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# Formulation and Characterization of a Black Sesame-Based Herbal Facial Gel for Skin Care Applications

***Prof. Piyush Ramesh Joshi[1], Dr. Vivekkumar K. Redasani[2], Prof. Jyoti Shivaji Pingle[3], Miss. Snehal Santosh Kumbhar[4]***

[1]Department of Pharmacognosy, Yashoda Shikshan Prasarak Mandals, Yashoda Technical Campus, Faculty of Pharmacy, Satara-415011.
[2]Principle of Yashoda Shikshan Prasarak Mandals, Yashoda Technical Campus, Faculty of Pharmacy, Satara-415011.
[3]Department of Pharmacognosy, Yashoda Shikshan Prasarak Mandals, Yashoda Technical Campus, Faculty of Pharmacy, Satara-415011.
[4]Student of Final Year Bachelor of Pharmacy,Yashoda Shikshan Prasarak Mandals, Yashoda Technical Campus, Faculty of Pharmacy, Satara-415011.
**Corresponding Author Name-** Prof. Piyush Ramesh Joshi.
Corresponding mail – piyushjoshi1402@gmail.com

Abstract:

The purpose of this study was to create and test an herbal face gel that contained black sesame (Sesamum indicum L.) seed extract for potential skincare advantages. The extract was prepared by hot maceration in a hydroalcoholic solution, followed by filtering, evaporation, and pigment removal with activated charcoal. Glycerine, methyl paraben, lavender oil, and aloe vera gel were added to a Carbopol 934-based gel to improve its moisturizing, preservation, and soothing characteristics. Over a one-month period, the formulation was evaluated in terms of physicochemical and organoleptic properties such as pH, viscosity, Spreadability, washability, skin irritation, and stability at room and refrigerated temperatures. Patch tests revealed that it was easily washable and did not cause skin irritation. Stability testing revealed no significant differences in appearance, pH, or viscosity. These findings lend support to the use of black sesame-based herbal face gel as a safe, stable, and effective natural skincare product.

**Keywords:** Skincare, Characterization, Formulation, Herbal, Patch.

## 1. Introduction:

Herbal compounds are becoming more popular in cosmetics due to their safety, multifunctionality, and low negative effects. Many botanicals contain antioxidants and bioactive that protect the skin from oxidative stress, promote collagen formation, and decrease inflammation. Black sesame (Sesamum indicum L.) seeds include lignans (e.g., sesamin, sesamolin), vitamin E, polyunsaturated fatty acids, and phenolic compounds that have antioxidant, anti-inflammatory, and anti-aging properties. Studies have demonstrated that black sesame components can scavenge UV-induced reactive oxygen species and inhibit matrix metalloproteinases, hence preserving collagen in skin cells Topical treatments of sesame derivatives have been shown to provide minor UV protection as well as skin softening qualities. Despite these benefits, little study has been conducted on the inclusion of black sesame extract into topical formulations. Carbopol-based gels are chosen for herbal actives because to their high viscosity, bio adhesion, and low irritant potential. Aloe vera and lavender oil add moisture, soothe, and are antibacterial. This study focuses on the development and testing of a stable, skin-friendly herbal facial gel using black sesame extract, with an emphasis on its physicochemical qualities, stability, and skincare potential.

## 2. Historical Background of Gels in Pharmaceutical and Cosmetic Applications:

The concept of gels originated in the early twentieth century, when colloidal science began to evolve. Gels are semisolid systems made up of small inorganic particles or big organic molecules suspended in a liquid. Their unusual viscosity, which falls in between a solid and a liquid, makes them ideal for topical applications. Gels became prominent in pharmaceutical sciences throughout the 1930s and 1940s for transdermal drug delivery, allowing for localized treatment with increased absorption and less systemic effects. The introduction of synthetic polymers such as Carbopol (carbomer) in the mid-twentieth century was a huge step forward, enabling more stable and varied gel formulations. Gels have long been used in cosmetology to provide hydration, cooling, and calming properties. Natural gels, such as aloe vera gel, were among the first used by ancient civilizations for skin care and wound healing, including the Egyptians, Greeks, and Chinese. Gels have evolved over time to include botanical extracts, essential oils, and contemporary preservatives to address both therapeutic and aesthetic purposes. Gels are becoming an important type of formulation in dermatological and cosmetic research because they provide controlled release, convenience of application, and consumer-friendly features.

## 3. Main Ingredients for Herbal Facial Gel:


Fig No. 1 Black sesame seed powder, Activated charcoal, Aloe vera gel, Carbopol, Glycerine, Rose water.

## 4. Advantages of the Herbal Facial Gel Formulation:

1. Natural and Safe Ingredients.
2. Moisturizing and Soothing Effects.
3. Stability and Skin Compatibility.
4. Eco-Friendly and Sustainable.
5. Antioxidant and Anti-Aging Properties.
6. Easily Washable.

## 5. Formulation Profile of Herbal Facial Gel:

Table No. 1 Formulation of Herbal Facial Gel.

| Sr. No | Ingredients | Quantity |
|---|---|---|
| 1. | Black sesame seed powder | 10 gm |
| 2. | Aloe vera | 10 ml |
| 3. | Activated charcoal | 0.5 gm |
| 4. | Carbopol | 2 gm |
| 5. | Glycerin | 10 ml |
| 6. | Rose Water | Q. S |

## 6. Method of Preparation of Herbal Facial Gel:

1. Black sesame seeds were cleaned, dried, and ground to a fine powder.
2. The powder had been soaked in water for 24 hours to extract the active components.
3. The mixture was filtered, and the extract was concentrated using mild heat.
4. Carbopol was progressively added to rose water while stirring continuously and left for 24 hours to form a gel base.
5. The gel base included aloe vera gel, black sesame extract, and activated charcoal.
6. Glycerine and a tiny amount of rose water were combined well.
7. To achieve a smooth gel.
8. The resulting gel was thoroughly mixed and placed in clean containers for examination.

## 7. Diagrammatic Represented Method of Preparation of Herbal Facial Gel:

Fig. No. 2 Method of Preparation of Herbal Facial Gel.

## 8. Physical Evaluation Parameter and Results of Herbal Facial Gel:

Table No. 2 Physical Evaluation Parameter of Herbal Facial Gel.

| Sr. No | Parameter | Observation |
|---|---|---|
| 1. | Color | White |
| 2. | Oduors | Fragrant |
| 3. | Appearance | Soft |
| 4. | Texture | Smooth |
| 5. | Spread ability | Uniform |
| 6. | Stability | Stable at Room Temp. |
| 7. | Consistency | Semisolid |
| 8. | Homogenecity | Good |
| 9. | Skin Irritation Test | No Irritation |
| 10. | Viscosity | 964 cP |
| 11. | Grittiness | Non-Gritty |
| 12. | pH | 6 |
| 13. | Color Stability | No change for one month. |
| 14. | Washability | Easily Washable |

## 9. Physical Evaluation Test Performance of Herbal Facial Gel:

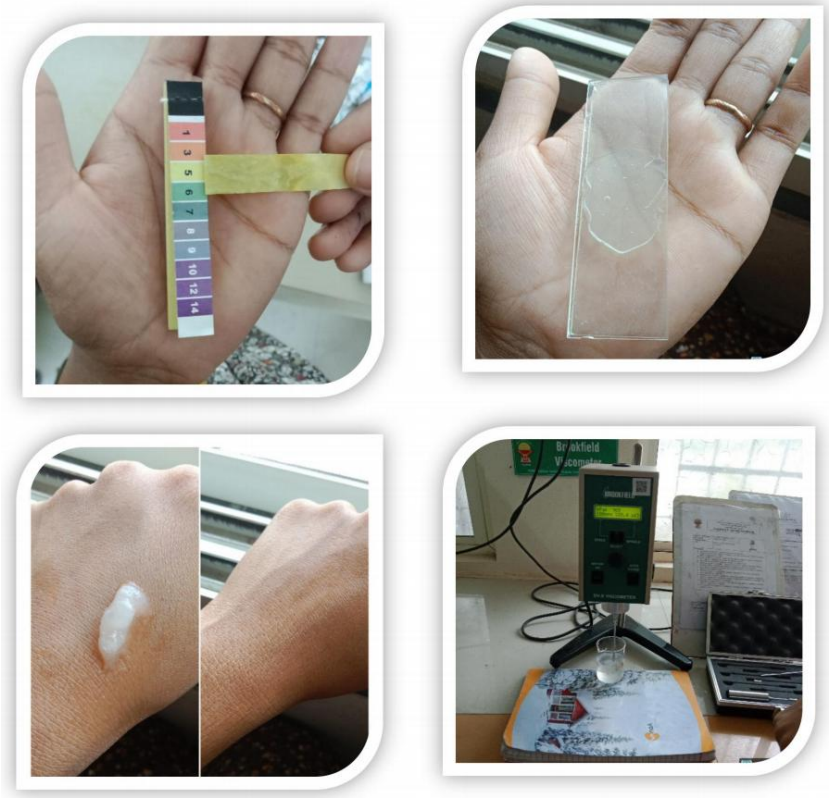

Fig No. 3 Evaluation Test Performance of pH Determination, Spreadability test, Skin irritation test, Viscosity Determination.

## Conclusion:

The prepared gel had a smooth, consistent texture and a lovely lavender smell. It had a skin-friendly pH and a mild viscosity. Spreadability was ideal for even applications. The product exhibited no symptoms of deterioration or microbiological development during storage. Biological testing proved the moisturizing benefits and lack of irritation, indicating dermatological safety. The formulation's appearance, pH, and viscosity remained consistent throughout the research. This study effectively created a stable, effective herbal face gel out of black sesame seed extract. The formulation met the organoleptic, physicochemical, biological, and performance standards. Bioactive such as sesamin and vitamin E helped to provide antioxidant and moisturizing qualities. The product was skin-safe and easily washable. These findings highlight the potential of black sesame-based gels in natural cosmetic formulations. Additional research could concentrate on long-term efficacy, consumer testing, and commercial scalability.

**Conflict of Interests:**

The authors declare that they have no known competing financial interests or personal relationship that could have appeared to influence the work reported in this paper.

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