange translucent
Phase Sepration	Nill	Nill
Homogenetic	Good	Excellent

#### Cyclic Temperature Test :-

Parameter	F1	F2
Freezer temperature	Unstable	Unstable
Room temperature	Stable	Stable

### CONCLUSION & SUMMERY

The aim of this report was to study about what exactly are facial serums and their history along with their overall importance. The study includes its proper selection and correct sequence of application. With tremendous amount of serums available in the market for each and every skin type and skin problem these days, it's essential for one to know what they are looking for in a serum precisely. When a righteous formulation is selected by scrutinizing every major skin issue, it is safe to say that significant improvements can be seen, leading to good results. Skin health is a crucial element of the altogether health of the body and having a proper skin care routine with an accurate serum for you, can sustain the ageing skin and ward off the ongoing damage. It eliminates fine lines, wrinkles, dark spots, and further blemishes if paired with appropriate moisturizer and sunscreen. Specific ingredients deal with a certain skin concern, as a result a combination of all the finest ingredients could show miraculous benefits. The report also shows numerous skin care brands for serums available in the market and a brief description of each product. This concludes that a facial serum is a boon for the cosmetic community and it's addition is crucial in the skin care regime. It is safe as well as having less side effects. In the world market, herbal formulations are in a great demand. Beta Carotene is the orange pigment found in fruits & vegetables like carrots. It is rich in Anti-acne, anti-oxidants, provides photoprotection, brightens skin tone. They are suitable for all types of skin.  $\beta$ -carotene face serum is used in skincare preparations such as face serum sunscreen, moisturizers, anti-aging creams, face powders, bath liquids, cleansing products, lipsticks, soaps. Thus, the face serum of beta-carotene is effectively in protection against aging and skin disorder.

### REFERANCES

- 1) Pham MA, Byun HG, Kim KD, Lee SM. Effects of dietary carotenoid source and level on growth, skin pigmentation, antioxidant activity and chemical composition of juvenile olive flounder *Paralichthysolivaceus*. *Aquaculture*. 2014;431:65-72.
- 2) Nierenberg DW, Dain BJ, Mott LA, Baron JA, Greenberg ER. Effects of oral supplementation with 3-carotene on serum concentrations of retinol, tocopherol, and five carotenoids. *Am J ClinNutz* 1997;66:315-319.
- 3) Stahl W, Sies H. Antioxidant activity of carotenoids. *Fat Soluble Vitamins: Old Molecules with Novel Properties* 2003, 24: 345-51.
- 4) Johnson J Do carotenoids serve as transmembrane radical channels? *Free Radical Biol Med* 2009, 47: 321-3
- 5) Stahl W, Krutmann J. SystemischePhotoprotektiondurchKarotinoide. *Hautarzt* 2006, 57: 281-Stahl W. Sies H. Carotenoids and protection against solar UV radiation. *Skin PharmacolAppl Skin Physiol* 2002, 15: 291-6.
- 6) Islam, S. N., et al. 2016. Carotenoids and  $\beta$ -carotenein orange 6leshed sweet potato: A possible solution to vitamin A deficiency. *Food Chemistry*,199:628–631.



- 7) Kasperczyk, S., et al. 2014. The influence of beta-carotene on homocysteine level and oxidative stress in lead-exposed workers. *Med Pr*,65(3):309–316.
- 8) Kim, M., Park, H. J. 2016. Molecular mechanisms of skin aging and rejuvenation. *Intech*, pages 57–76.
- 9) Koh, S. H., Loh, S. P. 2018. In vitro bioaccessibility of beta-carotene in pumpkin and butternut squash subjected to different cooking methods. *International Food Research Journal*, 25(1):188–195.
- 10) Kohl, E., et al. 2011. Skin ageing. *Journal of the European Academy of Dermatology and Venereology*, 25(8):873–884.
- 11) Kourouma, V., et al. 2019. Comparative study on chemical composition, polyphenols, flavonoids, carotenoids and antioxidant activities of various cultivars of sweet potato. *International Journal of Food Science & Technology*, 55(1):369–378.
- 12) Kurniawati, A. Y., et al. 2018. Characteristics of facial serum preparation with various concentrations of temu giring (*Curcuma heyneana*) fermented with *Lactobacillus bulgaricus*. [Accessed: November 2020].
- 13) Lim, J. Y., et al. 2014. beta-carotene inhibits neuroblastoma tumorigenesis by regulating cell differentiation and cancer cell stemness. *Biochemical and Biophysical Research Communications*, 450(4):1475–1480.
- 14) Longvah, T., et al. 2017. *Indian Food Composition Tables*. National Institute of Nutrition. Pages: 580.
- 15) Mansur, M. C. P. P. R., et al. 2012. Evaluation of the antioxidant and phototoxic potentials of *Bauhinia microstachya* var. *Massambabensis* Vaz leaf extracts. *Latin American Journal of Pharmacy*, 31(2):200–206.
- 16) Mardhiani, Y. D., et al. 2018. Formulation and stability from green coffee (*Coffea canephora* var. *Robusta*) extract serum as an antioxidants.
- 17) Indonesian Natural Research Pharmaceutical Journal, 2(2):19–33. Maris, Y. 2009. The relation of using night creams to thinning facial skin. [Accessed: August 2020].
- 18) Mazzeo, T., et al. 2011. Effect of two cooking procedures on phytochemical compounds, total antioxidant capacity and colour of selected frozen vegetables. *Food Chemistry*, 128(3):627–633.
- Hernansanz-Agustín, P.; Enríquez, J.A. Generation of Reactive Oxygen Species by Mitochondria. *Antioxidants* 2021, 10, 415.  
[CrossRef] [PubMed]
- 19) Halliwell, B.; Gutteridge, J.M.C. *Free Radicals in Biology and Medicine*; Chapter 2; Oxford University Press: New York, NY, USA, 2007.
- 20) Zastrow, L.; Groth, N.; Klein, F.; Kockott, D.; Lademann, J.; Renneberg, R.; Ferrero, L. The Missing Link—Light-Induced (280–1600 Nm) Free Radical Formation in Human Skin. *Skin Pharmacol. Physiol.* 2009, 22, 31–44.
- 21) Kumar, A.; Nautiyal, L.; Nautiyal, G. Reactive Nitrogen Species and Its Biological Effects. *J. Pharm. Phytochem.* 2019, 8, 4410–4412.
- 22) Pham-Huy, L.A.; He, H.; Pham-Huy, C. Free Radicals, Antioxidants in Disease and Health. *Int. J. Biomed. Sci.* 2008, 4, 89–96.
- 23) Valko, M.; Leibfritz, D.; Moncol, J.; Cronin, M.T.; Mazur, M.; Telser, J. Free Radicals and Antioxidants in Normal Physiological Functions and Human Disease. *Int. J. Biochem. Cell Biol.* 2007, 39, 44–84.
- 24) Niki, E. Lipid Oxidation in the Skin. *Free Radic. Res.* 2015, 49, 827–834.