



## Research Article

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## PREPARATION AND CHARACTERIZATION OF HERBAL FACE CREAM USING DIFFERENT PLANTS

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### ABSTRACT

Since the early beginning of mankind, medicinal plants have played a crucial role in human healthcare, serving as ingredients in traditional medicines, spices, and food components. Among these botanical treasures is *Allium sativum* L., commonly known as Garlic, a highly revered herb and spice derived from tubers. Garlic is a valuable herb with a rich history of culinary and traditional medicinal applications worldwide. Extensive scientific investigation has explored the wide array of biological activities associated with *A. sativum*, including its antioxidant, blood sugar-regulating, anti-inflammatory, cholesterol-lowering, anti-cancer, antithrombotic, antidiabetic, antihypertensive, obesity-regulatory, antimicrobial, and liver-protective properties, as substantiated by previous studies. *A. sativum* is renowned for its effectiveness in addressing a wide range of health issues, including cardiovascular conditions, cancer progression, rheumatism, diabetes, intestinal parasites, bloating, colic, dysentery, liver disorders and various other ailments. This review thoroughly examines updated data till last year of both traditional and therapeutic activities including anti-inflammatory, anti-cancer, and antimicrobial of *Allium sativum*.

### INTRODUCTION

Cosmetics make skin look better and more appealing while protecting it from dangerous endogenous and exogenous elements [1]. The sole purpose of cosmetics is to enhance one's outward appearance and prolong good health by lowering skin problems [2]. Skincare products are designed to nourish, moisturize, and improve skin texture [3]. A semisolid formulation intended for topical treatment is polyherbal cream. Oils, various excipients, and other plant extracts produce the

cream formulation [4]. *Aloe barbadensis* Miller, also known as aloe vera, has become famous for its many therapeutic, skin-care, and beneficial properties. It removes dead cells & makes skin soft & supple [5]. Since tea (*Camellia sinensis*) is an excellent source of polyphenols, catechins, amino acids, flavonoids, carotenoids, vitamins, and polysaccharides, among other nutrients, it is the most popular non-alcoholic beverage in the world and has significant skin and economic benefits. It helps us get rid of blemishes & acne [6]. One popular therapeutic

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herb is *Calendula officinalis*. Traditionally, pot marigold Linn. has been used to treat dermatological disorders, skin tumors, swellings, and ulcers. It has been found that various plant portions of this plant contain distinct secondary metabolites, such as carotenoids, phenolic acid, lipids, triterpenoids, esters flavoxanthin and astaxanthin, among others [7]. As a consequence, the addition of herbal substances to skincare formulations helps to both temporarily and significantly decrease the skin's generation of free radicals. Active components have antioxidant properties that protect against UV radiation and postpone the skin's aging process by minimizing wrinkles [8]. The main objective of the work was to prepare & evaluate herbal face cream using these herbs and selective excipients following maceration and percolation as extractive techniques.

## MATERIAL AND METHODS

### Collection of Herbs & Their Medicinal Importance

All the herbs were collected from a local authentic Bolpur, West Bengal nursery.

**Table 1: Description of Herbs**

Herb	Scientific Name	Family
Pot marigold	<i>Calendula officinalis</i>	Asteraceae
Aloe Vera	<i>Aloe barbadensis</i> Miller	Asphodelaceae
Tea	<i>Camellia sinensis</i>	Theaceae

### Preparation of Extracts

#### i) From Tea Leaves

Tea leaves were ground using a mixer grinder, and 40 gm of tea leaves powder was weighed. 6 gm sodium carbonate was added to it [9]. Then, around 300 ml of distilled water was added in a beaker. The content was mixed well using a glass rod. The tea leaves mixture was first boiled and filtered to remove any solid residue. Then, the remaining tea leaves were boiled again with more water and filtered. The two filtrates were combined into one beaker. Next, chloroform was added to the combined filtrate in a separating funnel. After gently shaking the funnel, two upper and lower layers formed. The organic phase's lower layer was collected and transferred to another beaker. This process was repeated a few times with chloroform to extract more caffeine. The collected organic phase was placed in a petri dish and covered with perforated aluminum foil. After a day, needle-shaped caffeine crystals were observed upon removing the aluminum foil cover.

#### ii) From Pot marigold Flowers

The pot marigold flowers were dried naturally and then finely ground using a mixer grinder. Next, 40 grams of the dried and powdered flowers were soaked in methanol for 72 hours at room temperature, with periodic shaking. The mixture was then filtered using filter paper to remove solid particles and evaporated using a hot water bath at 60°C. The remaining residue was collected for further analysis. [10].

#### iii) From Aloe Vera

The thick, juicy leaves of the aloe vera plant were harvested and washed thoroughly. Afterward, the leaves were cut into pieces crosswise. Using a knife, the outer thick layer of the leaves was carefully peeled off, leaving behind the inner gel-like pulp. This pulp was then separated using a spoon and minced in a mixer grinder to obtain the aloe vera extract.

### Methods of Preparation

The herbal cream was prepared following the process mentioned by Shivathaya et al., 2022 [11]. In the formulation process, the oil phase was prepared by combining cetyl alcohol, glyceryl monostearate, liquid paraffin, Tween80, and Tween 60 in a 120-gram beaker. This mixture was heated at 80°C for 30 minutes with continuous stirring, then cooled to 60°C. Concurrently, the aqueous phase was created using 116gm of purified water heated at 90°C in a 500ml beaker. Subsequently, the oil phase was slowly integrated into the aqueous phase with continuous stirring at 60°C for 10 minutes to form the disperse phase, which was then cooled to 40°C. In a separate beaker, propylene glycol and herbal extract were mixed at 40°C to create the drug phase, which was then added to the disperse phase at 40°C. The remaining propylene glycol was rinsed from its beaker, added to the mixture, stirred for 5 minutes, and cooled to room temperature to allow cream formation. Finally, the cream was transferred to a container and stored in a cool, dark place for further use.

### Evaluation test for Herbal face cream

The evaluation test for herbal face cream was as follows-

#### Physical Evaluation test [12]:

**Colour:** The herbal face cream's color was observed by visual inspection. The result is shown in Table 3.

**Odour:** The odor of herbal face cream was found to be characterized.

**State:** The state of the herbal face cream was observed visually. The result is shown in Table 3.

**Consistency:** The formulation of herbal face cream was rubbed on the wrist for examination. The cream has a smooth consistency.

**Table 2: Comparison of Prepared Herbal Face Cream Formulations**

S No	Ingredients	Quantity for Formulations 1 to 6					
		F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>
1	Methanolic extract of <i>Calendula officinalis</i> .	1.5%	3.0%	0	0	0	0
2	Extract of Aloe Vera	0	0	0	0	1.5%	3.0%
3	Extract of Caffeine	0	0	1.5%	3.0%	0	0
4	Cetyl Alcohol	12.0g	12.0g	12.0g	12.0g	12.0g	12.0g
5	Glyceryl Monostearate A/S	16.0g	16.0g	16.0g	16.0g	16.0g	16.0g
6	Liquid Paraffin	16.0g	16.0g	16.0g	16.0g	16.0g	16.0g
7	Triethanolamine	Q.S	Q.S	Q.S	Q.S	Q.S	Q.S
8	Tween 80	7g	7g	7g	7g	7g	7g
9	Perfume	Q.S	Q.S	Q.S	Q.S	Q.S	Q.S
10	Methyl paraben	0.02	0.02	0.02	0.02	0.02	0.02
11	Water	Q.S	Q.S	Q.S	Q.S	Q.S	Q.S

**Spreadability:** The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed between the slides, under a particular load. The longer the time taken to separate the two slides, the better the spreadability. Two sets of glass slides of standard dimension were taken. Then, one slide of suitable dimensions was taken, and the cream formulation was placed on that slide. Then, another slide was placed on the top of the formulation. Then, a weight or specific load was placed on the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. Then, the weight was removed, and excess formulation adhering to the slides was scrapped off. The upper slide was allowed to slip off freely by the force of weight tied to it. The time the upper slide took to slip off was noted [13].

$$\text{Spreadability} = \frac{m \times l}{t}$$

Where m= Standard weight tied to or placed over the upper slide (30g), l= length of a glass slide (5 cm), t= time taken in seconds.

**Washability:** A small amount of cream was applied to the hand, then washed with tap water. The result is shown in Table 3 [14].

**Non-irritancy test:** The area (1 cm<sup>2</sup>) on the left-hand dorsal surface was marked. Then, the cream was applied to that area, and the time was noted. After observation for 24 hours, no

**pH:** A pH meter was used to measure the pH of the prepared herbal face cream. Using 100ml distilled water, a solution of herbal face cream was formulated and kept for 2 hours. The solution's pH was determined three times, and the mean value was calculated. The result is shown in Table 3.

redness or irritancy was shown. The result is shown in table no 3 [15].

**Viscosity:** A Brooke field viscometer was used to test the viscosity of herbal face cream at 25°C at 63 rpm using spindle no. The result is shown in table no. 3 [16].

**Phase separation:** The prepared herbal face cream was taken in a Petri dish and kept aside for 24 hrs to observe the oil phase and aqueous phase separation. The result is shown in Table no 3 [17].

**After feeling:** Rubbing the cream feels like a slippery emollient. The result is shown in Table 3.

## RESULTS AND DISCUSSION

This study successfully formulated and evaluated six herbal face cream variations using extracts from pot marigold (*Calendula officinalis*), aloe vera (*Aloe barbadensis* Miller), and tea (*Camellia sinensis*). All formulations exhibited desirable characteristics for topical application. Maceration and percolation techniques were employed to extract active ingredients from the plant materials. The resulting o/w emulsion-based cream formulation has good spreadability and easy removal with water. This is crucial for user experience and efficient delivery of the active components. Notably, none of the formulations exhibited phase separation after 24 hours, indicating their stability at room temperature. The concentration of pot marigold extract ranged from 0% to 3%, while aloe vera

and caffeine extracts varied between 0% and 1.5%. This allowed for forming formulations with varying pot marigold content, a key element with reported wound healing and anti-inflammatory properties [18]. Similarly, aloe vera's inclusion (0% or 1.5%) provided potential benefits like hydration and skin-soothing effects [19]. Including or excluding caffeine (0% or 1.5%) might influence the cream's perceived feel and potential vasoconstrictive properties [20]. Evaluation parameters revealed a range of positive characteristics across all formulations (Table 3). The creams possessed a semisolid state with a characteristic odor. Consistency varied slightly, with ratings of "very smooth," "smooth," and "slightly smooth." This may provide options for

users with preferences for lighter or richer textures. All formulations exhibited a slightly acidic to neutral pH (6.5 to 6.9), aligning well with healthy skin's natural pH [21]. Spreadability values ranged from 6.6 to 7.1 g.cm/sec, indicating good ease of application. Washability varied slightly, with all formulations being easily washable except F3 (slightly washable). This could be due to 1.5% caffeine extract, potentially requiring slightly more effort for complete removal. Importantly, all formulations displayed no irritation on human skin during the 24-hour patch test. Additionally, the after-feel of all creams was described as emollient, suggesting a comfortable, softening effect on the skin and contributes to a positive user experience.

**Table 3: Result of evaluation of Herbal Face Cream**

Parameters	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>
Colour	Brown	Grey	Grey	White	Orange	Orange
Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
State	Semisolid	Semisolid	Semisolid	Semisolid	Semisolid	Semisolid
Consistency	Very Smooth	Smooth	Slightly Smooth	Smooth	Very Smooth	Smooth
pH	6.7	6.5	6.6	6.5	6.8	6.9
Spreadability	6.8 g.cm/sec	6.9 g.cm/sec	7.0 g.cm/sec	7.1 g.cm/sec	6.9 g.cm/sec	6.6 g.cm/sec
Washability	Very Easily washable	Easily washable	Slightly washable	Easily washable	Washable	Easily washable
Irritancy test	Non-irritant	Non-irritant	Non-irritant	Non-irritant	Non-irritant	Non-irritant
Viscosity (cps)	11800	11810	11805	11810	11815	11816
Phase separation	No phase separation	No phase separation	No phase separation	No phase separation	No phase separation	No phase separation
After feeling	Emollient	Emollient	Emollient	Emollient	Emollient	Emollient

### Limitations and Future Research

While this study demonstrates the successful development of stable and potentially beneficial herbal face creams, further investigation is warranted. Firstly, in-vitro studies could evaluate the creams' efficacy for specific claimed benefits like wound healing or hydration. Testing could also strengthen these findings by including a larger human population in irritation. Finally, exploring synergistic effects between the plant extracts and optimizing ingredient concentrations could lead to even more effective formulations.

### CONCLUSION

This research has established a foundation for developing safe and user-friendly herbal face creams. Incorporating pot marigold, aloe vera, and caffeine extracts alongside careful

formulation techniques resulted in stable o/w emulsions with promising characteristics for topical application. Future research can delve deeper into the creams' efficacy and explore potential synergistic interactions between the plant extracts.

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Nil

### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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