ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr1174

Exploring The Skin Lightening Potential of PADMAKA (*Prunus cerasoides*) In A Novel Face Serum

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Publication Date: 2025/05/07

Abstract: ***Prunus cerasoides*, also known as PADMAKA, is a tree found in the Himalayan region. It has been used in ayurveda because it contains natural compounds that help to resolve the skin problems. This study aims to formulate and evaluate a face serum using PADMAKA, combining traditional herbal knowledge with modern cosmetic science. In this study we formulate the face serum using appropriate ingredients and also characterized the pH, thickness and spreadability of formulation. Safety parameters such as skin irritation and germ contamination tests are performed. The serum's effects on skin hydration, brightening, and anti-aging was also studied on lab scale and real-life use. Finally, people's opinions will be collected to see if the serum is effective and can be sold in the market. The obtained results conclude that the formulated PADMAKA-based serum is safe, stable, and useful for natural skincare.**

Keywords: *Serum, Skin lightening, Prunus Cerasoides, Skincare.*

How to Cite: Devendra Patil; Bhavesh Mistari; Ruchira Gajbhiye; Manoj Girase; Umesh Koli; Jagruti Badgujar; (2025). Exploring The Skin Lightening Potential of PADMAKA (Prunus cerasoides) In A Novel Face Serum. *International Journal of Innovative Science and Research Technology*, 10(4), 2695-2702.
https://doi.org/10.38124/ijisrt/25apr1174

I. INTRODUCTION

Prunes cerasoides, which is popularly known as PADMAKA, is a deciduous tree of the family *Rosacea* [1]. This species is found mainly in temperate Himalayan regions including Nepal, Sikkim, Bhutan, Myanmar, West China, and Northern India. Its altitudinal range in the sub-montane regions of the Himalayas is 1500–2400 m (3,900-7,900ft) [2]. Due to its effective, powerful medicinal properties, mostly for the treatment of skin diseases, this plant has been widely used in Ayurveda [3]. The bark and the seeds contain bioactive substances that have anti-inflammatory and antioxidant properties that rejuvenate the skin [4]. Therefore, it might also serve as an important ingredient in cosmetic formulations [5].

In cosmetic circles, serums are highly concentrated formulations designed to drive active ingredients deep into the skin [6]. Skin lightening serums in particular have gained serious attention because of an increasing trend toward an even skin tone or decreased hyperpigmentation [7]. Classically, chemical agents like hydroquinone, corticosteroids, and mercury were known to be used for skin lightening; however, due to extreme fears of adverse side effects including skin irritation, thinning, and toxicity, herbal substitutes gradually gained popularity [8]. Serums used in cosmetics generally describe concentrated preparations [9]. Like all other creams, it is equally concentrated in water or oil [10]. Acne serum penetrates deep into the skin layers and release active agents. In addition to this, a good serum repairs, promotes hydration, calms, eases skin irritations, and shrinks pores [11]. All ingredients of the serum should ideally possess anti-aging, anti-inflammatory, as well as antioxidant

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properties; hence, it would suit all skin types [12]. Gels, liquids for oily and combo skin, serums and lotions for normal to dry skin, and creamy moisturizing and emollient creams for dry skin were the good preparations [10]. Skin lightening or brightening is one of the prominent areas in skin care that have proven to be a hot topic. Various skin-lightening agents have been manufactured with the aim of creating uniform skin tone and reduced pigmentation for luminescence [13]

This study focuses on the creating and assessing of a face serum based on PADMAKA, interweaving traditional Ayurvedic concepts with new-age cosmetic formulation techniques [14]. The objectives of the study will be, the development of optimized formulations of a PADMAKA enriched face serum using proper excipients. Physicochemical properties assessment like pH, viscosity, spreadability, and stability [15]. Assessing skin irritation test and microbial contamination to evaluate the safety profile of cosmetologically formulation. The effect of serum on skin hydration brightens effects, and anti-aging will be determined through in-vitro and in-vivo studies. Acceptability from user and subject panel to determine effectiveness and marketability [15]. This also aims to show that the PADMAKA based face serum is a safe, stable, and efficacious formulation for herbal skin care, thus contributing toward the development of natural, sustainable cosmetic products [16].

II. MATERIALS AND METHODS:

Fig 1 Padmaka (*Pruns cerasoids*)

A. Plant Profile: -

- Scientific Name: Prunus cerasoides
- Common Name: Himalayan wild cherry, bird cherry
- Ayurveda: Padmak
- Hindi: Padam [2]

- *Plant Material:*

B. Collection, Authentication and Preservation of Sample

This study characterizes the physicochemical properties of Padmaka powder purchased from Amazon. The powder was analyzed using ATIR,"Padmakh Powder by [Nutrixia] – A Premium Herbal Supplement for Healthy Digestion and Detoxification""Padmakh Powder by [Nutrixia] – 100% Natural, Vegan-Friendly Superfood for Improved Wellness""Padmakh Powder by [Nutrixia] – A High-Quality Ayurvedic Remedy for Vitality and Digestive Health [2].

- *Macroscopic Study:*

- *Morphological characteristics:*

Morphological characteristics of bark of Prunus cerasoides such as shape, texture, color and peeling sections were studied as per visual observations and verified with standard taxonomical books [17].

- *Organoleptic Study:*

Visual and tactile observations were made of organoleptic qualities like taste, smell, and touch. The collected data was precisely recorded and documented [18].

III. PREPARATION OF PLANT EXTRACT

In order to compare effectiveness of extraction methods, the Phyto-constituents of the plant's stem bark were extracted using both maceration and Soxhlet extraction techniques [19]

A. Extraction Methods:

- *Maceration:*

A different 250 ml conical flask, 100 ml of ethanol and distilled water were added, along with 50gm of the powdered stem bark. The macerated samples were shaken continuously for 72 hours at 180 revolutions per minute using an electrical shaker after the conical flask was fully wrapped with aluminum sheet and sealed with a rubber stopper.

The marc of every crude extract was separated from the extract's solvent using Whatman No. 1 filer paper. Both extracts underwent independent phytochemical screening using different techniques [19]

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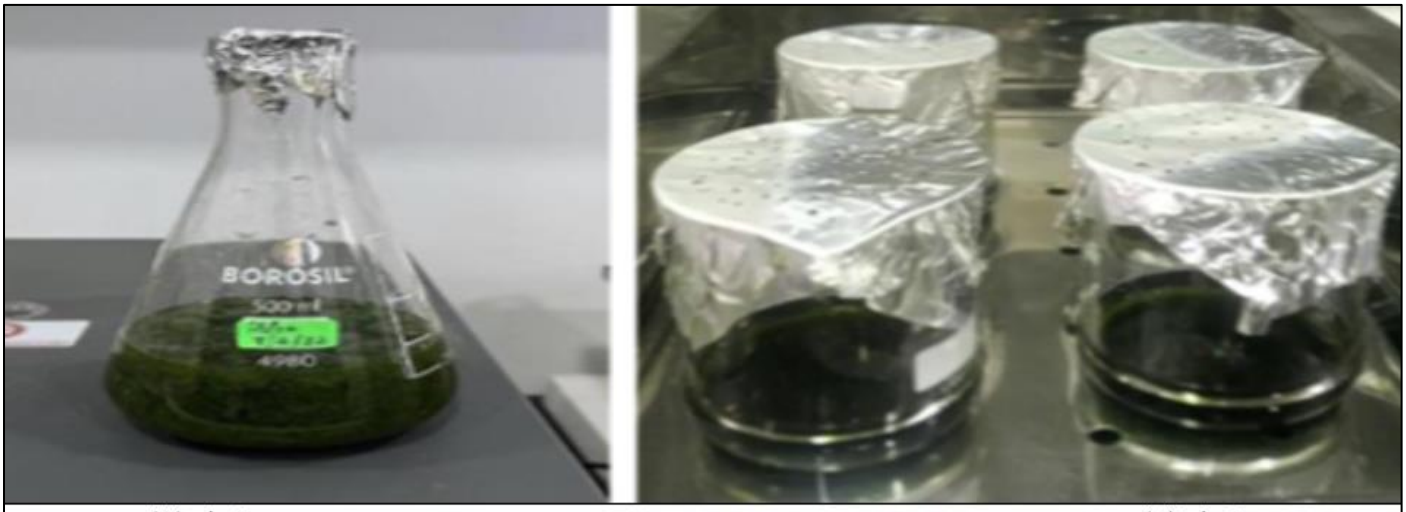

(A) Fig 2 Conical Flask Containing Powder Drug with Ethanol (Maceration Process)
(B) Fig 3 Beaker Containing prepared extract of prunus cerosides

B. Soxhlet Extraction

The Plant material was ground into a powder using ethanol and the Soxhlet extraction technique. In a round-bottom flask, 50 gm of plant powder were extracted at 60^0c using 200 ml of ethanol. For a whole day, or longer if required, the mixture was extracted until all of its color was gone. At room temperature, the extract was allowed to evaporate until it had returned to one-third of its original volume. The extracts were stored at 40^0C in a refrigerator in vials [19].

Fig 4 Soxhlet Extraction of Padmaka (*Pruns cerasoids*)

IV. PHYTOCHEMICAL SCREENING

Phytochemical screening for both aqueous and ethanol extract were studied for various plant substances like alkaloids, flavonoids, carbohydrates, tannins, terpenoids, steroids, saponins, glycosides using coloration as well as precipitation reaction methods [22].

A. Various Qualitative Tests for Different Phytochemicals

➢ *Tests for Alkaloids:*

- *Mayer's Test:*

A test tube will be filled with one milliliter of the extract. The mixture will next be combined with one milliliter of Mayer's reagent, which is a potassium mercuric iodide solution. Alkaloids can be identified by looking for a cream-colored or white precipitate [23].

- *Dragendorff's Test:*

One milliliter of the extract will be put into a test tube. One milliliter of the Dragendorff's reagent (potassium bismuth iodide solution) will be added to the mixture and agitated. Alkaloids are present when a vivid red precipitate occurs [24].

- *Wagner's Test:*

A test tube will be filled with one milliliter of the extract. After that, the mixture will be agitated with one milliliter of potassium iodide, also known as Wagner' reagent. The presence of alkaloids is indicated by reddish-brown precipitate [25].

- *Tests for Flavonoids:*

Lead Acetate Test: To check for flavonoids, a test tube with one milliliter of extract will be used. Then shake with a few drops of lead acetate. The presence of flavonoids is indicated when a yellow precipitate appears [26].

Alkaline Reagent Test: One milliliter of the extract will be put into a test tube. After adding a few drops of sodium hydroxide, then the mixture will be shaken. Flavonoids are distinguished by their bright yellow hue, which gradually turns colorless when diluted acid is added [27].

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- *Tests for Steroids:*

Salkowski Reaction: After shaking the test extract with chloroform and adding concentrated H2SO4 along the test tube walls, a red color emerged, signifying the presence of steroids [28].

- *Tests for Terpenoids:*

Salkowski's Test: Concentrated sulfuric acid (3 ml) was added carefully to the mixture of add 5 ml of extract and 2 ml of chloroform to form a layer. The interface became reddish-brown in color, showing the existence of terpenoids [29]. The presence of alkaloids is indicated by reddish-brown precipitate [25].

B. Tests for Flavonoids:

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Concentrated sulfuric acid (3 ml) was added carefully to the mixture of add 5 ml of extract and 2 ml of chloroform to form a layer. The interface became reddish-brown in color, showing the existence of terpenoids [29]

V. ATTENUATED TOTAL REFLECTANCE SPECTROSCOPY (ATIR)

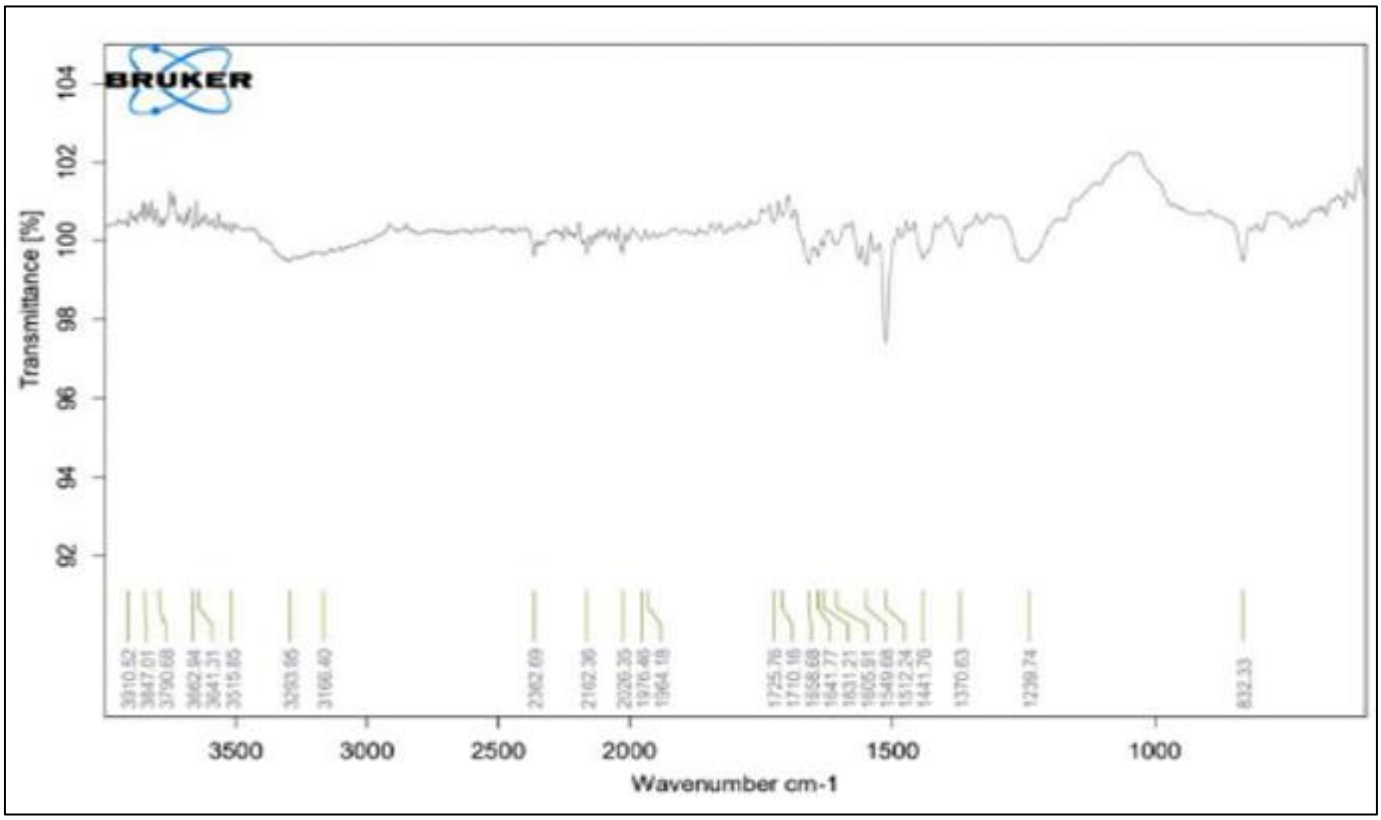

Fig 5 Attenuated Total reflectance spectroscopy (ATIR)

Since Prunes Cerasoides is known to contain bioactive compounds like flavonoids, phenolic, tannins, and terpenoids, the IR spectrum would typically show.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr1174

Table 5 Attenuated Total reflectance spectroscopy (ATIR)

Sr.No	Functional Group	Wavenumber	Apperance	Source
1	O-H Stretch (Phenols /Alcohols)	~3200-3600cm^{-1}	Broad peak	Hydroxyl groups from Flavonoids & phenolic Compounds.
2	C-H Stretch(Alkanes & Aromatic Rings)	~2850-2950cm^{-1}	Sharp peaks	Aliphatic chains & aromatic rings.
3	C=OStretch (Carbonyls,esters,Aldehyde,ketones)	~1650-1750cm^{-1}	Strong,sharp peak	Carboxylic acids, esters & Flavonoids.
4	C=C Stretch (Aromatic Rings/Alkanes)	~1500-1600cm^{-1}	Medium to strong Peaks	Aromatic rings in flavonoids & tannins.
5	C-O Stretch (alcohols,Esters & Ethers)	~1000-1300cm^{-1}	Strong peak	Glycosides & esters.
6	Fingerprint Region (Complex Vibrations)	~600-1500cm^{-1}	Multiple peaks	Complex organic molecules.

VI. METHOD OF PREPARATION

- All the equipments needs to be thoroughly cleaned and washed.
- All the ingredients are collected Then, EDTA and Carbopol was swelled in distilled water.
- The Ascorbic acid and HPMC was added in the mixture with continuous stirring with the help of mechanical stirrer.
- 1gm of PADMAKA Active extract was added in above mixture.
- After Addition of Active ingredient Perfume and preservative was added.
- At last Formulated Face serum was transfer in well labeled container.

VII. FORMULATION

Table 6 Formulation

Sr.No	Ingredient	Quantity for 100%	Uses Of Ingredients
1	Carbopol 934	**0.3%**	Gelling Agent
2	Hydroxypropylmethyl cellulose	**0.1%**	Binding Agent,Texture enhncer.
3	Ascorbic Acid	**0.5%**	Antioxidant
4	PADMAKA	**1**	Skinbrightening agent,Active Ingredient
5	Glycerin	**3%**	Humectant
6	Phenoxyethanol	**0.5%**	Preservative
7	Triethanolamine	**0.1%**	Neutralizer
8	Water	**94.5%**	Solvent
9	EDTA	**0.5%**	Chelating Agent
10	Perfume	**0.5-1%**	Fragrance

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr1174

VIII. EVALUATION PARAMETERS FOR FACE SERUM

Table 7 Evaluation Parameters For Face Serum

Colour	Transparent
Odour	Characteristics odour
Tests	Tasteless
Texture	Smooth homogenous
Homogenity	Good
pH	5
Viscosity	13759pa.s
Spreadability	5.5 cm
Washability	Washable

IX. BENEFIT OF USING A FACE SERUM:

Serum really does it all, from moisturizing the skin to minimize the visibility of wrinkles and fine lines to reducing the visibility of dark patches and the appearance of dark spots and smoothing the textural of the skin. An excellent serum with antioxidants protect the skin from harmful substances and is well worth the expense and work. Serum has the ability to exfoliate, firm, and smooth the skin. Basically, it really depends on what you want your serum to do. Regular use of serum increases the formation of collagen, helps to significantly improve texture, and leaves skin feeling firm, smooth, and youthful. Vitamin C content in particular is essential for skin renewal. Serums with high plant-based concentrations can easily lighten dark spots, scars, and pimple marks. Additionally, it can shield your skin from damaging inorganic treatments like chemical peels, which increase its vulnerability to UV damage.

Fig 5 Formulated Face Serum

X. RESULTS

The skin brightening serum was kept at three different temperatures for the duration of the Stability Study. 8°C, 27°c 40^{0}C. The formulation of the Serum was found to have a wonderful, Skin Friendly pH 4.5-5. The developed face serum have good spreadability and absorption. Dark spots, wrinkles, fine lines, and further blemishes are all removed by the serum. It gives skin lightening effect.

XI. CONCLUSION

The present study is totally depending on Facial Serum. There are so many facial serum are in market for different type of skin and Skin problems. The Aim of this present work is to recover the "Skin issues and give skin lightening effect.

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.

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In Conclusion the PADMAKA Active extract and Ascorbic acid had valuable contituents for use in skin care Cosmetics. The PADMAKA extract showed skin lightening anti-aging properties.But further research in the form of clinical studies would be required additionly it gives anti-aging properties, enhances skin hydration and nourishment, reduces pores, and improves skin texture,anti-acne. The formulation Indicates Potential Skin lightening activity due to presence of active components required for skin lightening effect in face serum. After additional clinical and toxicological research confirmed our predictions, we advised using the developed skin lightening serum to improved skin tone, texture and skin lightening effect**.**

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