AKT PUBLICATION

International Journal of Pharmacognosy and Herbal Drug Technology (IJPHDT)
ISSN: 3049-1630 | Vol. 03, Issue 02, Feb.-2026 | pp. 19-41

ORIGINAL ARTICLE https://www.aktpublication.com/index.php/ijphdt

# Comparative Ratios Analysis of Formulation, Preparation and Evaluations of *Aloe barbadensis* & *Solanum lycopersicum* Extracts on Polyherbal Moisturizing Creams

**Victor Dey[1]*, Vinay Sagar Verma[1], Deepak Biswas[1]**

[1]Kamla Institute of Pharmaceutical Sciences (KIPS), Shri Shankaracharya Professional University (SSPU), Junwani, Bhilai-490020, Chhattisgarh (C.G.), India.

***Corresponding Author E-mail: deyvictor06@gamil.com**

## Abstract:

Herbal creams are useful in tropical applications where moisturizers are one of the most common industrial preparations used to soften, nourish and moisturize customers skin (Background). The goal of our current research is to create herbal creams that can provide multiprotective benefits including decreased dust, dirt, moisture, acne, pimples, and skin irritation, as well as microbe-free skin to lessen rough skin or dry, flaky patches caused by winter weather or other environmental factors, and even more facial glow (Objective plan). This study uses the W/O emulsion procedure to examine the interaction of polyherbal moisturizing creams with lycopene and aloe vera gel in varying ratios, as well as its base as a control, to provide the synergistic effects of natural creams. Chemical studies were being performed on the aloe vera and lycopene extracts (Methodology). In comparison to prior batches, $F_2$ has demonstrated an exceptional look and complied with all evaluation methodologies, demonstrating that all products are more stable and safer to use. The quality of all products was being formed, and all formulations developed potentials (Results). The study found that all 4 batches polyherbal moisturizing creams shows that multiple beneficial, protective and provided moisturized skin with youthful-looking nature (Conclusion).

**Keywords:** Moisturizers, dry skin, investigate, multiprotective effects, W/O emulsion, quality, bumping, effectiveness, batches.

**Received:** Nov. 21, 2025 **Revised:** Dec. 29, 2025 **Accepted:** Jan. 18, 2026 **Published:** Feb. 19, 2026

**DOI:** https://doi.org/10.64063/3049-1630.vol.3.issue2.2

https://aktpublication.com/index.php/ijphdt/issue/archive

## 1. INTRODUCTION

Pharmaceutical cosmetics are products that are typically used to make the skin look more beautiful and more pure [1]. The Greek word ~"kosmesticos" which means to embellish, is the root of the English word cosmetics. Creams fall under the category of semisolid emulsions that are designed for external application and fall under the oil in water (O/W) or water in oil (W/O) types. Its main function is to stay at the application site for a longer amount of time. It is applied to the outer or superficial part of the skin [2]. Polyherbal cosmetics have been used since ancient times to enhance the appearance of the skin with the purpose of promoting appearances or beautifying the skin [3].

In reality, a moisturizer is a cosmetic preparation that is used to lubricate, protect, and moisturize the skin. It also has a liquid property that is used to soften the skin. It is specially made naturally for customers with dry skin and is typically added to moisturizers to improve the skin's stratum corneum's (SC) ability to bind water. By decreasing evaporation, they raise the skin's water content in the epidermis, which is essentially intended to affect or restore hydration [4]. In order to create this cream base, the majority of the various types that are on the market use synthetic adhesives, emulsifiers, thickeners, colors, surfactants, and perfuming agents. The use of natural herbs must be widely replaced with hazardous synthetic substances [5].

### 1.1. Background Information

The natural moisturizing benefits of aloe vera, combined with its anti-inflammatory, anti-oxidative, anti-aging, anti-cancer, immunomodulatory, and face-glow capabilities, have made it a popular ingredient in health foods, cosmetics, and traditional medicines [6]. According to reports, aloe gel's moisturizing properties are still well-liked. Aloesin, for example, inhibits human tyrosinase activity through a non-competitive inhibition mechanism. It also contains essential components for wound healing, including zinc, amino acids, vitamin C, and vitamin E, which aid in the synthesis of collage and counteract the breakdown of collagen [7]. However, tomato extract lycopene which gives many fruits and vegetables their red colour has lately been employed as a pigment with strong antioxidant qualities. In certain instances, it also has antimicrobial and anticancer qualities [8]. Despite the tropical climate, lycopene's capacity to shield cells from oxidative damage has been linked to specific health benefits and a reduction in photodamage. addition is frequently used in cosmetic compositions because of its ability to prevent skin from aging and photodamage [9].

Not-withstanding their potential advantages, the excipients in aloe vera and tomato extracts have synergistic effects that, to the best of our knowledge, function as a moisturizing protectant cream. The evaluation was tested to determine the effectiveness of the moisturizing and skin-protective properties.

### 1.2. Statement of the Problem

Continuous exposure to environmental stressors such as sunlight, ultraviolet radiation, heat, pollution, and dry climatic conditions leads to dehydration of the skin, impairment of the skin barrier, and premature skin aging. While conventional moisturizing creams help in maintaining skin hydration, they often lack protective components against oxidative stress induced by sun exposure or contain synthetic additives that may cause irritation with prolonged use. Single-ingredient formulations may not provide comprehensive skin benefits such as hydration, soothing, antioxidant protection, and barrier repair simultaneously. Therefore, there is a need for a combination-based moisturizing cream that integrates multiple natural extracts with complementary actions to enhance skin hydration, improve protection against environmental damage, and ensure better safety and skin compatibility. Developing a poly-herbal moisturizing cream using synergistic plant extracts can address these limitations by offering a multifunctional, effective, and safer skincare formulation [4-5].

### 1.3. Objectives of the Study

The primary objectives of this study were:

- To formulate poly-herbal moisturizing creams using different comparative ratios of *Aloe barbadensis* and *Solanum lycopersicum* extracts.
- To standardize and optimize the preparation process of the creams by evaluating the effect of varying extracts ratio on formulation stability and consistency.
- To evaluate the physicochemical properties of each formulation prepared with different extract ratios.
- To assess the moisturizing efficacy and skin compatibility of the formulated creams through suitable mechanism of action.
- To compare the overall performance of the comparative formulations and identify the most effective extract ratio based on stability, moisturizing potential, and safety profile.
- To assess the safety profile and potential side effects of extracts in acne related disease.

## 2. MATERIALS AND METHODOLOGY

### 2.1. Materials Used

The following chemicals and reagents were used in this study as follows: Aloe Vera, Tomato, Emulsifying Wax Flakes, Tocopheryl Acetate and Artificial Vanilla (They were obtained and collected from my home lawn used for the study and need of extracts and purchased from local market vendors) and others Coconut Oil, Almond Oil, Eucalyptus Oil, Borax, Pure White Bees Wax, Cocoa Butter, Ascorbic Acid, Ethanol and Distilled Water were being provided by the KIPS College.

### 2.2. Procedure of Herbal Extracts:

The *Aloe barbadensis* leaf gel extract was prepared by centrifugation method [10]: **(A) Plant material:** The plant material is matured Aloe vera leaves in their entirety. This plant's identification was verified at KIPS, Bhilai, by the use of phyto-screening chemical assays. **(B) Cutting:** For the experiment, the freshly picked aloe vera leaves were hand chopped in the early morning. Aloe vera leaves are collected and carefully removed from the mother plant, being careful not to break the rind, in order to prevent bio-degradation. The leaves are then promptly stored in an ice box at 4-5°C and sent to the laboratory. Fresh water was used to completely wash the leaves. Using a knife, the leaves' outer peel and exudates were pain snakingly removed to create a fillet. **(C) Trimming:** To get homogenized pulp, the fillets were mashed in a home blender (mixer or boss hand blender). **(D) Centrifugation**: To separate the crude gel and fiber, the 60 ml pulp was centrifuged on a volume basis using a cooling type centrifuge. The temperature must be at 5°C during this procedure, and the instrument must rotate at 10,000 rpm for 30 minutes. **(E) Purification and storage:** In order to purify it, 100 ml of crude gel were combined with 0.1 gm of charcoal. Pure gel was extracted from crude gel using the vacuum filtration process. The pure gel was gathered for additional experimental examination and kept at 4°C in an airtight bottle.

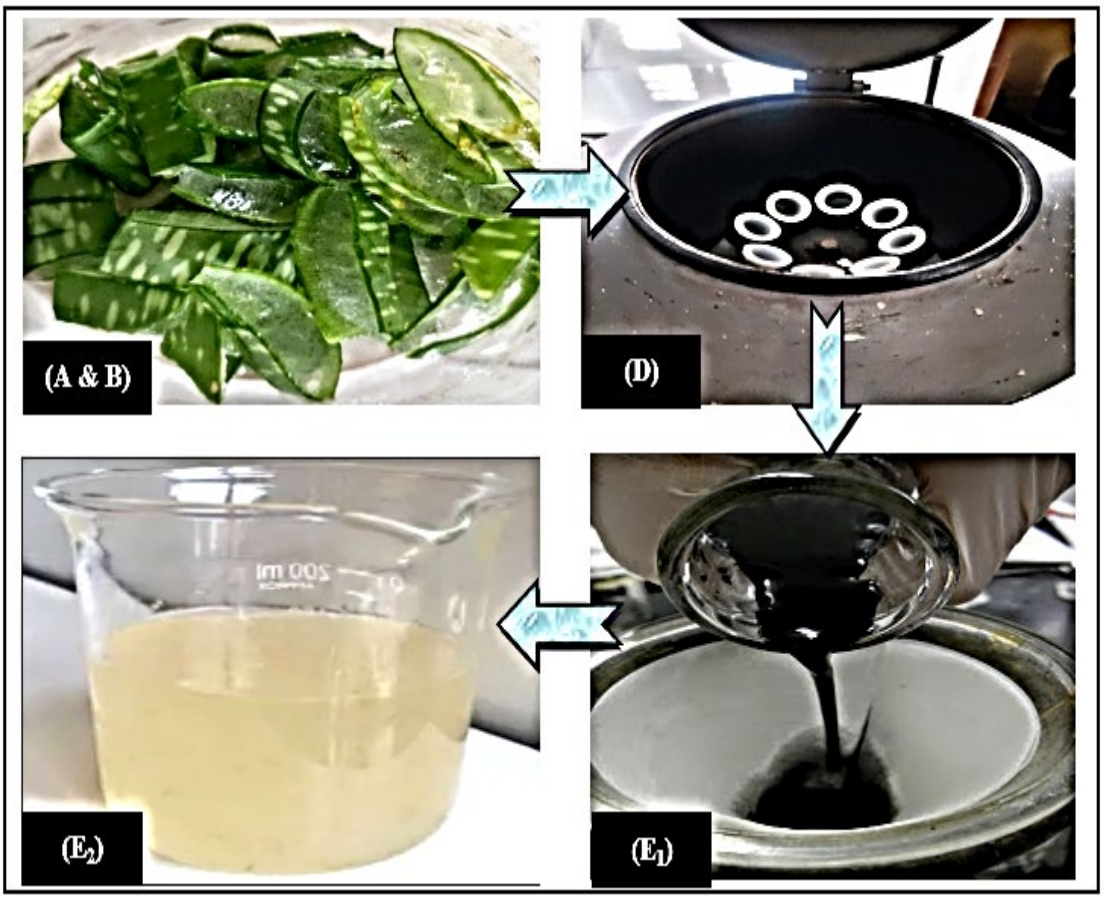


**Figure 1:** Extraction process of Aloe vera gel obtained from *Aloe barbadensis* leaves.

The *Solanum lycopersicum* fruits extract was prepared by simple solvent extraction method [11, 12]: **(A) Plant material:** Matured bright ripped red fruits of tomato are being used as the plant material.

This ripped fruit has been buyed from the local grocery shop. The identification of this plant by performing phyto-screening chemical tests was confirmed in KIPS, Bhilai.

**(B) Tomato paste:** The plant material is tomato fruits that are fully ripe and bright red. This torn fruit was purchased from the neighborhood supermarket. Using phyto-screening chemical testing to identify this plant. **(C) Simple solvent extraction:** This traditional technique for extracting lycopene from materials required the straightforward use of organic solvents. The conical flask was filled with roughly each paste. After extracting these samples overnight and macerating them in a solvent mixer with 200 milliliters of hexane and diethyl ether in a 75:25 ratio at room temperature, the final product was obtained. Whatman filter paper (by *M.B. Hussain et al.*) was used to filter this extract from each flask. After removal, the final product is obtained via an evaporation procedure (conducted by Dr. Rath Susanne et al.) at 40–60°C under vacuum. A dark-red, viscous liquid known as tomato lycopene extract is made from tomato varieties that have a high lycopene concentration. Each sample's crude extract was kept at 4°C until it rise.

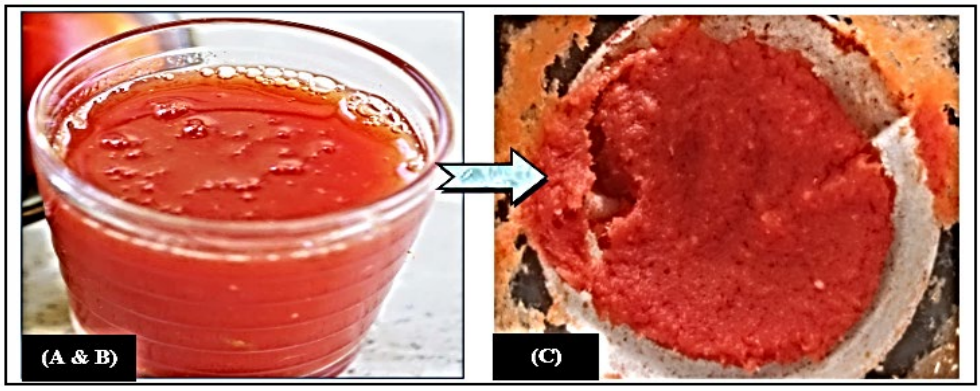


**Figure 2:** Extraction process of Lycopene obtained from *Solanum lycopersicum* fruits.

### 2.3. Preparation and Formulation of Moisturizing Creams:

At first, all the formulation of polyherbal moisturizing cream was to collect and arrange different glasswares (such as beakers, spatula, measuring cylinder, petri dish, etc.) and equipments (such as weighing machine, spatula, heating mantle, etc.). After that, the pure extracts of Aloe vera gel and Lycopene were taken previously from their botanical sources as well as other ingredients were taken [3, 14, 31]. In this investigation, two distinct phases were added with constant agitation to create the W/O emulsion formulation, which was then applied under various formulation patterns as indicated in Table 1. [14-16, 31]:

- According to SOP, every piece of equipment and chemical should be cleansed and rinsed.

  In a different stage, each ingredient was accurately weighed.
- **Phase 1:** The oily phase involved adding all of the oils and well stirring after all of the solid/waxes ingredients and surfactant had been melted by indirect heating to 75°C±1°C.
- **Phase 2:** The aqueous phase, which contained borax dissolved in distilled water, was heated to the same temperature for the same amount of time. Vitamin C, lycopene extracts, and aloe vera gel extract were then added.
- While the wax and oil combination is still hot, gently add the phase-1 to the phase-2 while swirling constantly to ensure full incorporation.

- During this stirring period, a few drops of preservative and essence were added to give the mixture a pleasing smell.
- Keep doing this for 5 minutes, stirring constantly, then turn off the heat to ensure full homogeneity and stir until it becomes moisturizing. Adding additional wax to this cream could make it heavier than other creams.
- Using the same ingredients and the same procedure as before, but without the lycopene and aloe vera gel extracts, a cream base was also made. It is a straightforward W/O basis that was chosen to avoid interfering with the assessment of Active's moisturizing capabilities.
- The different batch kinds are mostly separated and designated as CB, $F_1$, $F_2$ and $F_3$ formulations of polyherbal moisturizing cream. Each batch's evaluation parameters are carried out independently.

**Table 1:** Composition of formulated polyherbal moisturizing creams[30].

| Sr. No. | Ingredients | Quantity/Amount for 200 gm (W/W) of composed with Formulation Codes | | | |
|---|---|---|---|---|---|
| | | **CB** | **$F_1$** | **$F_2$** | **$F_3$** |
| | ***Aqueous Phase*:** | | | | |
| 1 | Aloe vera gel* | --- | 10 | 3.8 | 6.2 |
| 2 | Lycopene powder*₹ | --- | 6.2 | 3.8 | 10 |
| 3 | Powdered borax | 15 | 15 | 15 | 15 |
| 4 | Distilled water (to make) | *q.s.* | *q.s.* | *q.s.* | *q.s.* |
| 5 | Vitamin C | 3.5 | 3.5 | 3.5 | 3.5 |
| | ***Oily Phase*:** | | | | |
| 6 | White Bees Wax (Pure) | 15 | 15 | 15 | 15 |
| 7 | Cocoa Butter | 6.8 | 6.8 | 6.8 | 6.8 |
| 8 | Emulsifying wax₹ | 6 | 6 | 6 | 6 |
| 9 | Coconut oil | 1.5 | 1.5 | 1.5 | 1.5 |
| 10 | Almond oil | 1.5 | 1.5 | 1.5 | 1.5 |
| 11 | Eucalyptus oil | 1.5 | 1.5 | 1.5 | 1.5 |
| 12 | Vitamin E oil₹ | 1.57 | 1.57 | 1.57 | 1.57 |
| 13 | Vanilla essence₹ | 12 | 12 | 12 | 12 |
| 14 | Ethanol | 0.025 | 0.025 | 0.025 | 0.025 |

* : Extracted before from its original botanical sources brought from my local residence
₹ : Itself buying by the online/offline format way
CB : Cream Base
$F_1$ : Formulation 1
$F_2$ : Formulation 2
$F_3$ : Formulation 3
*q.s.* : Quantity sufficient or Quantity as required applied

### 2.4. Evaluation Parameters of Cream:

➢ **Physical appearance:**

This refers to the manually created emulsion of the cream's physical properties, which were to be visually examined and evaluated based on their colour, texture/consistency, odor, and condition. The roughness and color of the cream, which were preserved for a long period, were used to measure and evaluate its appearance [18]**.** For every formulation, these measurements were made three times, and the analytical mean and standard deviation (SD) [Mean ± SD] were calculated, as shown in Table 2.

➢ **pH Determination:**

A glass electrode, a reference electrode, and a digital pH meter were used to potentiometrically measure a solution's pH. The pH meter was used in accordance with the manufacturer's guidelines. The equipment was first calibrated using buffer solutions with pH values of 4, 9, and 7 in order to standardize it. The pH of the 10% w/v cream suspension was then measured at room temperature after it had been dissolved in demineralized water as a solvent in an appropriate beaker. The pH was determined after the electrodes were submerged in the solution [19]. For every formulation, these measurements were made three times, and the analytical mean and standard deviation (SD) [Mean ± SD] were calculated, as shown in Table 3.

➢ **Viscosity:**

A Brookfield viscometer with a helipth stand, which was used for rheological investigations, can be used to measure the viscosity of any cream. After allowing the sample to equilibrate for five minutes, spindle No. 63 was used to measure the dial reading at a temperature of 25°C at 2.5 *r.p.m.* [21]. The viscometer's matching dial reading was recorded at each speed. The viscosity in centipoises was obtained by directly multiplying the dial values by the variables listed in the Brookfield Viscometer catalogue [22]. For every formulation, these measurements were made three times, and the analytical mean and standard deviation (SD) [Mean ± SD] were calculated, as shown in Table 3.

➢ **Homogenicity:**

This test refers to smearing 1 gram of preparation onto a clean surface on glass that yields a homogenous arrangement with no discernible grain and should spread evenly, indicating the homogenicity of all creams. Additionally, the instant skin feel which includes stiffness, grittiness, and greasiness which was evaluated; lumps or unmixed particles should not be present [19]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 3.

➢ **Phase Separation:**

When a day, the oil phase and aqueous phase separation were visible when the manufactured cream was moved into a suitably wide closed mouth container maintained at a temperature between 25

and 100°C and out of direct sunlight. Phase separation was monitored for any changes [20]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 3.

➢ **Spreadability test:**

The following method was used to determine the test: a sufficient amount of 0.5 gm sample formulation was placed inside a circle that was pre-marked on a glass plate with a diameter of 1 cm, and then another glass plate was placed on top of it. For five minutes, a weight of no more than 500 mg was permitted to lie on the upper glass plate. It was observed that the test formulation spread, increasing the diameter. [21]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 3.

$$S = \frac{\text{Standard weigh tied to upper slide (m)} \times \text{Length of glass slide (l)}}{\text{Time taken to separate slides (t)}}$$

➢ **Washability/Removal test:**

Washing the area that had been administered with flowing water allowed for the easy removal of a small amount of the prepared creams [22]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 3.

➢ **Irritancy/Irritability test:**

Create a 1 $cm^2$ space on the dorsal surface of the left hand. After that, the prepared cream was applied to the designated area, and the time was recorded. The contact skin is then examined for itching, erythema and edema at regular intervals for up to 24 hours, and any findings are reported [22]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 4.

➢ **After feel test:**

Following the application of the predetermined quantity of cream, the emolliency, slipperiness, and amount of residue were to be monitored. [19, 23]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 5.

➢ **Type of smear/Film determination:**

Following the application of all creams, a human volunteer examined the type of film or smear that developed on the skin's surface, noting its greasiness and behaviour. If the smear was simply or greasy like nature [18]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] in given Table 5.

➢ **Sensitivity and exposure irritation test:**

After applying the prepared cream on the hand's 1 cm skin, it was left in the sun for four to five minutes. Applying the cream to the volunteer's skin even asserts that "self, no ethical/human

priorrer permission need due to non-toxic, natural, and safe components which makes it exceptional" (Puja Saha; Supriyo Das et al.) [18, 19]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 4.

➢ **Dye test:**

This involves combining the cream with the crimson red dye. Examine a drop of cream under a microscope after placing it on a microscopic slide and covering it with a cover slip. When the disperse globules appear red and the ground is colorless, the cream is of the O/W type, when the disperse globules look colorless on the red ground, the cream is of the W/O type [22, 24]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 6.

➢ **Acid value determination:**

This involves dissolving 10 grams of material in a precisely weighed 50 milliliter mixture of equal parts alcohol (ethanol) and solvent ether (diethyl ether). The flask was then connected to a reflux condenser and heated gradually until the sample was completely dissolved. 1 milliliter of phenolphthalein was then added, and the mixture was titrated with 0.1N NaOH until a faint pink color appeared after 30 minutes of shaking [22, 25]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 7.

$$\text{Acid value} = \frac{\text{No. of mL of 0.1N KOH solution} \times 5.61}{\text{Weight of substance (gm)}}$$

➢ **Saponification value determination:**

Note the reading as "a" after the 2 grams of material refluxed with 25 ml of 0.5N alcoholic KOH for minutes. One milliliter of phenolphthalein was then added and titrated right away with 0.5 N HCl. Do it again without the material being inspected. Mark the result reading note as "b" and repeat the process without the substance being analyzed. [22, 25]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 7.

$$\text{Saponification value} = \frac{(b\text{-}a) \times 28.05}{\text{Weight of substance (gm)}}$$

Where, b = Volume of titrate in omitted condition (no cream involved),
a = Volume of titrate (cream involved)

➢ **Hard and sharp edge abrasive particles:**

Place a sample of paste (approximately 15 grams) on a piece of plain paper. Use your finger to spread the paste on paper to check for hard, sharp-edged abrasive particles. There must be no hard, sharp-edged abrasive particles in the sample cream formulation that could be dropped by the finger

[19]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 4.

➢ **Total fatty matter (TFM) determination:**

To do this, precisely weigh out 2 gms of the substance into a conical flask, then add 25 ml of diluted hydrochloric acid (Dil. HCl), install a reflux condenser and boil the mixture until it turns clear. After emptying the flask's contents into a 300 ml separating funnel, let it cool to 28°C. 50 ml of petroleum ether, divided into 10-ml parts, should be used to rinse the conical flask. Fill the separating funnel with the petroleum ether rinse, give it a good shake, and then wait for the layers to separate. Using 50 ml parts of petroleum ether, separate the aqueous phase and shake it out twice. When tested with methyl orange indicator solution, mix all of the petroleum ether extracts and rinse them with water until they are acid-free. Filter the petroleum ether extracts into a conical flask that has been previously dried at a temperature of about 90 ± 2°C and then weighed using filter paper that contains sodium sulfate ($Na_2SO_4$). Use petroleum ether to wash the $Na_2SO_4$ on the filter, then mix the washing with the filtrate. Remove the petroleum ether by distillation, then dry the remaining material in the flask to a constant mass in the humidity chamber at 90 ± 2°C [27-28]. This acceptance of measurement range is given according to BIS (Bureau of Indian Standards) that not more than 5% by mass requirement [28]. These measurements were repeated 3 times for each formulation and the mean was taken with its SD. These results were found of every formulation which was specified in Table-18.

$$TFM\ value\ (\%\ by\ mass) = \frac{Mass\ in\ gm\ of\ the\ residue}{Mass\ in\ gm\ of\ material\ taken\ for\ the\ sample} \times 100$$

➢ **Non-volatile content/residue determination:**

This involves weighing 1 gram of each formulation in a large squat-shaped weighing bottle that has been cleaned, dried, and weighed. It is then heated on a steam bath with an air jet for 30 minutes. After two hours of heating at 105 ± 1°C in an oven, the material was cooled in a desiccator, weighed, and the percentage of non-volatile material or residue mass content was reported. [29]. This acceptance measurement range is given according to BIS that not more than 10% by mass requirement [28]. These measurements were repeated 3 times for each formulation and the mean was taken with its SD. These results were found of every formulation which was specified in Table 19.

$$Non-volatile\ content\ (\%\ by\ mass) = \frac{Mass\ in\ gm\ of\ the\ residue}{Mass\ in\ gm\ of\ the\ material\ taken\ for\ test} \times 100$$

➢ **Ash value:**

An indicator of how well the demineralization (DM) process removes calcium carbonate ($CaCO_3$) is the measurement of ash. This involved weighing 5 grams of each formulation in a silica crucible with a flat bottom and heating it for an hour on a steam bath with an air jet. A glass stirring rod was then used to combine it with 1 gm of cellulose powder that had been reduced in ash. In a muffle furnace, the dish was heated to 600°C, and the resulting ash was analyzed [29]. These

measurements were repeated 3 times for each formulation and the mean was taken with its SD. These results were found of every formulation which was specified in Table 20.

➢ **In vitro occlusivity test (F):**

Each beaker used in this had dimensions of 3.2 cm in diameter and 4.6 cm in height. In order to conduct the test, 10 gms of distilled water were added to each braker, and the open end was sealed with Whatman filter paper (0.45 pore size) that had 200 mg of the sample equally distributed throughout its upper surface. After that, these beakers were kept for 48 hours at 37 ± 2°C/ 607 ± 5% RH. In order to calculate the water flux, the in vitro occlusivity of samples of all formulations, prototype formulations, and a negative control in which the filter paper was left uncovered was examined [21]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] in given Table 8.

$$F\ (\%) = \frac{A\text{-}B}{A} \times 100$$

Where, A = Water flux via uncovered filter (percent water loss), and
B = Water flux via filter when covered by test preparation (percent water loss)

➢ **Psychometric/ Preference analysis:**

Based on sensory evaluation, the developed product was compared, and the degree was determined by ranking the products according to the Hedonic scale provided in Table 2. The colour, smell, texture, wetness, spreadability, thickness, absorbency, gloss, stickiness, slipperiness, firmness, and skin sensation were the parameters of the psychmetric/preference analysis [29-30]. These measurements were repeated 3 times for each formulation and the mean was taken with its SD. These results were found of every formulation which was specified in Table-22.

**Table 2:** Hedonic scale values for grading the products while dispensing formulations of moisturizers.

| Grade | Score |
|---|---|
| **Extremely liking** | 8-9 |
| **Between extremely liking and medium** | 7 |
| **Medium/Neutral** | 5-6 |
| **Between medium and dislike** | 4 |
| **Dislike extremely** | 1-3 |

➢ **Freeze thaw test:**

This involves putting all herbal creams in a low-temperature freezer and letting them come to room temperature. This cycle was carried out five times, and visual appearance was used to

monitor and verify any changes [27]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 9.

➢ **Thermal stability test:**

Insert the cream into the glass bottle using a spatula, then tap it to ensure it sinks to the bottom. After filling the bottle to two-thirds of its capacity, put the plug in and tighten the cap. For 48 hours, keep the filled bottle upright inside the incubator at 20°C, 30°C, and 40°C. was established in accordance with Indian Standard Guidelines (ISG) which provide that there should be no oil phase breakage [13, 21]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 10.

➢ **Anti-microbiological study:**

In essence, the tropical formulation was non-resistance and broad, encouraging against a variety of bacteria that can be very helpful in dermatology preparation where infections are frequently combined. By observing the antifungal activity of every batch, the formulation with antimicrobial agents as the active moiety has the ability to prevent microbial growth, making it an optimized batch. Initially, the extract's MIC (Minimum Inhibitory Concentration) against Candida albicans was determined. The agar disc-diffusion experiment was used to screen the herbal cream against fungal stains of Candida albicans. They assessed the zone of inhibition [25, 26]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 11.

➢ **Accelerated stability studies:**

A two-week accelerated stability study of produced formulations was carried out in accordance within ICH criteria. The most stable formulations were planned and observed at room temperature of approximately 25 ± 2°C and 40°C ± 2°C. They were in two different relative humidity settings, which were 60 ± 5% RH and 75 ± 5% RH. On the seventh day of the evaluation parameters, the formulations were observed at both room temperature and a higher temperature [18]. These all measurements were repeated 3 times for each formulation and where the analytical mean was taken with its Standard deviation (SD) [Mean ± SD] as given in Table 12.

## 3. RESULTS AND DISCUSSION

This study demonstrates how synergistically shows the corporation of skin penetration with the UV ray absorption. The results display found in every formulation's ratio which was specified under given following Tables 3 to 12 through multi-purpose moisturizing cream domains according to the illustration as given below:

### 3.1. Physical appearance:

**Table 3:** Physical appearance of polyherbal moisturizing creams.

| Formulation Codes | Colour | Odour/ Smell | Consistency | State | Roughness while rubbing |
|---|---|---|---|---|---|
| **CB** | White creamy base | Vanilla | Smooth | Semi-solid | Nil |
| **$F_1$** | Slightly pale ivory | Vanilla | Smooth | Semi-solid | Nil |
| **$F_2$** | Pale ivory | Vanilla | Smooth | Semi-solid | Nil |
| **$F_3$** | Peach | Vanilla | Smooth | Semi-solid | Nil |

### 3.2. Evaluation parameters of common possible creams:

**Table 4:** Evaluated parameters of possible common tests of polyherbal moisturizing creams.

| Formulation Codes | pH of creams | Viscosity at 2.5 rpm (cPs) | Homoge-nicity nature | Phase separation | Spreadability test (gm.cm/sec) | Washability test |
|---|---|---|---|---|---|---|
| **CB** | 5.23 ± 0.06 | 4700 ± 3.24 | Pass | Nil | 8.14 ± 0.12 | Easy wash |
| **$F_1$** | 6.10 ± 0.14 | 4560 ± 1.60 | Pass | Nil | 10.17 ± 0.16 | Easy wash |
| **$F_2$** | 6.35 ± 0.08 | 5345 ± 4.05 | Pass | Nil | 5.81 ± 0.17 | Easy wash |
| **$F_3$** | 6.09 ± 0.10 | 2930 ± 5.57 | Pass | Nil | 6.78 ± 0.04 | Easy wash |

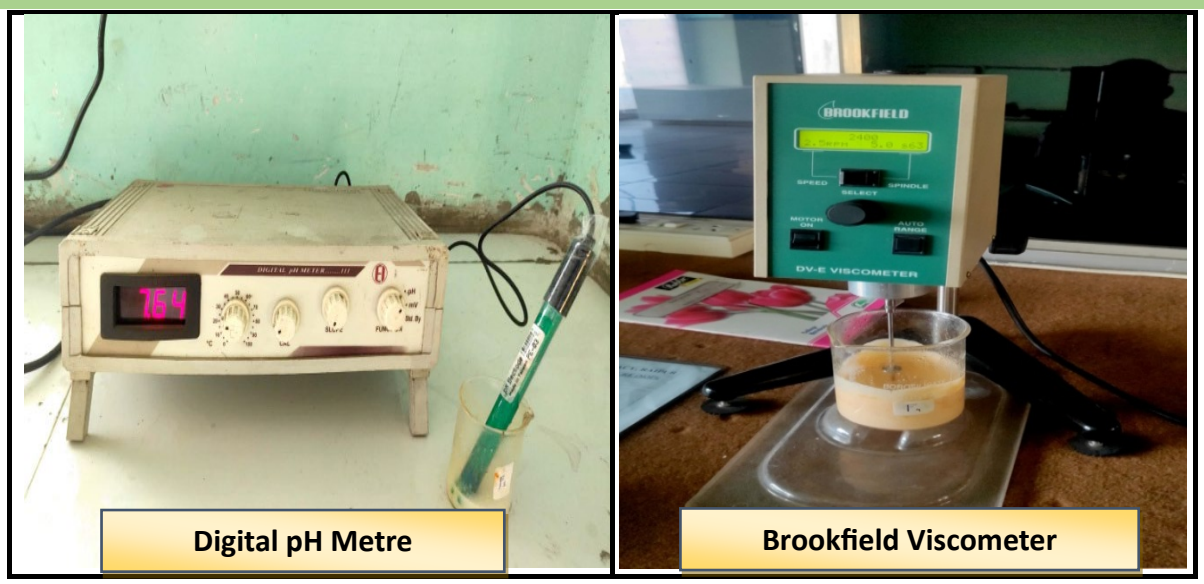


**Figure 3:** Digital pH meter and Broofield Viscometer Process Validation done based on SOP.

### 3.3. Irritancy and sensitivity exposure irritation test:

**Table 5:** Irritancy and sensitivity exposure irritation tests of polyherbal moisturizing creams.

| Formulation Codes | Irritancy test of creams | | | Sensitivity test under sunlight | Exposure irritation under bright sunlight | Hard & Sharp edge abrasive particles |
|---|---|---|---|---|---|---|
| | Irritant effect/ Itchiness | Erythema | Edema | | | |
| **CB** | Nil | Nil | Nil | Nil | Nil | Nil |
| **$F_1$** | Nil | Nil | Nil | Feel glossy | Nil | Nil |
| **$F_2$** | Nil | Nil | Nil | Sometime glossy | Nil | Nil |
| **$F_3$** | Nil | Nil | Nil | Little glossy | Nil | Nil |

### 3.4. After feel and type of smear test:

**Table 6:** After feel and type of smear tests of polyherbal moisturizing creams.

| Formulation Codes | Emolliency & Slipperiness (per days interval) | | | | | Amount of residue left after feel | Type of smear/film (per days inteval) | | | | | Greasiness under smear test | Grittiness under smear test |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 5 | 10 | 15 | 25 | | 0 | 5 | 10 | 15 | 25 | | |
| **CB** | G | G | G | G | P | Nil | G | E | E | E | G | Nil | Nil |
| **$F_1$** | G | E | E | E | E | Nil | G | G | E | E | E | Nil | Nil |
| **$F_2$** | G | E | E | E | E | Nil | G | E | E | E | E | Nil | Nil |
| **$F_3$** | G | E | E | E | E | Nil | G | E | E | E | E | Nil | Nil |

Where, P = Poor, G = Good, E = Excellent

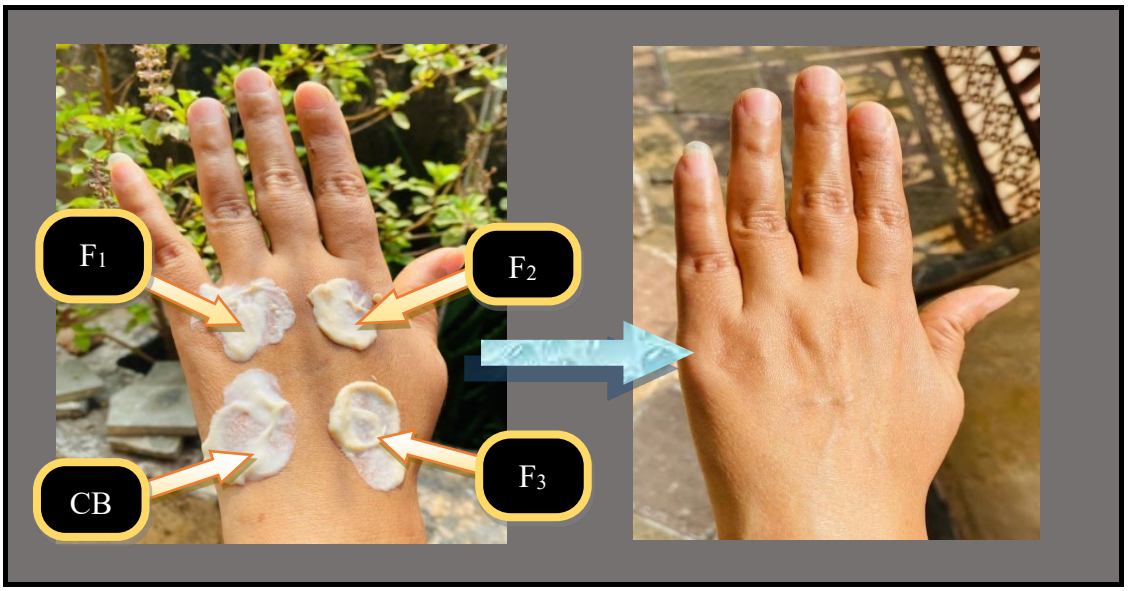


**Figure 4:** Emollience and Smear test result view of batch moisturizing creams.

### 3.5. Dye test of creams:

Biebrich scarlet dye staining solution was used to stain the cream under a microscope in order to examine all created formulation developed moisturizing creams. All polyherbal formulations have been shown to be W/O (water-in-oil) emulsions because the dispersed globules look colorless on the red ground. Table 6 displays all of these studied data.

**Table 6:** Dye test of polyherbal moisturizing creams.

| Formulation Codes | Dye test |
|---|---|
| CB | W/O |
| $F_1$ | W/O |
| $F_2$ | W/O |
| $F_3$ | W/O |

### 3.6. Acid and Saponification Values tests of creams:

**Table 7:** Acid and Saponification Values test of polyherbal moisturizing creams.

| Formulation Codes | Acid value | Saponification value |
|---|---|---|
| CB | 5.049 ± 0.28 | 316.965 ± 2.14 |
| $F_1$ | 3.927 ± 0.24 | 23.842 ± 1.40 |
| $F_2$ | 4.488 ± 0.22 | 32.257 ± 0.80 |
| $F_3$ | 2.356 ± 0.24 | 28.050 ± 1.61 |

### 3.7. Total Fatty Matter (TFM) determination:

The total amount of fatty matter utilized to separate creams following their reaction with mineral acids is the subject of this assessment test investigation. Low-grade TFM creams draw water away from the skin and cause dryness, which should be avoided. Table 8 displays all of the analyzed data together with its characteristics.

**Table 8:** TFM value determination of all prepared formulation moisturizing creams.

| Formulation Codes | TFM of creams found in test results (% by mass) [Mean ± SD] | Conformation to use (in nature) |
|---|---|---|
| CB | 6.0 ± 1.52 | Harmful/Abrasive |
| $F_1$ | 3.0 ± 1.00 | Slightly Harm |
| $F_2$ | 2.5 ± 2.64 | Useable |
| $F_3$ | 2.0 ± 1.58 | Useable |

### 3.8. Non-volatile/residue content and Ash determination:

The content mass that remains after all water, solvents, and other volatiles have been evaporated or eliminated from all created formulations of moisturizing creams is the subject of this evaluation examination study. The leftover material, which can be either weighed or stated as a volume, has proved helpful in determining the total number of solids included in the film creation. The ash value, which primarily focuses on chemical characterization, is thus established to assess the purity of all manufactured formulation developed moisturizing creams. With the exception of CB, the ash content of most creams is determined by the concentration of lycopene and aloe vera gel, as well as by the roasting of their excipients. Table 9 displays the data that has been analyzed.

**Table 9:** Non-volatile content determination of all prepared formulation moisturizing creams.

| Formulation Codes | Non-volatile content of creams (% by mass) [Mean ± SD] | Ash value of creams (%) [Mean ± SD] |
|---|---|---|
| CB | 25.0 ± 0.503 | 0.750 ± 0.072 |
| $F_1$ | 12.0 ± 0.540 | 0.126 ± 0.009 |
| $F_2$ | 8.0 ± 0.246 | 0.088 ± 0.018 |
| $F_3$ | 9.6 ± 0.435 | 0.120 ± 0.051 |

### 3.7. In-vitro occlusivity test:

This is the only way that the reduced percentage of water loss and improved occlusivity which prevented a significant amount of water loss and contributed to the lipid nature of the created formulations, were significant. While herbal oils naturally produce a thin, oily film on the skin, humectants like pure white beeswax and cocoa butter, which are found in polyherbal moisturizing creams, are crucial in keeping water in the skin and making it softer and glossier. With the aid of a surfactant, these two phases have been combined to form an emulsion (cream). The emollient

action on the skin is produced by herbal waxes that mostly include greater fatty content. Additionally, it makes oily layer media easier to spread, and humectants are essential for halting water loss.

**Table 10:** In vitro occlusivity tests of polyherbal moisturizing creams.

| Formulation Codes | Water loss/flux via uncovered filter-A (ml) | Water loss/flux via covered filter-B (ml) | *In vitro* occlusivity (%) |
|---|---|---|---|
| **CB** | 9.8 ± 0.11 | 6.1 ± 0.05 | 37.75 ± 0.72 |
| **$F_1$** | 9.7 ± 0.30 | 5.8 ± 0.10 | 40.20 ± 1.27 |
| **$F_2$** | 4.8 ± 0.15 | 4.1 ± 0.05 | 16.66 ± 2.08 |
| **$F_3$** | 9.9 ± 0.10 | 4.3 ± 0.15 | 42.42 ± 0.33 |

### 3.8. Psychometric/Preference test:

In order to depict the effects of moisturizers on skin compliance, these parameters were examined in this assessment examination study. The score setup design is shown in Table 2. Prior to administering formulations, readings were first obtained for each volunteer and were referred to as baseline values (BL). Subsequent readings were taken after each application and all volunteers who applied were questioned about the circumstances and whether they were irritated. The moisturizers control effect and mean differences in effectiveness were found to differ. Therefore, it was discovered that $F_2$ had the highest product score, whereas $F_3$ had the lowest value. Many conflicts arise during the compilation and acceptance process because of these disparities. All of the score board data that was examined and gathered by all of the created items is displayed in Table 9 and is represented in Figure 5.

**Table 11:** Psychometric/Preference test result score board of all prepared formulation moisturizing creams.

| Formulation Codes | Psychometric/Preference test | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | T | W | Sp | Tk | Ab | Gl | Sk | Sl | Fr | Se | $\sum S$ [Mean ± SD] |
| **CB** | 6 | 5 | 5 | 5 | 4 | 9 | 2 | 7 | 7 | 6 | 8 | 7 | 73 ± 1.52 |
| **$F_1$** | 8 | 6 | 7 | 7 | 8 | 9 | 8 | 9 | 9 | 8 | 8 | 7 | 94 ± 2.08 |
| **$F_2$** | 8 | 6 | 9 | 9 | 7 | 9 | 7 | 8 | 9 | 8 | 8 | 8 | 96 ± 0.57 |
| **$F_3$** | 9 | 6 | 6 | 6 | 8 | 9 | 6 | 8 | 9 | 7 | 9 | 8 | 91 ± 1.73 |

Where, C = Colour, O = Odour, T = Texture, W = Wetness, Sp = Spreadability, Tk = Thickness, Ab = Absorbency, Gl = Gloss, Sk = Stickness, Sl = Slipperiness, Fr = Firmness, Se = Skin sensation and $\sum S$ =Average score.

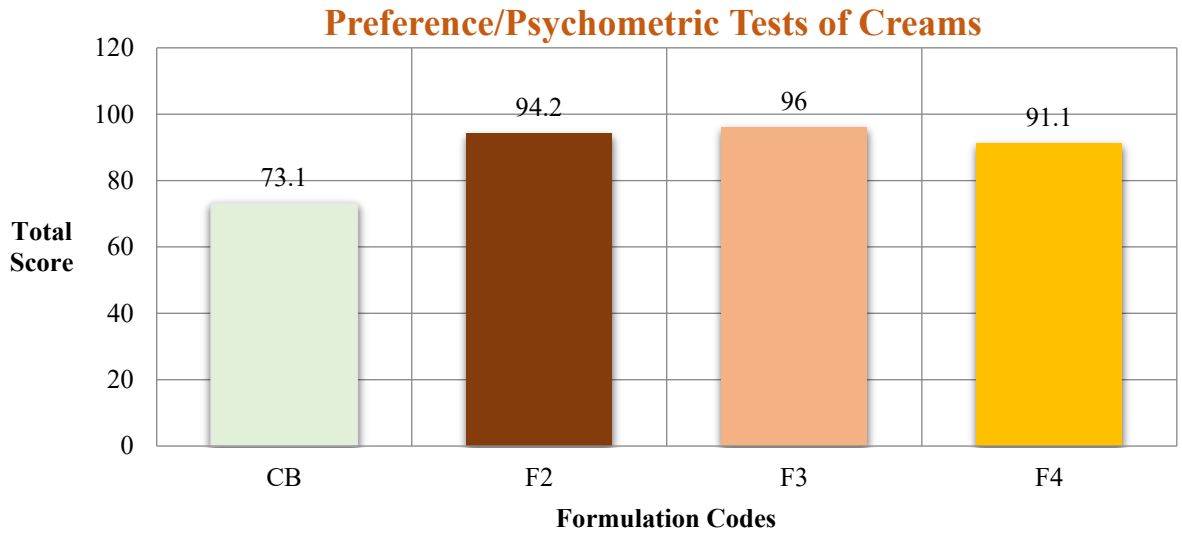


**Figure 5:** Ranking graph of all prepared polyherbal moisturizing creams according to the preference data analysis.

### 3.9. Freeze thaw and Thermal stability tests:

**Table 12:** Freeze thaw and Thermal stability tests of polyherbal moisturizing creams.

| Formulation Codes | At RH 65% with different temperatures conditions | | | | | Any oil phase separation observed during any period of time |
|---|---|---|---|---|---|---|
| | At low 4°C (Freeze thaw) | Under 20°C | Under 30°C | Under 40°C | Under 50°C (Stress study) | |
| **$F_1$/CB** | Stable | Stable | Stable | Stable | Stable | Nil |
| **$F_2$** | Stable | Stable | Stable | Stable | Stable | Nil |
| **$F_3$** | Stable | Stable | Stable | Stable | Stable | Nil |
| **$F_4$** | Stable | Stable | Stable | Stable | Stable | Nil |

### 3.10. Anti-microbiological study:

The cream was shown to have the best potential effects on microbial *Candida albicans* against regional growth based on the results of the microbial investigation. The zone of inhibition was computed as indicated shows in Figure 4 and Table 12.

**Table 13:** Anti-microbiological study on polyherbal moisturizing creams.

| Formulation Codes | Zone of Inhibition of cream fight against *Candida albicans* (mm) | | |
|---|---|---|---|
| **$F_1$/CB** | 5.56 | ± | 0.307 |
| **$F_2$** | 23.34 | ± | 1.153 |

| | | | |
|---|---|---|---|
| **$F_3$** | 67.22 | ± | 2.731 |
| **$F_4$** | 43.32 | ± | 0.046 |

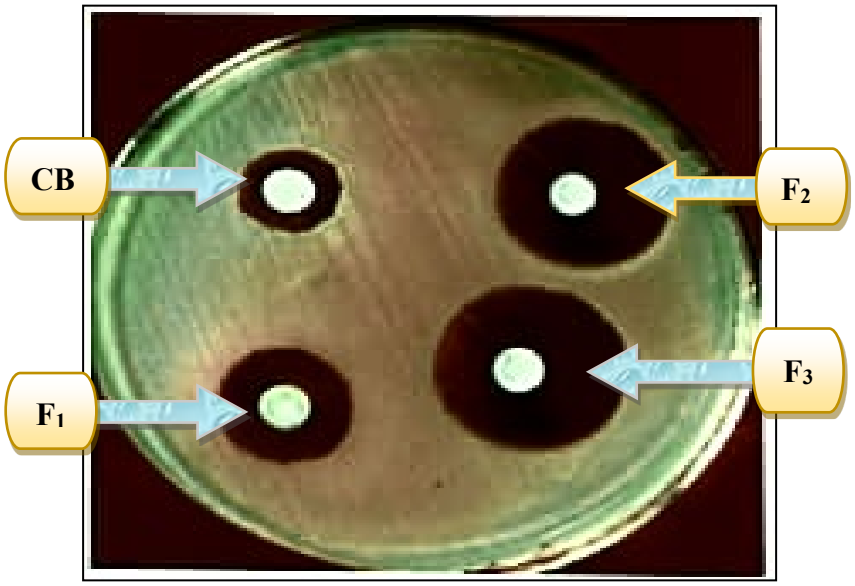


**Figure 5:** Zone of inhibition of polyherbal creams in *Candida albicans* culture.

### 3.11. Accelerated stability studies:

All the studies show that all four formulations are being stable except CB (Cream Base) along with showing standard variable deviation in parameters which makes the reading helpful to make accurate as shown in the given Table 11.

**Table 11:** Accelerated stability studies on polyherbal moisturizing creams.

| Formulation Codes | Time interval | Accelerated stability studies under which certain parameters conditions were observed/checked | | | |
|---|---|---|---|---|---|
| | | Physical Appearance | Colour | Texture/ Consistency | Product degradation |
| **$F_1$/CB** | Initial | Semi-solid | No change | Ok | Nil |
| | After 7 days | | No change | Ok | Nil |
| | After 14 days | | No change | Ok | Nil |
| **$F_2$** | Initial | Semi-solid | No change | Ok | Nil |
| | After 7 days | | No change | Ok | Nil |
| | After 14 days | | No change | Ok | Nil |
| **$F_3$** | Initial | Semi-solid | No change | Ok | Nil |
| | After 7 days | | No change | Ok | Nil |
| | After 14 days | | No change | Ok | Nil |
| **$F_4$** | Initial | Semi-solid | No change | Ok | Nil |
| | After 7 days | | No change | Ok | Nil |
| | After 14 days | | No change | Ok | Nil |

## 5. CONCLUSIONS

The polyherbal skin moisturizing creams of *Aloe barbadensis* leaf gel extract *with Solanum lycopersicum* ripe fruit extract were evaluated as the current work comes to a close. All ingredients were prepared and tested under various ratios using water-in-oil emulsions. The cream with 3.8 grams of *Aloe barbadensis* gel extract and 3.8 grams of *Solanum lycopersicum* extract under F2 composition exhibits the highest efficacy effects and is gentle on the skin's surface, both of which meet the Indian Standard Guideline (ISG) and studies that demonstrate that it is good, safe, stable for more than three months, and a healthy cosmetic moisturizing cream with the highest control effectiveness. When applied to human skin, the other formulation ratio absorbs within an hour and even combats fungal pathogenic infections. All of the aforementioned evaluation, test, and commitment results demonstrate that moisturizing improves the benefits of skin research, and the technique used appears to be simple, effective, and efficient. However, the outcomes of these research may vary based on the quality of the components employed as well as the environmental circumstances. As a result, there is a growing need for further research and analysis on herbal cosmetics in the global industry, which might increase and possibly address the competitive appetite and important societal demands.

## 6. AKNOWLEDGEMENTS

The author would like to express our gratitude to my guide, Dr Vinay Sagar Verma, who only urged to support by giving the information regarding the whole expression, and also thanks to Mr Deepak Biswas and the staff team who gave support in this publication . Kamla Institute of Pharmaceutical Sciences, Junwani, Bhilai, Chhattisgarh and all guiding mentors who providing me with the necessary support and facilities to carry out this project.

## 7. CONFLICT OF INTEREST

Here, Author and Co-authors have no claims in any conflict of interest.

## 8. SUPPLEMENTARY MATERIALS

As the supplementary materials is available based on my other papers similarly for completing the research in depth explanation available in other version of my only related papers:

- https://doi.org/10.59400/nmm.v4i1.1573
- http://doi.one/10.1729/Journal.40545

## REFERENCES

1. B.S., Kalpesh K. Mehta, Anshu Gupta. (2016). Dispencing Pharmacy: A Practical Manual. *Pharm M. Press*. *p.* 389-399.
2. Manisha Yogesh Sonalkar, Sachin Annasaheb Nitave. (2016). Formulation and evaluation of polyherbal cosmetic cream. *World J Pharm Sci. 5*, 772-779.

3. Yadav Rohan, Thakur Shiva Kant, Parihar Rishabh, Chauhan Uma, Chauhan Arsh, Chawra Himmat Singh. (2023). Pharmaceutical Preparation and Evaluation of Cold Cream. *International Journal of Innovative Science and Research Technology*. *8*(5), 1069-1075.
4. Navindgikar Nikhil Nitin, Kamalapurkar K. A., Chavan Prasant S. (2020). Formulation and Evaluation of Multipurpose Herbal Cream. *Int J Curr Pharm Res*. *12*(3), 25-30.
5. Xu, S.; Kwa, M.; Lohman, M.E.; Evers-Meltzer, R.; Sliverberg, J.I. (2017). Consumer Preferences, Product Characteristics, and Potentially Allergenic Ingredients in Best-selling moisturizers. *JAMA Dermatol.* 153, 1099-1105.
6. Loden M. (2005). The clinical benefit of moisturizers. *J. Eur. Acad. Dermatol. 19*(6), 672-688.
7. Xiu Z, Hong W, Yuan S, Li N, Lan W, Bin L, *et al.* (2006). Isolation, structure elucidation, antioxidative and immunomodulatory properties of two novel dihydrocoumarins from Aloe Vera. *Bioorganic and Medicinal Chemistry Letters*. 16, 949-953.
8. Aktar N, Khan BA, Khan MS, Mahmood T, Khan HMS, Iqbal M, *et al*. (2011). Formulation Development and Moiturising Effects of a Tropical Cream of Aloe vera Extract. *World Academy of Science, Engineering and Technology*. 75, 172-179.
9. Bhowmik Debjit, Kumar K.P. Sampath, Paswan Shravan, Shrivastav Shweta. (2012). Tomato – A Natural Medicine and Its Health Benefits. *Journal of Pharmacognosy and Phytochemistry. 1*(1), 33-43.
10. Franco Lourdes, Marchena Ana M, Rodriguez Ana B. (2021). Skin Health Properties of Lycopene and Melatonin. *Journal of Dermatology and Skin Sciences*. *3*(1), 26-28.
11. Chandegara V.K., Varshney A.K. (2005). Gel Extraction from Aloe Vera Leaves. *Value Addition to Agro-Horti-Medicine Produce & Its Marketing.* 12, 166-171.
12. Ph.D. Rath Susanne, Ph.D. Olempska-Beer Zofia, Ph.D. Kuznesof Paul M. (2023). Lycopene Extract from Tomato. *Chemical and Technical Assessment*. 320, 1-5.
13. Hussain M. B., Ahmad R. S., Waheed M., Rehman T. U., Majeed M, Khan M. U. (2017). Extraction and Characterization of Lycopene from Tomato and Tomato Products. *RJOAS. 63*(3), 195-201.
14. Mr. Pawar Siddharth Baban, Prof. Gore Aaditee, Dr. Slave Megha T. (2023). A Review on Herbal Moisturizer. *IJARIIE*. *9*(6): 1071-1082.
15. Tangadkar Kajal Nivrutti, Karbhari Talekar Sakshi, Lahu Shinde Ashok, Prof. Suryawanshi Akshada Dilip. (2022). Formulation and Evaluation of Herbal Moisturizing Cream. *Journal of Emerging Technologies and Innovative Research*. *9*(6), k79-k98.

**16.** Pegu Arup Jyoti, Mrs. Sharma Ankita. (2019). Review on Aloe Vera. *International Journal of Trend in Scientific Research and Development*. *3*(4), 35-39.

**17.** Mr. Pawar Shubham Tukaram, Mr. Bhagat Vishnu Popat, Mr. Jadhav Vaibhav A., Mr. Rode Abhijit R. (2023). Formulation and evaluation of moisturizing cream. *International Research Journal of Modernization in Engineering Technology and Science. 5*(5), 6899-6905.

**18.** Saha Puja, Das Supriyo, Saha Anupam. (2021). Formulation and Evaluation of Herbal Cream For Skin Care Using Extracts of Krishna Tulsi as Active Ingredient with Anti-Microbial Activity. *Pharmwave.* 14, 35-43.

**19.** Dr. Chauhan Nidhi N., Mrs. Vasaval Parul, Dr. Mohmmad Patel Shoaib. (2020). Comparision of Formulated and Marketed Herbal Creak Cream by Evaluation Parameters. *International Journal of Creative Research Thoughts. 8*(2), 62-69.

**20.** Badwaik Chandrashekhar B., Lade Updesh B., Agarwal Tikesh, Barsagade Prachi, Nandgave Madhuri, Gaddamwar Nilam. (2022). Formulation and Evaluation of Herbal Face Cream. *International Journal of Pharmaceutical Research and Applications*. *7*(1), 955-959.

**21.** Maru Avish D., Lahoti Swaroop R. (2018). Formulation and Evaluation of Moisturizing Cream Containing Sunflower Wax. *International Journal of Pharmacy and Pharmaceutical Sciences*. *10*(11), 54-58.

**22.** Lalita Chauhan, Shalini Gupta. (2020). Creams: A Review on Classification, Preparation Methods, Evaluation and its Applications. *Journal of Drug Delivery and Therapeutics.* 10, 281-288.

**23.** Ahshawat M.S., Saraf S. (2008). Preparation and Characterization of Herbal Creams for Improvement of Skin Viscoelastic Properties. *Int J Cosmet Sci*. 30, 183-193.

**24.** Sharma Anshul, Banyal Maneesh, Gupta Jyoti, Joshi Swati. (2020). Formulation and Evaluation of Herbal Cold Cream. *IJARIIE. 9*(3), 2578-2585.

**25.** Shete Smita, Mohite Mukesh, Karodi Revan. (2020). Formulation and Invitro Evaluation of Herbal Skin Whitening Cream of *Glycyrrhiza glabra* Extract and *Solanum Tuberosum* Juice. *IJCRT*. *8*(4), 314-322.

**26.** Pimpale Amol. (2018). Formulation and Evaluation of Antibacterilal, Antifungal Cream of Garlic Oil. *International Journal of Trend in Scientific Research and Development. 3*(1), 849-851.

**27.** Miss. Patil Riya A., Dr. Mahalle Suchita G., Mr. Pawar Adita S. (2021). Formulation and Evaluation of Moisturizing Cream using *Amaranthus Cruentus* Seed oil. *International Journal of Advance Study and Research Work*., *4*(3), 29-39.

**28.** Public legal law: Bureau of Indian Standards Act 1986, Pub. L. No. 1972-78, Stat. 71 (21 February 1991). *Indian Standard* Skin Creams-Specification. 6608:2004, 2, p. 1-7.

**29.** Saraf Swarnlata, Sahu Sneha, Kaur Chanchal Deep, Saraf Shailendra. (2010). Comparative Measurements of Hydration Effects of Herbal Moisturizers. *PHCOG RES.* *2*(3): 146-151.

**30.** Mawazi Saeid Mezail, Ann Jo, Othman Noordin, Khan Jiyauddin, Alolayan Sultan Othman, Thagfan S. Al, *et al.* (2022). A Review of Moisurizers: History, Preparation, Characterization and Applications. *MDPI.*, *9*(61): 1-14.

**31.** Dey, V., & Mohapatra, S. (2024). A Brief Review on Declarative Concepts of Pharmaceutical Characteristics, Classification, Mechanisms, Preparation, Formulation and Evaluation Studies of Moisturizing Cream. *Nano and Medical Materials*, *4*(1), 1573, 1-45. DOI: https://doi.org/10.59400/nmm1573