

An Overview of Formulation and Evaluation of Herbal Serum

Mrs. Sonali Namdev¹ and Mrs. Sunita Patidar²

Department of Pharmacy, Swami Vivekanand College of Pharmacy, Indore¹

Associate Professor, Department of Pharmacy, Swami Vivekanand College of Pharmacy, Indore²

Abstract: *The recent beauty trends have led to the development of cosmetics that combine traditional Indian medicine with modern practices. Herbal Formulations are gaining prominence as the use of herbs for beautification becomes more prevalent, thanks to their effectiveness and minimal side effects. These botanical ingredients found in plant-based products play a crucial role in promoting skin health. Herbal Serums, in particular, are widely utilized for their diverse applications. Known for their ability to penetrate deep into the skin layers and rapidly absorb due to their non-greasy texture and specialized formulation, Herbal Serums are crafted with high concentrations of active ingredients. Herbal cosmetics are experiencing a surge in demand in the global market, representing a valuable natural resource. These formulations have garnered significant attention for their efficacy and relatively few or no side effects compared to synthetic drugs. The current study centers on the formulation and evaluation of herbal serum.*

Keywords: Herbal Serum, Cosmetic, Phytochemicals, Moisturizing, Revitalizing

I. INTRODUCTION

In contemporary society, beauty is highly prioritized, with skincare products serving as a primary avenue within the cosmetics industry. These products consist of intricate chemical formulations, which can be derived from natural sources or synthesized artificially. (1) Skin aging, characterized by the formation of wrinkles, is a multifaceted process influenced by prolonged exposure to ultraviolet (UV) radiation, which damages the skin. Wrinkling is often associated with a decline in collagen levels due to the presence of reactive oxygen species (ROS) generated by UV exposure. Consequently, anti-aging treatments aim to address both age-related ailments and the underlying causes of aging, with the goal of extending the healthy lifespan and preserving youthful characteristics. These treatments typically promote skin renewal and stimulate collagen production. (2-4)

The term "cosmetic" originates from the Greek word "kosmetikos," which denotes the ability, arrangement, or skill in adorning oneself. Initially, cosmetics were linked with activities such as hunting, warfare, religious rituals, and superstitions, before eventually becoming associated with medicinal practices. (5) Traditionally, natural ingredients have been utilized for skincare purposes over many centuries, and they are increasingly prominent in modern formulations. These ingredients can be derived from various sources such as herbs, fruits, flowers, leaves, minerals, water, and land. The effectiveness of natural ingredients in skincare products relies on their efficacy in laboratory settings and real-life applications, as well as the dermatological base in which they are integrated. Incorporating bioactive extracts or phytochemicals from diverse botanical sources in cosmetics serves two main purposes: nurturing the skin and leveraging their properties to influence skin biology, thereby providing essential nutrients for skin health. Botanical products typically contain a wealth of vitamins, antioxidants, essential oils, hydrocolloids, proteins, terpenoids, and other bioactive compounds. (6)

Herbal cosmetics are skincare products containing phytochemicals sourced from various botanical sources, which have the ability to affect skin functions and provide essential nutrients for maintaining healthy skin. Ayurvedic practices have long utilized a variety of herbs to develop cosmetics aimed at safeguarding the skin from environmental factors and enhancing its aesthetic appeal. (7) Herbal cosmetics are preferred over chemically synthesized products because they typically have fewer or no harmful side effects, are considered safe for use, and are compatible with most skin types. Ayurvedic cosmeceuticals are particularly trusted for their safe, comprehensive effects and use of natural herbal extracts. Drawing from the extensive knowledge of Ayurveda, maintaining beauty and skin health involves balancing

the three doshas (Vata, Pitta, and Kapha) and the body tissues (Rasa, Rakta, and Mamsa). (8) Consequently, there is a growing emphasis on skin health, with people turning to various products such as creams, lotions, and serums to mitigate these effects and slow down the aging process. A quality skin serum has the potential to enhance skin firmness, smoothness, minimize pores, and boost moisture levels. (9)

II. SERUM

Serum is a highly concentrated cosmetic product frequently utilized in the field of cosmetology, with its origins rooted in professional skincare. Unlike creams, serums contain a high concentration of biologically active substances, typically ten times more, whether based on water or oil. This high concentration allows serums to address cosmetic concerns more rapidly and effectively than traditional creams. (10) A serum is characterized by its rapid absorption, deep penetration into the skin's layers, non-greasy texture, and highly concentrated formula containing active substances. It typically comes in the form of a gel, lightweight lotion, or moisturizing consistency designed to deliver active ingredients deep into the skin. A quality skin serum can contribute to firmer, smoother skin texture, minimize the appearance of pores, and boost moisture levels. Serum formulations may include topical antibiotics, topical retinoids, and other active ingredients. (11)

2.1 Effects of Serum

Concentrated formulas are swiftly absorbed by the skin, allowing for a higher intake of active ingredients, which are easily assimilated. These powerful compounds, when found in increased concentrations, can effectively hydrate the skin and deliver lifting effects, along with other advantages. Based on their effects, all serums are typically categorized as follows: Lifting, Revitalizing, Moisturizing, Nourishing, Anti-inflammatory, and Anti-stress. (10, 12)

Serums target specific areas of the body, including the face, neck, décolletage, and eyelids. Special care must be taken for delicate areas of the skin, requiring the use of specific preservatives and bases, along with precise calculation of active ingredient doses. Serums are suitable for individuals of all ages. When using concentrated formulas, not only can quick cosmetic effects be achieved, but there is also psychological satisfaction after treatment, as results are practically visible immediately. (10)

In essence, serums are regarded as value-added cosmetic products. They come in various forms such as transparent, semi-transparent, and viscous liquids available in the market. Due to their concentrated nature and the need to meet various body requirements, serums are typically used in small amounts. (10, 13)

2.2 Formulation of Herbal Serum

Mechanical Homogenization method: The process of formulating herbal serum typically involves several steps. Initially, data is gathered and active ingredients are extracted from the herbal sources. A preliminary phytochemical screening of the extract is conducted. The formulation process may include the Mechanical Homogenization method, where oil extracts are taken in suitable quantities and mechanically homogenized to reduce their size. Different aqueous extracts are then mixed thoroughly and gradually added to the homogenized oil extracts in a homogenizer, and the mixture is triturated until it forms a thick, clear liquid. Preservatives such as methyl paraben and propyl paraben are added in a 1:1 proportion, and a suitable quantity of perfume is added for flavoring purposes. (14-15)

2.3 Evaluation Parameter of Herbal Serum (16)

2.3.1 Physical Evaluation:

Colour and appearance

Homogeneity: The formulation exhibited consistent distribution of extracts, which was confirmed through visual observation and tactile examination.

Rheological analysis: The viscosity of the formulation was assessed using a Brookfield Viscometer at a speed of 100 rpm, employing spindle type model S64.5 ml of the serum was placed in a beaker, and the spindle was immersed in it for approximately 5 minutes before recording the measurements.

Spreadability: Spreadability refers to the serum's capacity to efficiently cover a larger surface area upon application to the skin or the affected region.

Determining Percent Spread by Area: To calculate the percent spread by area, use the following formula: % Spread by Area = $(A2/A1) * 100$.

After feel: After application, the emollient properties, slipperiness, and residue amount were assessed by applying a fixed quantity of serum onto the skin and evaluating the skin feel.

Redispersion Testing: Redispersion testing was conducted using the microcentrifugation method. Formulations were centrifuged for 3 minutes at 2000 RPM. Following centrifugation, the product was shaken, and observations were made regarding its ability to redisperse. A formulation demonstrating successful redispersion was considered satisfactory. (16)

2.3.2 Chemical evaluation: Since the skin typically has an acidic pH ranging from 4 to 6, it is preferable for the formulation to fall within this pH range.

2.3.3 Biological Evaluation: Biological assessment indicated that the formulation did not cause skin irritation and was deemed safe for use. (18)

Test for microbial growth: In this procedure, the mixed culture is directly diluted into tubes containing liquid agar medium. The medium is kept in a liquid state at a temperature of 45 degrees Celsius to ensure thorough distribution of the inoculum. The inoculated agar medium is then transferred into petri plates, allowed to solidify, and then placed in an incubator. In the series dilution technique, the original inoculum is diluted using sterile water or saline solution to gradually decrease the concentration of the microbes. A volume of 1 ml of the diluted mixture is added to 20 ml of liquid nutrient agar medium at 45 degrees Celsius. The liquid agar nutrient medium is then shaken, poured into a sterile petri plate, allowed to solidify, and subsequently incubated.

Stability Studies: The formulation and development of a pharmaceutical product are incomplete without conducting thorough stability analysis to assess both its physical and chemical stability, ensuring the safety of the product.

Globule size determination: Particles within the range of 0.1-0.2 μ m significantly improve the formulation's ability to penetrate the skin, leading to more rapid and effective results.

Cyclical Temperature Test: This test is conducted without adherence to specific fixed temperature and humidity conditions. Instead, temperature variations occur cyclically each day, ranging from room temperature to freezing temperature, to simulate temperature changes effectively. (17-18)

IV. CONCLUSION

The concept of beauty and cosmetics has roots as ancient as human civilization itself. Indian herbs are renowned globally for their significance, contributing to the rising demand for herbal cosmetics worldwide, viewed as precious offerings from nature. Herbal formulations have long garnered attention due to their effectiveness and minimal side effects compared to synthetic drugs. Serums are valued for their rapid absorption, ability to penetrate deep skin layers, non-greasy texture, and high concentration of active ingredients. In this report, we discuss the uses, methods, and evaluation criteria of herbal serums. Various studies have highlighted the carcinogenic and skin-irritating properties of synthetic acne treatment products. Addressing these concerns, herbal serum formulations could offer a viable solution.

V. ACKNOWLEDGMENT

The author is thankful to the management of Swami Vivekanand College of Pharmacy, Indore for providing necessary facilities to carry out the research work and warm thankful to my guide for providing all support and encouragement.

REFERENCES

- [1]. Kamble R, Gamare D, Yeole P, Pathan MA, Indulkar A, Kale MK, Juvatkar PV. FORMULATION AND EVALUATION OF HERBAL BASED ANTI-AGING FACE SERUM. Foldscope & its Applications. 2022:127.
- [2]. Aimi Muneerah Shamsuddin, Mahendran Sekar *, Ahmad Zawawi Musa. Formulation and evaluation of antiaging cream containing mangiferin. International research journal of pharmacy. 2018; 9 (6)

- [3]. Arora B. P. (2008). Anti-aging medicine. Indian journal of plastic surgery: official publication of the Association of Plastic Surgeons of India, 41(Suppl), S130–S133.
- [4]. Face serums: A complete guide to incorporating them into your routine. yora.com. (n.d.). Retrieved July 9, 2022, from <https://yora.com/blogs/journal/face-serum>.
- [5]. Sujith Varma, A. Fathima, P. Jagannath, M. Akash. IJDFR, 2011; 2(5):140-165.
- [6]. Burlando B, Verotta L, Cornara L, Bottini-Massa E. Herbal Principles in Cosmetics: Properties and Mechanisms of Action. United States: CRC Press; 2010.
- [7]. Kumar M, Sumith & Swarnkar, Vandana & Sharma, Suhani & Baldi, Ashish. (2012). Herbal Cosmetics: Used for Skin and Hair. Invention Rapid Cosmeceuticals. 2012. 1-7.
- [8]. Dr. Rahul Kumar Gupta*, Dr. Pawan Kumar Sharma, Dr. Anand Pandey, Dr. Maneesh Kumar Gupta and Dr. Umesh Mujhalda. Ayurveda perspective of skin care: a review on cosmaceuticals And traditional formulation. European Journal of Biomedical AND Pharmaceutical sciences. Year: 2018, Volume: 5, Issue: 5, 1110-1113.
- [9]. Cho JM, Lee YH, Baek RM, Lee SW J, Effect of platelet rich plasma on ultraviolet B induced skin wrinkles in nude mice, *Plast Reconstr Aesthet Surg*, 2011; 64(2): e31-9.
- [10]. Thakre AD. Formulation and development of de pigment serum incorporating fruits extract. *International Journal of Innovative Science and Research Technology*. 2017 Dec;2(12):330-82.
- [11]. Salvioni L, Morelli L, Ochoa E, Labra M, Fiandra L, Palugan L, et al. The emerging role of nanotechnology in skincare. *Adv Coll Interface Sci* 2021;293:102437.
- [12]. Kinya Akashi, Kinya; “Active oxygen eliminator and moisturizer containing watermelon extract”, Applicant: National university Coporation Nara Institute of Science and Technology, Ikoma-shi, Nara630-0192(JP), Date of publication: 14/02/2007.
- [13]. Drallos and thaman, “Cosmetic formulation of skin care products” volume 30, pg no. 167-180.
- [14]. Sahu M K, Soni GC, Prajapati SK. *IJPRS*, 2012; 1(3): 224-235.
- [15]. https://www.researchgate.net/publication/263929557_Formulation_and_evaluation_of_fairness_serum_using_polyherbal_extracts.
- [16]. Sujith S Nair, Molly Mathew, Sreena K. *IJPCS*, 2012; 1(4): 1362-1368
- [17]. Salvioni L, Morelli L, Ochoa E, Labra M, Fiandra L, Palugan L, et al. The emerging role of nanotechnology in skincare. *Adv Coll Interface Sci* 2021;293:102437.
- [18]. https://www.researchgate.net/publication/263929557_Formulation_and_evaluation_of_fairness_serum_using_polyherbal_extracts.