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## Review

### A Comprehensive Review of Facial Serums: Formulations, Benefits, and Key Ingredients in Skincare

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	<h3>Abstract</h3>
Published on: 21 Mar 2025	<p>The need for skin care procedures and products has grown significantly in recent years. Among humans, being beautiful is an obsession. As a result, a number of products that make you look young and intelligent have been introduced. Globally, the use of herbal compounds has increased. Herbal cosmetics are becoming more and more popular worldwide and are a priceless natural resource. Herbal cosmetics are made by combining diverse herbal ingredients with a cosmetic foundation to nourish and treat a range of conditions. As a result, attention has been focused on protecting the skin between people and their companies. Herbal face packs encourage blood flow, skin regeneration, softness preservation and pore-clogging debris removal. Herbal cosmetics have the advantages of being non-toxic and reducing allergic reactions. A skin care regimen consists of a cleanser, a serum, a moisturizer and a sunscreen. The newest product for creating a fantastic skin routine is a serum. Serums come in a variety of formulation types for skin types, including dry, oily and anything in it. The purpose of this research review is to emphasize the many benefits of utilizing the appropriate serum formulation for various skin types and the outcomes that most people can anticipate. Additionally, it contains information discusses the different skin-healing and skin-brightening substances that are utilized in serums these days and how they work to give the skin an appropriate glow that might not be possible normally. Serums composed of different concentrated vitamins and acids have demonstrated remarkable effects, despite the fact that there is now no beneficial procedure that may slow down the aging conditions of the skin.</p>
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<p><b>Keywords:</b> Herbal cosmetics , Skin care ,Serum formulation , Skin types (dry, oily, combination) ,Skin regeneration</p>	

## 1. INTRODUCTION

In recent years, there has been a discernible movement in skincare products toward natural and herbal solutions due to growing awareness of the possible advantages of botanical substances. Among them, herbal face serums are becoming a popular choice for consumers seeking skincare products that are both mild and efficient. These serums, which take a holistic approach to skincare, address a variety of skin issues by harnessing the power of nature. Natural components like oils and concentrated botanical extracts make up herbal face serums, which are lightweight and rapidly absorbed <sup>(1)</sup>. These serums are designed to give the face strong antioxidants, vitamins, minerals and nutrients, which will leave the complexion looking radiant and healthy. Serums work better. Regarding face serum <sup>(2)</sup>. The biggest and most defensive organ in the body, the skin, can occasionally develop for a number of causes, including exposure to UV rays, pollution, and cosmetics that has been on all night and may have triggered irritated or allergic reactions. Two distinct anti-oxidant and anti-aging components that can preserve the appearance of youthful, healthy skin are aloe vera and bale fruit extract <sup>(3)</sup>. The word "cosmetic" comes from a Greek word that means "to adorn," which means to embellish oneself or an item. According to the Food Drug & Cosmetic Act, cosmetics are items applied to the human body that are intended to cleanse, beautify, enhance attractiveness or alter appearances. Cosmetics now come in a variety of formats, including eye shadows, lipsticks, serums, lotions, nail polishes and scents. For example, face powders are used on top of foundation creams to give skin a glowing appearance. Cosmetology includes the study of cosmetics and their uses as well as the practice of improving skin, nails and hair through beauty treatments <sup>(4)</sup>. Face serums with components associated with better barrier function, less wrinkles, and fine lines The origins of plant-based herbal extracts can be found in ancient writings such as the Bible, Vedas and Upanishads. Although allopathic therapies are the only ones used in traditional medicine, there is growing interest in using herbal remedies to supplement them <sup>(5)</sup>. One important way that creams and serums or lotions differ from one another is in how they are made, particularly in what they don't include. Most serums are water-based formulas that totally eliminate oils, while some contain lubricating and thickening ingredients like nut or seed oils <sup>(6)</sup>

### ADVANTAGES

Enhance the texture of your skin.  
 Reduces the number of skin pores.  
 Nourishes and hydrates the skin.  
 Boost the suppleness of your skin.

### DISADVANTAGES

- For those with chronic skin conditions that compromise the skin barrier, such as rosacea or eczema, the gel or liquid-like serum texture is inappropriate.
- For those with chronic skin disorders that impair the skin barrier, such as rosacea or eczema, the gel or liquid-like serum texture is inappropriate <sup>(7)</sup>.

## 2. IDEAL PROPERTIES OF SKIN SERUM

### Reduces Skin Irritation

Known for its antiviral and cell-regenerating properties, aloe vera gel provides a soothing effect akin to that of applying it topically to sunburn.

### Thorough Hydration

Able to change the amount of moisture in the skin.

### Fight Acne and Fade Blemishes

Bael fruit reduces acne and pimples by stopping bacterial overgrowth.

### Remove Dark Circles and Puffiness

Rich antioxidants and vitamin E aid in reducing puffiness and discolouration of the eyelids. **Reduces Under-Eye Circle Prominence:**

Reduces the visibility of under-eye circles.

### Removes Dead Skin Cells:

Promotes the production of collagen.

### Contains Antioxidant Properties:

Promotes skin that looks healthy.<sup>(8)</sup>

## 3. TYPES OF SERUM

Oil serum

Water based serum

Gel serum



Emulsion serum  
Pressed balm serum.

### 3.1 Oil Serum

**Fig 1: Oil Serum**

The oil serum is the most straightforward to make out of all the face serums. Usually, it is made up of just premium, fast-absorbing, specialized carrier oils, sometimes referred to as "dry" oils. In addition to providing moisturizing and barrier-repair benefits, the premium oils in the serum also include polyphenols, vital fatty acids, and other substances that the skin can digest<sup>(9)</sup>.

### 3.2 Water Based Serum

Serum based on water are same as that of gel serums, but they may contain little or no gums and thickeners. They are perfect for delivering high-performing hydrophilic plant extracts that are trapped against the skin under a lotion or cream. The best method to ensure that water-based chemicals penetrate the skin deeply is to use an anti-aging face mist that is placed under an emulsion and then an oil. characteristics that balance and tone the skin. Next you would add skin-feeling components like humectants, which aid in the serum's skin-clinging properties.<sup>(10)</sup>



**Fig 2: Water Based Serum**

### 3.3 Gel Serum

Gel serums provide the skin a "tightening" sensation, giving your customer the impression that specific facial areas are momentarily tightened or lifted. The gel serum offers you the chance to add some amazing water-based (hydrophilic) botanical extracts because this formulation is water-based. Although gels are typically thought of as translucent, you can give them colour by adding vibrant plant extracts, glycerides, and other substances <sup>(11)</sup>. Gel serums provide the skin a "tightening" feeling, which makes certain facial areas feel tighter or more lifted. This kind of serum is a water-based formulation since it permits the addition of plant extracts that are based on water <sup>(12)</sup>.



**Fig 3: Gel Serum**

### 3.4 Emulsion based Serum

Emulsion-based face serum is a kind of moisturizer that delivers high-performance skin components while reinforcing the skin's barrier. An emulsifier is used to join two "immiscible" phases, like water and oil, in order to keep them together and in a stable state. The greatest way to introduce high-performance actives into the skin's tissues is using this serum <sup>(13)</sup>. An emulsion-based face serum is a moisturizer that strengthens the skin's barrier function while also delivering high-performance chemicals to the skin. Two "immiscible" phases—such as water and oil—that do not wish to mix with one another are combined to form an emulsion. To make a bind and keep the oil and water in a stable state, we employ an emulsifier. The best chance of getting high-performance actives deeply into the tissues of the skin is with an emulsion <sup>(14)</sup>.



**Fig 4: Emulsion Serum**

### 3.5 Pressed balm serum

A balm serum contains oil-soluble active ingredients that can benefit the skin in addition to the traditional balm base of butters, waxes, and oils. The occlusive barrier created by the butters and waxes hydrates and nourishes the skin while enabling the active ingredients in the serum to do their job. This kind of serum can blend thousands of beautiful plant oils with hundreds of particular butters and waxes <sup>(15)</sup>. The primary distinction between the balm serum and the others is that, whilst the others are liquid, this one takes on a solid form. A balm serum comprises oil-soluble (lipophilic) active substances that can help the skin in addition to the usual balm foundation constituents of butters, waxes, and oils. Hundreds of amazing botanical oils can be combined with dozens of intriguing, unusual butters and waxes to create a balm serum <sup>(11)</sup>.





**Fig 5: Pressed Balm Serum**







#### 4. BENEFITS OF USING FACE SERUM







Serum genuinely does it all, from moisturizing the skin to minimize the appearance of fine lines and wrinkles to lowering the appearance of dark spots and improving the texture of the skin. Antioxidant-rich serums are worth the money and effort just for shielding the skin from environmental aggressors. Serum has the ability to exfoliate, firm, and smooth the skin. Basically, it all relies on what you want your serum to achieve <sup>(12)</sup>. Regular use of serum increases the formation of collagen, helps to significantly improve texture, and leaves skin feeling firm, smooth, and youthful. In particular, the amount of vitamin C is essential for skin renewal. With serums that include high concentrations of plant-based ingredients, dark spots, scars, and pimple marks can be readily lightened. Additionally, it can shield you from damaging inorganic treatments like chemical peels, which increase the risk of UV damage to your skin. Some people find blackheads and whiteheads to be a nightmare, and they are typically caused by Pollution and enlarged pores <sup>(13)</sup>. By reducing the size of open pores, a coffee-based face serum with vitamin C can help cure and prevent blackheads and whiteheads. further aids in moisturizing and nourishing your skin. Many individuals in their 20s tend to overlook eye care, but using under-eye serums can help all skin types heal and avoid damage in addition to those with wrinkles and dark circles. You may rapidly improve your appearance and brighten your eyes with a cleansing and energizing under-eye serum that has anti-inflammatory qualities. Those with sensitive skin have extremely high levels of inflammation. Frequent application of an anti-inflammatory serum helps minimize redness and dryness, shield your skin from more harm, and restore its youthful appearance <sup>(14)</sup>.






#### 5. LIST OF PLANT USED IN SERUM FORMULATION

**Table 1: List of plant used in serum formulation**

S.no	Name of plant	Chemical constituents	Functional properties	Parts used in face serum preparation	Part of the plant
01	Aloe vera	Minerals, organic acids, phenolic chemicals, amino acids, polysaccharides, anthrones, and C-glycosides	Antioxidant qualities, pain relief, anti-inflammatory, anti-itch, and wound healing	Aloe leaf gel <sup>(15)</sup>	
02	Liquorice	Triterpenoids, coumarins, flavonoids, and glycyrrhizin	Hepatoprotective, antibacterial, antioxidant, and anti-inflammatory qualities	Roots <sup>(16)</sup>	

03	Manjistha	Purpurin, munjistin, rubiadin, and p-methoxybenzoic acid	Antimicrobial, antioxidant, and anti-inflammatory qualities	Dried roots <sup>(17)</sup>	
04	Lavender	Lavandulyl acetate, linalyl acetate, and linalool	Anti-inflammatory, anti-anxiety, and relaxant qualities	Essential oil of flowers <sup>(18)</sup>	
05	Rosemary	Ursolic acid, carnosic acid, and rosmarinic acid	Memory-boosting, anti-inflammatory, and antioxidant qualities	Leaves <sup>(19)</sup>	
06	Green tea	Caffeine with catechins (EGCG)	Weight loss support, anti-inflammatory, and antioxidant qualities	Leaves <sup>(20)</sup>	
07	Almond	Vitamin E, linoleic acid, and oleic acid	Anti-aging, moisturizing, and skin barrier-repairing qualities	Oil <sup>(21)</sup>	
08	Coconut	Vitamin E, caprylic acid, and lauric acid	Antimicrobial, anti-inflammatory, and moisturizing qualities	Oil <sup>(22)</sup>	

09	Ginseng	Ginsenosides	Immune-boosting and adaptogenic (stress-reducing) qualities	Root and leaf <sup>(23)</sup>	
10	Jojoba	Wax esters	moisturizing (like the natural oils in skin), and anti-inflammatory	Oil <sup>(24)</sup>	
11	Olive	Oleuropein	anti-inflammatory and antioxidant (anti-aging) qualities	Fruits and leaf <sup>(25)</sup>	
12	Turmeric	Curcumin	anti-inflammatory (relieving arthritis), and antioxidant qualities	Roots of the turmeric plant <sup>(26)</sup>	
13	Calendula	Triterpenoids and flavonoids (quercetin) Thymol	anti-inflammatory qualities for skin disorders, wound-healing qualities	Petals <sup>(27)</sup>	
14	Thyme	Thymol	antioxidant qualities and antimicrobial (against germs and fungus) qualities	Oil <sup>(28)</sup>	

15	Peppermint	Menthol	characteristics that reduce headaches and aid in digestion (relieves indigestion)	Oil <sup>(29)</sup>	
16	Chamomile	Apigenin	Relaxant (slows down and encourages sleep), anti-inflammatory	Flowers oil <sup>(30)</sup>	
17	Shea butter	Stearic acid with oleic acid	Anti-inflammatory qualities and skin and hair moisturizing qualities	Oil shea butter <sup>(30)</sup>	
18	Argan	Fatty acids with tocopherols (vitamin E)	Antioxidant qualities, skin and hair moisturizing	Argan oil <sup>(30)</sup>	
19	Cilantro	Linalool	Antioxidant (gets rid of free radicals), antibacterial qualities	Leaves or the leaves of coriander <sup>(30)</sup>	

## 6. MARKETED FACE SERUM

### Dandelion Anti-Aging Serum by Boutique

A mystical serum made with pure dandelion, nutmeg oil, vitamin E, and minerals. This serum is the best whitening treatment available because it acts as a present for your face. It is ideal for daily usage because it provides skin a radiant glow and works wonderfully at erasing dark spots. Known as one of the best face serums in India, it leaves skin immaculately luminous by eliminating wrinkles and all other flaws.

### Vitamin C Serum for Face by True Skin Naturals

An effective anti-aging serum that targets fine lines, wrinkles, and other signs of aging on the face. Because of its scientific properties, using this serum guarantees that your skin will be clear, glowing, and velvety smooth in the future. formula that increases the production of collagen. This face serum is a combination of natural



and organic ingredients that not only soothes the skin but also reduces age-related marks, acne, and breakouts, making it suitable for even the most sensitive skin types.

### **Radha Beauty Vitamin C Serum<sup>31</sup>**

This anti-aging elixir reduces wrinkles and fine lines and leaves your skin feeling silky, clear, and tender. To treat acne, age spots, or skin sensitivity, just generously apply it to your face and neck. Renowned as a top antioxidant serum in India, it protects your skin from sun damage while rejuvenating it, leaving behind a youthful glow. Serum OZ+ Radiant Serum is a new product for your skin. The chemicals in this serum work like successful to give your skin a glowing appearance. It is the strongest antioxidant that supports skin brightness and is the best in India. In addition to enhancing the face's inherent radiance, it works well as a base for normal to oily skin types prior to applying makeup. This product, which is paraben-free, works well to whiten your face and give you a brighter, more radiant complexion.

### **Good Vibes Rose Hip Radiant Glow Face Serum<sup>32</sup>**

This lightweight formula is your ally in the fight against aging signs like fine lines, thanks to its abundance of Vitamin C and natural fruit extracts that improve your skin. Good Vibes Rose Hip Radiant Glow Face Serum: This serum soothes puffiness with almond oil, improves collagen with rosehip oil, and keeps sebum in check. Vitamin E shields from oxidative harm, and sesame oil protects against UV rays. The combination of cleansing and hydrating ingredients in this serum is ideal for all skin types, guaranteeing a healthy and radiant complexion.

### **Jovees Herbal Vitamin C Face Serum:**

Jovees herbal serum revitalizes sagging skin and improves its texture and brightness. Because of its high vitamin C content and natural fruit extracts that revitalize your skin, this light product is your ally in the fight against aging symptoms like fine lines. Delving deep into your skin, this serum nourishes and brightens, while grape seed extract ensures optimal hydration. As this serum does its job, you can wave goodbye to dark spots and hyperpigmentation and reveal a more even, brighter skin.

### **Minimalist 10% Face Serum with Niacinamide:**

The Minimalist Zinc Serum with 10%+ Niacinamide. This niacinamide-enriched aloe-infused treatment improves protein synthesis, balances skin tone, and prevents the formation of melanin. Zinc becomes the mix to control sebum, quiet inflammation, and improve the skin's texture. Designed for oily, prone to pimples, and blemish-prone skin types, this pH-balanced serum is a safe addition every day regular of skin care.

### **St.Botanica Retinol 2.5% + Hyaluronic Acid Face Serum:**

The St. Botanica Retinol 2.5% E & Hyaluronic Acid Someone Facial Serum, a potent elixir produced to combat dryness and shield your skin from the harmful effects of UV exposure. packed with 2.5% retinol, this serum stimulates cell renewal and repair, effectively stalling premature aging for a more youthful appearance. The hyaluronic acid in this serum acts as a magnet for moisture, ensuring your skin stays hydrated and supple.

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### **L'Oréal Paris Revitalift 1.5% Hyaluronic Acid Face Serum<sup>33</sup>**

This L'Oréal Paris hyaluronic acid serum is a dermatologist suggested solution for full, radiant, and supple skin. It is motivated by 1.5% hyaluronic acid, is a powerful humidifier which can hold up to 1000 times its the weight in water and seal moisture to the skin. It completely penetrates the skin to moisturize and make it soft and smooth.

## **CONCLUSION**

Overall health is greatly affected by the condition of the skin, and using the proper serum in a skincare routine helps prevent environmental damage and prevent aging. Each of them handles a particular skin issue, and when used skill fully, they may give remarkable results. The analysis also lists various skincare companies that sell serums, highlighting the crucial part that face serums play in contemporary skincare regimes.

## REFERNCES

1. Kaur L, Singh AP, Singh AP, Kaur T. A review on herbal cosmetics. *Int J Pharm Drug Anal* 2021;7:196-201.arkete
2. Gurjar G, Kanade M. Analysis of phytopathogenic fungi isolated from some important crop plants using morpho molecular tools–foldscope and ITS region sequencing. *Mycol Prog* 2020; 19:1475-93.
3. Thorat PS, Bhadane HB, Wagh SS, Gaikwad MS, Chhajed SS. General review on face serum. *World J Pharm Res* 2023; 12:445
4. Bharatia R, Gupta N, Upadhyay P, Tiwari SK, Gupta S, Sahni K. A Review on Cosmeceuticals. *International Journal of Pharma Professional’s Research (IJPPR)*. 2024 Mar 22;15(1):128-41. doi:10.48165/ijpponline.2024.15110
5. DK, S. S., & Jain, V., Challenges in formulating herbal cosmetics, *Int J App Pharm*, 2018;10(6): 47-53. doi: <http://dx.doi.org/10.22159/ijap.2018v10i6.27> 377
6. Kaur, L., Singh, A. P., Singh, A. P., & Kaur, T., review on herbal cosmetics, *International Journal of Pharmaceutics and Drug Analysis*, 2021;9(3): 196-201. doi:10.47957/ijpda.v9i3.483
7. Bijauliya, R. K., Alok, S., Kumar, M., Chanchal, D. K., & Yadav, S., A comprehensive review on herbal cosmetics, *International Journal of Pharmaceutical Sciences and Research*, 2017; 8(12):4930 4949. doi: 10.13040/IJPSR.0975 8232.8(12).4930-49
8. Tiwari, R., Tiwari, G., Yadav, A., & Ramachandran, V., Development and evaluation of herbal hair serum: A traditional way to improve hair quality, *The Open Dermatology Journal*, 2021;15(1):52-58. doi: 10.2174/1874372202115010052
9. Gupta, R. K., Soni, P., Shrivastava, J., Rajput, P., & Parashar, S., Cosmeceutical role of Medicinal plants/Herbs: A Review on commercially available Cosmetic ingredients, *Himalayan Journal of Health Sciences*, 2018; 3(4)70-73. doi:10.22270/ijist.v3i4.27
10. Sasidharan, S., & Joseph, P., Formulation and evaluation of fairness serum using polyherbal extracts, *Int. J. Pharm*, 2014 ;4(3): 105-112. <https://www.researchgate.net/publication/263929557>
11. What Is a Serum & How to Choose the Best Serum? ByMahigna Content Writer at Clovia
12. <https://formulabotanica.com/organic-facial-serum-formulation/>
13. Womens Heath watch; June 12, 2018
14. Pal, R. S., Pal, Y., & Wal, P., In-house preparation and standardization of herbal face pack, *The Open Dermatology Journal*, 2017;11(1): 72-80. doi:10.2174/1874372201711010072
15. Patidar, M., Deshmukh, N., Mandloi, N., Patidar, B., Solanki, L., & Pillai, S., Formulation and evaluation of face serum contain phytosome of gingerol oil, carica papaya pulp extract and aloe vera gel, *World Journal of Pharmaceutical Research* ,2023; 12(18): 726-740. ISSN 2277– 7105
16. Kohakade, M. S., &Karodi, R., Formulation and Evaluation of Face Serum, *Latin American Journal of Pharmacy: A Life Science Journal*, 2023; 42(3):205-210. doi:10.20959/wjpr20192-14104
17. Mishra, A. K., Mishra, A., & Chattopadhyay, P., Herbal cosmeceuticals for photoprotection from ultraviolet B radiation: A review, *Tropical Journal of Pharmaceutical Research*, 2011; 10(3):351-360. doi:10.4314/tjpr.v10i3.7
18. Thornfeldt, C., Cosmeceuticals containing herbs: fact, fiction, and future, *Dermatologic Surgery*, 2005; 31: 873-881. doi: 10.1111/j.1524-4725.2005.31734.
19. Korać, R. R., &Khambholja, K. M., Potential of herbs in skin protection from ultraviolet radiation, *Pharmacognosy reviews*, 2011; 5(10): 164. doi: 10.4103/0973-7847.91114
20. Akhtar, N., Zaman, S. U., Khan, B. A., Amir, M. N., & Ebrahimzadeh, M. A. , Calendula extract: effects on mechanical parameters of human skin, *Acta Pol Pharm*, 2011; 68(5):693-701. PMID: 21928714
21. Ghafarifarsani, H., Hoseinifar, S. H., Sheikhlar, A., Raissy, M., Chaharmahali, F. H., Maneepitaksanti, W., Van Doan, H., The effects of dietary thyme oil (*Thymus vulgaris*) essential oils for common carp (*Cyprinus carpio*): growth performance, digestive enzyme activity, antioxidant defense, tissue and mucus immune parameters, and resistance against *Aeromonas hydrophila*, *Aquaculture Nutrition*, 2022; doi: 10.1155/2022/7942506
22. Kligler, B., & Chaudhary, S., Peppermint oil, *American family physician*, 2007; 75(7): 1027-1030. PMID: 17427617.
23. Srivastava, J. K., Shankar, E., & Gupta, S., Chamomile: A herbal medicine of the past with a bright future, *Molecular medicine reports*, 2010; 3(6): 10.3892/mmr.2010.377. 895-901. doi:
24. Andersson, A. C., & Alander, J., Shea butter extract for bioactive skin care, *Cosmet. Toilet*, 2015; 130:18-25.
25. Bijauliya, R. K., Alok, S., Kumar, M., Chanchal, D. K., & Yadav, S., A comprehensive review on herbal cosmetics, *International Journal of Pharmaceutical Sciences and Research*, 2017; 8(12):4930 4949. doi: 8232.8(12).4930-49 10.13040/IJPSR.0975

26. Goik, U., Goik, T., Załęska, I., The properties and application of argan oil in cosmetology. *European Journal of Lipid Science and Technology*, 2019; 121(4): 1800313. doi:10.1002/ejlt.201800313
27. Yapar, E. A., Herbal cosmetics and novel drug delivery systems, *Indian Journal of Pharmaceutical Education and Research*, 2017; 51(3):152-158. doi:10.5530/ijper.51.3s.3
28. Khan, N., Ahmed, S., Sheraz, M. A., Anwar, Z., & Ahmad, I. (). Pharmaceutical based cosmetic serums. In *Profiles of Drug Substances, Excipients and Related Methodology*, Academic Press, 2023 ;48: 167-210. doi: 10.1016/bs.podrm.2022.11.006
29. <https://formulabotanica.com/organic-facial-serum-formulation/>
30. *Womens Health watch*; June 12, 2018
31. Ashique, S., Sandhu, N. K., Haque, S. N., & Koley, K., A systemic review on topical marketed formulations, natural products, and oral supplements to prevent androgenic alopecia: a review, *Natural products and bioprospecting*, 2020; 10:345-365. doi: 10.1007/s13659-020-00267-9.
32. Leong, M. Y., Mogana, R., Selvaraja, M., Chinnappan, S., Por, C. S., Yap, C. S., ... & Dharmendra, K., A review on herbal skin carecreams, *Current Trends in Biotechnology and Pharmacy*, 2021; 15(4):455-470. doi: <https://doi.org/10.5530/ctbp.2021.4.48>
33. Anusha, R., Akhila, N., Nikhitha, J., Harish, K., Abdull, R. S., & Inamul, S. Y., Formulation and evaluation of herbal hair serum-a review, *International Journal of Basic & Clinical Pharmacology*, 2023; 12(5):759-766. <https://doi.org/10.18203/2319-2003.ijbcp20232>