



A REVIEW ARTICLE ON PLANT BASED ALTERNATIVE TO SYNTHETIC SERUMS FOR SKIN

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ABSTRACT :

The need for skin care treatments and products has grown significantly in recent years. The necessity of maintaining a decent look and beauty standard has increased. People and businesses alike are thus moving more and more in the direction of skin care. A cleanser, serum, moisturiser, and sunscreen are the usual ingredients of a skin care regimen.

Among them, serums have emerged as the new standard for creating a fantastic skincare regimen. There are many different formulations of serums available for oily, dry, or combination skin types. The Aim of this literature review is to know about the plant based alternatives that can be used in place of synthetically prepared serums.

KEYWORDS:

Synthetic serums, Plant based Serums, Skin , Cosmetic, Cosmetology etc.

INTRODUCTION:

The examination of human skin is a crucial field for research and development in the fields of dermatology, toxicology, pharmacology, and cosmetology. Cosmetology is the study and application of beauty treatment. Branches of specialty include hairstyling, skin care, cosmetics etc. Cosmetics and cosmeceutical products both are part of cosmetology. The purpose of cosmetics is to make your skin seem beautiful. It has components that would make your skin appear more beautiful on the outside. The effects happen right away and are transient. It doesn't improve the interior condition of your skin; it just affects the outside layer of it. Cosmetic products also include those that are widely used as makeup. Cosmeceutical products are designed with your skin concerns in

mind. It is the ideal fusion of scientific solution, natural components, and cosmetics. It includes face serums, sunscreen, anti-hairfall shampoo etc.¹

In the field of cosmetics, serum is a concentrated substance that is frequently used. Like any other cream, the serum has the same amount of water or oil concentration. A concentrated solution with 10 times more organic content than cream is called a serum. Consequently, takes care of the aesthetic issue swiftly and efficiently. Face serum is an oil-and water-based emulsion that is extremely concentrated. Because serums, also known as concentrates, have around 10 times the amount of biologically active ingredients as creams do, they are a superior option for treating skin issues. Within a month or less, adding a few drops of face serum to your regular skin care regimen will show effects. This is due to the fact that face serums are composed of minuscule molecules that facilitate rapid penetration of the skin. Numerous beneficial active ingredients and minerals, including ceramides, amino acids, and antioxidants, are abundant in serum. This explains why the most expensive product in a skin care kit is usually the face serum.²

Serums are categorised into two categories- first is Synthetic face serums & second is natural face serums. Products with scientifically and laboratory-derived components, such retinol and hyaluronic acid, are known as synthetic face serums. They include formulae created using synthetic versions of natural substances. Despite this, synthetic face serums are not always harmful. The "Chemo Phobia," which essentially results from labels that are bewilderingly filled with chemical names, is the source of the stigma and terror surrounding synthetic goods. Furthermore, using synthetic face serums frequently contains chemicals that may have negative side effects on your skin if you use them repeatedly. Hyaluronic acid abuse, for instance, might cause your skin to become dry and thirsty. Moreover, those who suffer from long-term skin disorders like rosacea or eczema may find it difficult to use synthetic face serums. Due to their weakened skin barriers, these individuals may experience irritation from serums that permeate their skin too rapidly. Natural face serums, like botanical oils, are made from components that may be found in the environment or that are taken from plants. Sulphates, parabens, and other chemicals that harm the environment are not included in natural face serums. They don't utilise petrochemical ingredients or genetically modified organisms (GMOs). This is the main distinction between synthetic and natural face serums.

Plant-based compounds provide a number of advantages. First and foremost, plant-based products are more organic than their conventional competitors. Since plant extracts rather than synthetic chemicals are used to make plant-derived beauty products, they do not deplete the skin of its natural oils and moisture like traditional beauty products do. Another advantage of plant-based cosmetics is that the majority of plant extracts are hypoallergenic, making them perfect for sensitive skin types. Lastly, plant-based compounds are a great way to cure a range of skin concerns.

For optimal health, these nutrients are required for all skin types. For oily and combination skin, gel and liquid preparations work best; for normal to dry skin, serums and light lotions work best; and for extremely dry to very dry skin, more emollient lotions and moisturising creams work best. Texture is all about skin type, yet no matter what product, texture, or individual preference, everyone may benefit from the same amazing components for healthy skin. The biggest and most protective organ in the body, the skin works to mend and restore itself every

day. However, there are a number of factors that can create dry patches on the skin, including pollution, UV radiation, and cosmetics left on overnight that can irritate or trigger allergic responses.³

TYPES OF SERUMS:

It's crucial to understand that there are several kinds of skin serums and that you should search for particular components depending on your objectives. In general, face serums fall into the following categories:

ON THE BASIS OF ACTION

- anti-aging serum like retinol
- skin-brightening serums like vitamin C
- hydrating serums
- acne-prone and sensitive skin serums etc.⁴

ON THE BASIS OF FORMULATIONS:

- The oil base serum
- The water base serum
- The gel base serum
- The emulsion serum
- The pressed balm serum⁵

Here are some synthetic serums that can replaceable by plant based serums:

RETINOL:

Retinoids consist of retinol, retinoic acid, and other naturally occurring physiologically active forms of vitamin A as well as synthetic retinol analogues. In place of cyclohexane, synthetic analogues (tazarotene, acitretin, etretinate) have a benzene ring. Retinol, retinal and retinoic acid have the same biological features as vitamin A. Retinoids are involved in the process of embryogenesis during development of the nervous system, liver, heart, kidneys, intestine, eyes and limbs. Following World War I, studies revealed the significance of retinol, or vitamin A, and how its lack causes follicular hyperkeratosis and xerosis. In order to increase clinical efficacy and safety, the retinoid drug project was started in 1968 with the goal of chemically modifying vitamin A's molecule to create molecules that are comparable to it. Liver was used to cure endemic night blindness in ancient Egypt, about 3000 years ago, when these compounds were first used in medicine. The modern history of retinoids, however, began in 1909 when an essential factor in the viability of an embryo in the fatty extract of the egg yolk, called vitamin A, was discovered. Retinoids finally were introduced into the treatment of dermatoses including photoaging more than two decades ago.⁶



Plant based alternative for retinol is *Bakuchiol*: *Bakuchiol* is an extract derived from the leaves and seeds of *Psoralea corylifolia*, more commonly known as the “*bakuchi* plant.” *Bakuchi* is a herbaceous plant that belongs to the leguminosae family. It is commonly found in India, especially in regions with a tropical climate. The seeds of *Bakuchi* are particularly rich in compounds that offer a wide range of benefits for the skin. The seeds of *Bakuchi* contain essential compounds such as psoralen, isopsoralen, and bakuchiol. These compounds are known for their anti-inflammatory, antimicrobial, and antioxidant properties, making *Bakuchi* a valuable ingredient in skincare.⁷ *Bakuchiol* is suggested to exhibit retinol-like functions, as in a skin substitute model, both substances show similar gene expression patterns in vitro and an improvement of cutaneous photodamage in vivo. Hence, it has also been referred to as a plant-derived functional retinoid analogue.⁸

HYALURONIC ACID (HA):

Another excellent component for treating dry and uneven skin is this one. It ensures that the skin does not lose any of its natural moisture by retaining the skin's natural moisture and water levels. Your skin appears radiant and naturally healthy thanks to this substance. Hydrating dry, dehydrated skin is the specialty of hyaluronic acid. Hyaluronic acid (HA) is helpful as a topical moisturising component because it functions as a biologic humectant, which helps the skin retain water.⁹

The synthetic hyaluronic acid is obtained in one of two ways:

1. It can be extracted from animals – rooster comb or cows’ eyes, in particular.
2. It can also be created artificially in the laboratory by harvesting it from *Streptococcus* bacteria typically grown on wheat grains.¹⁰

Functions of HA include the following: hydration, lubrication of joints, a space filling capacity, and the framework through which cells migrate. The synthesis of HA increases during tissue injury and wound healing. It is super effective because it can absorb up to 1,000x its own weight in water. Since it is so absorbent, it’s able to draw in water and lock in vital moisture by rehydrating the skin, it smoothes and plumps the surface, while dramatically reducing fine lines and wrinkles.¹¹



Plant based alternative for HA is Senna seeds . Senna is a small herb belonging to the *Cassia* genus of the Caesalpiniaceae family. Its botanical name is *Cassia augustifolia*. Senna seed can hold up to 100 times its weight in water .The Polysaccharides (the hyaluron molecules) can be extracted directly from the seeds of the plant.¹²

NIACINAMIDE

Topical niacinamide has the special ability to decrease pore size and sebum production. According to Draelos et al., using 2% topical niacinamide for four weeks reduced surface sebum levels in a Caucasian research group and significantly decreased sebum excretion rate and pore size in a Japanese cohort. Niacinamide's capacity to raise intracellular NAD and NADP, whose reduced forms (NADH and NADPH) act as antioxidants, contributes to its anti-aging effects. Topical niacinamide reduces the deposition of excess glycosaminoglycans, promotes the formation of collagen, and guards against protein glycation. Glycation causes the molecules of collagen and elastin to crosslink, which stiffens and changes the skin's viscoelastic characteristics.¹³

Niacinamide is most often synthesised through chemical processes. These involve the conversion of niacin into niacinamide by using ammonia or other reducing agents.

This process forms a white, crystalline powder, then used as an ingredient in skincare products.¹⁴



Niacinamide has been shown to mitigate the release of pro-inflammatory lipids, such as arachidonic acid and prostaglandin D2, during skin barrier disruption. The study was carried out in Sweden for an alternative to niacinamide, to strengthen the skin barrier. Swedish plant extracts were compared for skin barrier benefits and two candidates outperformed the rest: *Betula alba* (BA) and *Empetrum nigrum* (EN). These two extracts upregulated genes as well as proteins important for skin barrier health, both when used individually and in combination. Additionally, they showed strong antioxidant and anti-inflammatory activity. These show more appreciable effects on Trans-epidermal water loss (TEWL) and cutaneous hydration index were measured versus niacinamide at 3%. In comparison to niacinamide, BA extract induced significantly higher levels of aquaporin 3 (AQP3) and occludin (OCLN), proteins important for skin hydration and consequently skin barrier health. *Empetrum nigrum* extract exhibits significantly higher levels of AQP3 and OCLN proteins, compared to niacinamide, and thereby follows the same pattern as BA. So this study proves that (BA) *Betula alba* Bark Extract and *Empetrum nigrum* Fruit Juice, a Natural Alternative to Niacinamide.¹⁵

Other sources of Niacinamide are banana, potato, and papaya which are used externally on the face. This is the best Alternative to Niacinamide, a form of Vitamin B3 known for its skin-improving properties.¹⁶

SALICYLIC ACID:

Salicylic acid (SA) belongs to a class of substances called hydroxy acids, which are utilised extensively for many cosmetic reasons due to their numerous beneficial characteristics.¹⁷ Additionally, synthetic SA can be produced. PIH, freckles, acne vulgaris, melasma, and other diseases can all be treated with SA. In chemical terms, SA is either ortho hydroxybenzoic acid or 2-hydroxybenzoic acid.¹⁸ Willow bark extract is a beta-hydroxy acid that is abundant with salicylic acid and helps to exfoliate skin and dry up inflammatory acne lesions.¹⁹



CONCLUSION:

The aim of this article is to study about the plant based alternatives for synthetically made face serums .A good skin care regimen with the right serum for you may prevent further damage and maintain the ageing process of your skin, which is an important aspect of overall body health. When used in conjunction with the right moisturiser and sunscreen, it gets rid of wrinkles, dark spots, fine lines, and other imperfections. Certain compounds address certain skin concerns; thus, a blend of the best components may have extraordinary effects. Synthetic facial serums are typically preferred since they are fast solutions, and sometimes that's just what we need. But it's important to realise that a quick cure isn't always the best course of action. Similar to synthetic face serums, natural face serums come in many forms to address different problems based on their ingredients. However, utilising a naturally crafted product carries a somewhat lower chance of adverse consequences.Hence, Plant based alternatives for retinol, HA, Niacinamide, Salicylic acid are Bakuchiol, Senna seeds ,Betula alba (BA) and Empetrum nigrum(EN),Willow bark extract.

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