FORMULATION AND EVALUATION OF ANTI MICROBIAL ACTIVITY OF FACE WASH

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ABSTRACT

This study focuses on the formulation and evaluation of a plant-based face wash incorporating seed extract of *Dalbergia sisso*. The face wash was formulated using a combination of propylene glycol, sodium lauryl sulphate, carbopol, hydroxypropyl methylcellulose (HPMC), triethanolamine, and preservatives. The physical properties, including color, appearance, consistency, pH, and viscosity, were evaluated and found to be satisfactory. The antibacterial activity of the prepared formulation was assessed using the well diffusion assay against Staphylococcus aureus. The face wash exhibited a mean zone of inhibition of 18 mm, indicating significant antibacterial properties. The results suggest that the formulated face wash, enriched with plant-based extracts, is effective in cleansing and providing therapeutic benefits, making it a promising addition to skincare routines.

KEYWORDS : Formulation, *Dalbergia Sisso*, Face Wash, Skincare, Carbopol

1. INTRODUCTION

Facial hygiene is an essential component of personal care, and face wash products play a central role in daily skincare routines. These formulations are specifically designed to remove dirt, excess oil, dead skin cells, and environmental pollutants from the skin's surface. Unlike traditional soaps, which can disrupt the skin's natural pH balance and protective barrier, face washes are developed to cater to various skin types and concerns, including acne, dryness, sensitivity, and oiliness **(Alsakhawy et al., 2022).**

With increasing awareness about skincare and the effects of environmental pollution, consumers are becoming more inclined toward dermatologically tested and ingredient-focused products **(Al-Otaibi & AlMotwaa et al., 2023).** As a result, the demand for scientifically formulated face washes has surged. Recent advancements in cosmetic science have led to the development of face wash products containing active ingredients such as salicylic acid, niacinamide, hyaluronic acid, herbal extracts, and natural exfoliants, which provide both cleansing and therapeutic benefits.

This study focuses on the formulation and evaluation of a face wash incorporating plant-based extracts. The antibacterial properties of the prepared formulation were also assessed using the well diffusion assay against *Staphylococcus aureus*.

2. MATERIALS AND METHODS

2.1 Formulation of Facewash

A little quantity of water along with preservatives was added to the previously prepared solution of propylene glycol and sodium lauryl sulphate, then carbopol was added slowly and stirred well until a gel like dispersion was obtained, Various gel formulations were prepared based on quantity of ingredient of HPMC and Carbapol 940 to this the stock solution of seed extract was added, and then triethanolamine was added finally and left for overnight **(Kamble et al., 2019).**

2.2 Evaluation of prepared facewash:

The physical properties, such as color, appearance, and consistency, were determined visually. Viscosity was measured using the Brookfield Viscometer (Ottendorf, Germany) **(Kamble et al., 2019),** and the pH of a 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature

2.3 Antibacterial Activity (Well Diffusion Assay)

2.3.1 Well diffusion assay

2.3.1.1 Preparation of Dilutions of the Samples

The dilutions of the samples were made for the concentration of 25µg/ml, 50µg/ml, 75µg/ml, and 100µg/ml, respectively of the sample. after that volume makeup was done with distilled water till 1ml.

2.3.1.2 Preparation of Nutrient Agar Media

28 g of Nutrient Media was dissolved in 1 litre of distilled water. The pH of the media was checked before sterilization. Media was sterilized in an autoclave at 121^{o}C at 15 lbs pressure for 15 minutes. Nutrient media was poured into plates and placed in the laminar air flow until the agar had solidified.

2.3.1.3 Well Diffusion Assay

Culture of bacterial strains (*S. aureus* MTCC 10787*)* was spread on the Nutrient agar media (NAM). The bacterial suspension was standardized to 10^8 CFU/ml of bacteria and placed into the shaker. Then, 100µl of the inoculum from the broth (containing 10^8 CFU/ml) was taken with a micropipette and then transferred to a fresh and sterile solidified Agar Media Plate **(Mohammadi-Sichani *et al.*, 2012).** The agar plate was inoculated by spreading the inoculum with a sterile spreader, over the entire sterile agar surface. Two wells of 6 mm were bored in the inoculated media with the help of sterile cork-borer. Each well was filled with of samples (oil and facewash). It was allowed to diffuse for about 30 minutes at room temperature and incubated for 18-24 hours at 37^{o} C. After incubation, plates were observed for the formation of a clear zone around the well which corresponds to the antimicrobial activity of tested compounds. The zone of inhibition (ZOI) was observed and measured in mm. A ruler was placed on the back of the inverted Petri plate and used to measure zones to the closest millimeter. The Petri plate

was held a few inches above a black, non-reflecting surface. The diameters of the well as well as the zone of complete inhibition (as seen with the unaided eye) were determined **(Manandhar *et al.*, 2019).**

3. RESULTS

3.1 Materials and chemical name

The instruments used in the study included a Brookfield Viscometer for measuring viscosity, a digital pH meter for determining the pH of the formulations, an autoclave for sterilizing the nutrient media, micropipettes for precise volume transfer, sterile cork-borers for creating wells in the agar plates, a shaker for bacterial culture standardization, and a laminar air flow unit to ensure a sterile environment. The chemicals involved in the preparation and evaluation of the facewash formulations included propylene glycol, sodium lauryl sulphate, carbopol, hydroxypropyl methylcellulose (HPMC), triethanolamine, and seed extract. Additionally, nutrient agar media and distilled water were used for the well diffusion assay, along with preservatives added to the initial solution.

3.2 Formulation of Facewash of *Dalbergia sisso*'s oil

Figure 1: Face wash of oil of *Dalbergia sisso*

Table 1: Quality parameters of Facewash formulation of *Dalbergia sisso*

S. No	Parameters	Observation
1.	Colour	Transparent
2.	Odour	None
3.	Consistency	Consistent
4.	pH	5.9
5.	Viscosity (cp)	5549cp

3.3 Antibacterial activity of Facewash

Table 2: Antimicrobial activity of *Dalbergia sisso* oil's facewash against *S. aureus*

Sample	Zone of inhibition in mm			
	Plate 1 (mm)	Plate 2 (mm)	Plate 3 (mm)	Mean
Oil	7	10	7	8
Facewash of oil	15	21	18	18

Figure 2: Antibacterial activity of Samples against *S. aureus*

4. DISCUSSION:

The formulation of a face wash incorporating seed extract of Dalbergia sisso presents a promising avenue for enhancing skincare products with natural, antibacterial properties. This study underscores the significance of plant-based extracts in cosmetic formulations, resonating with the growing consumer preference for dermatologically tested and ingredient-focused products. The face wash's physical attributes, such as transparency, lack of odor, and consistent viscosity, suggest its suitability for daily use. With a pH of 5.9, the formulation is well within the acceptable range for skincare products, ensuring it does not disrupt the skin's natural barrier.

The antibacterial activity results are particularly impressive, with the face wash exhibiting a mean zone of inhibition of 18 mm against Staphylococcus aureus. This indicates that the Dalbergia sisso extract effectively inhibits bacterial growth, which is vital for maintaining skin health and preventing acne. The enhanced antibacterial activity of the face wash compared to the oil alone (8 mm) highlights the synergistic effects of the formulation ingredients.

These findings contribute to a broader understanding of incorporating natural extracts into cosmetic products, offering a viable alternative to synthetic chemicals. The study also emphasizes the need for further research to explore the long-term effects and stability of such formulations, as well as their efficacy against a wider range of bacteria and skin concerns.

5. CONCLUSION:

In conclusion, the formulated face wash incorporating Dalbergia sisso seed extract demonstrates promising antibacterial properties and desirable physical characteristics. The mean zone of inhibition of 18 mm against S. aureus underscores its potential as an effective skincare product. This study supports the integration of plant-based extracts into cosmetic formulations, catering to the increasing demand for natural and scientifically validated skincare solutions. Future research should focus on optimizing the formulation, conducting clinical trials, and exploring additional therapeutic benefits to further validate its efficacy and safety for consumer use.

6. REFRENCES

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