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Creation and Comparison Analysis of Anti-Acne Gels Made from Polyherbal Ingredients

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Abstract: *Rauvolfia serpentina (L) is the context. The antibacterial qualities of Benth. ex Kurz. (Apocynaceae) are commonly utilized in contemporary herbal remedies. Curcuma longa L. (Zingiberaceae), a common antiseptic, is used in a variety of skin lotions and has antibacterial, anti-inflammatory, blood-purifying, and antioxidant qualities. Indica Azadirachta With their astringent, antiviral, stimulant, stimulant, and antibacterial qualities, A. Juss. (Meliaceae) effectively combats acne and maintains healthy skin. Goal: Today, 85% of youngsters suffer from acne, a common skin condition. In this study, two polymers—Carbopol and hydroxy propyl methyl cellulose (HPMC)—as well as plant extracts from Rawvolfia serpentina, Curcuma longa, and Azadiracta indica were used to create polyherbal anti-acne face wash gels. When compared to Clindamycin gel, the effectiveness was nearly same when tested using a standard*



Keywords: Rauvolfia serpentina

I. INTRODUCTION

India's herbal medication industry is arguably the TwhoerlVd'esdoalsd,easnt medical system. ancient Indian holy text, even describe the ancient practice of herbal treatment, demonstrating how long-standing the use of herbs in ancient India is. Ayurveda and Unani, two traditional herbal medicinal systems, focus on using natural products and herbs to treat illnesses.

The majority of recommended medications still contain plant extracts, despite the fact that herbal remedies could seem novel to western healers and medical professionals.Today, nations all over the world value this age-old medical practice, and the high demand for Indian herbal medications has led to its explosive expansion, with an annual growth rate of about 30% (Rashmi, 2008).

In recent years, there has been a noticeable rise in the market for herbal remedies, skin care products, and even cosmetics on a global scale.

Since the skin is the area of our body most exposed to pathogens, it needs to be protected from skin conditions, particularly those caused by bacteria that cause acne. 85% of today's teens suffer from acne, They primarily affect the face and neck, which have the greatest oil glands, and they may persist until adulthood. making it the most prevalent skin condition characteristics of acne.

Seborrhea, inflammatory lesions, comedones, excessive sebum production, and the presence of bacteria like Propionibacterium acnes, Staphylococcus epidermidis, and Malassezia furfur in the follicles are the typical Thus, these One possible

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treatment for acne is to target bacteria. The application of long-term antibiotics to treat modification causes the organisms to become resistant to the
medication. This multifaceted adaptability is dependent on based on the organism's vulnerability to the therapy and host variables, such as stress levels and hormones,
Herbal alternatives for the treatment have been researched in order to address this issue. The herbal extracts were modified and created as a polyherbal anti-
acne face wash gel because they couldn't be used directly for the treatment. The gels in this study were made with different concentrations of herbal extracts in hydroxypropylmethyl cellulose (HPMC) and carbopol, and their anti-acne effectiveness as well as their antimicrobial activity against the microorganisms that cause acne were tested.

II. MATERIALS AND METHODS

Plant material

The formulation's plant ingredients were gathered from Herbal Crude Drugs, a whole-sale provider located in Mumbai, India.

Media and animals

Four groups of Wistar albino rats (150–200 g) were chosen, each including three animals. Agar medium and nutrient broth were purchased from SD Fine Chemical Ltd. in Mumbai, India. The chosen animals were kept in well-ventilated rooms with a light:dark cycle of 12:12 hours, in acrylic cages with standard environmental conditions of 25 ± 2°C, 45–55% relative humidity, and a standard rodent feed and unlimited water.
Creating a face wash gel that prevents acne of 135 ml.each 45 g extrac

Making a gel base Table 1 lists all of the ingredients that were weighed. Gel-HPMC and Gel-CRB are the names given to the gels that were created utilizing HPMC and Carbopol 940 (Harisaranraj et al., 2010). After swirling the gelling chemicals in a tiny amount of distilled water, glycerin was gradually added. The remaining water was used to dissolve the powdered materials, which were then stirred overnight (Gowda et al., 2009).

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Evaluation of premade gels in comparison

The physical characteristics were identified. The Brook Field Viscometer (Ottendorf, Germany) was used to test the viscosity (Hiremath et al., 2008), and a digital pH meter (New Delhi, India) was used to assess the pH of the gels. The freeze-thaw cycling method was The gels were heated to 4°C for seven days, 25°C for seven days, and 40°C for seven days (Schoch, 1968). used to test the gels' stability

Table 1. Ingredients used in the formulation

Gel-HPMC		Ingredient	Quan
Ingredient	Quantity		
HPMC (hydroxy propyl methyl cellulose)	3.0 g	Carbopol	tity
Glycerin	50 ml	940	500
Lauric acid	1.0 ml	Glycerin	mg
Triethanolamine	0.5 mg	Lauric acid	50 ml
Methyl paraben	20 ml	Triethanolamine	1.0 g
Propyl paraben		Methyl paraben	0.5 l
Distilled water		Propyl paraben	0.5 g
		Distilled water	20 ml

Table 2. pH, viscosity and spreadability of formulations.

Formulation	pH*	Viscosity*(cps)	Spreadability * (g·cm/s)
Gel-CRB 100	6.46 ± 0.04	8266 ± 0.11	3.1 ± 0.31
Gel-HPMC 50	6.82 ± 0.49	8742 ± 0.28	3.4 ± 0.14
Gel-HPMC 100	7.22 ± 0.37	7548 ± 0.34	2.2 ± 0.50
Gel-HPMC 200	7.34 ± 0.12	5164 ± 0.45	1.9 ± 0.33

*Mean of triplicate readings

Table 3. Stability studies of formulations.

	pH			Viscosity (cps)			Synerisis			
Formulation	4°C	25°C	40°C	4°C	25°C	40°C	4°C	25°C	No	40°C
Gel-CRB 100	6.45	6.46	6.46	8265	8266	8266	No	No	No	No
Gel-HPMC 50	6.82	6.82	6.82	8740	8742	8747	No	No		No
Gel-HPMC 100	7.22	7.22	7.22	7548	7548	7550	No			No
Gel-HPMC 200	7.34	7.34	7.36	5163	5164	5164	No			No

Following each stage, the gels were allowed to come to room temperature and observations were made about pH, viscosity, and synerisis.

Albino rats were used for the skin irritation test.

weighing roughly 150–200 g for both sexes. The creatures were kept on regular animal feed with unrestricted access to water. The rats' backs had their hair shaved, and an 2 cm³

on both sides. Control was exercised by one side. The opposite side for each formulation's test using two animals In 2008, Hiremath et al. Two gel applications each day were made for three days, and the location was checked for any signs of sensitivity. erythema and edema

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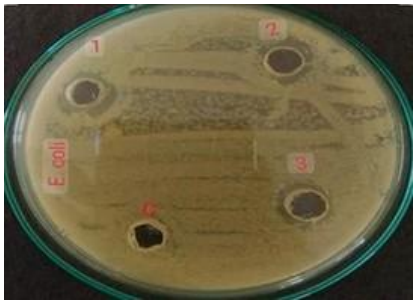
Determination of the antibacterial efficacy of polyherbal face wash gels against microorganisms that cause acne

The antibacterial activity was screened using the turbidimetric technique. A Petri plate was aseptically covered with a sterile nutritional agar medium. A volunteer with noticeable acne had their face's skin cleaned with distilled water and allowed to air dry. After that, a cotton swab soaked in five milliliters of distilled water was applied to the ruptured pimple until the entire swab touched the acne. The previously prepared media was covered with a uniform layer of this solution. To obtain a healthy culture of bacteria, this was cultured for 24 hours at 37°C (Mondal, 2004).For five minutes, six sterile cotton balls with a diameter of one centimeter were submerged in distilled water and created drug formulations. 50 milliliters of nutrient broth were made and sterilized; 5 milliliters were set aside and used as a reference standard in one UV spectrophotometer cell.

The organism cultivated in the Petri plate was added to the remaining broth as an inoculant. Six sterile test tubes were filled with this inoculation broth (5 ml), and cotton balls were suspended in each and labeled appropriately. They were kept in an incubator at 37°C for twenty-four hours. After that, they were removed and their absorbance at 600 nm was measured



III. RESULTS AND DISCUSSION

The compositions had a brownish yellow color, and as the extract concentration in the gel rose, so did the color's intensity. The mixed extracts' brownish yellow hue could be the cause of this.

Table 2 provides the formulations' pH and viscosity The findings demonstrated that when theextract content rose, there was a considerable shift in pH and viscosity.

Table 4. Anti-acne efficacy of formulations. Formulation Gel-CRB 100a Gel-HPMC 50a Gel-HPMC 100a Gel-HPMC 200a Standardb Control *Mean of triplicate readings.	Absorbance*
	0.1438 ± 0.02
	0.166 ± 0.07
	0.1432 ± 0.01
	0.1285 ± 0.03
	0.1271 ± 0.04
	0.759 ± 0.03

a10% extract in distilled water. bConcentration of clindamycin (100 mg/ml).

This could be because the carbopol employed in the recipe has an acidic nature. This demonstrates how weakly acidic the anti-acne gels are. As the extract readings

demonstrated a consistent decline. The Gel-CRB 100's viscosity fell between that of the Gel-HPMC 50 and 100. This demonstrates that even a smaller amount of carbopol gives the gel a nice consistency.

Gel-HPMC 50, with 3.4 g•cm/s, has a greater spreadability than other formulations, according to the spreadability test findings, which are shown in Table 2.

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Table 3 contains the findings of stability studies that were conducted. The findings demonstrated that, with a small variation, the gels remained stable at all temperatures. Gel-HPMC 200 at 40°C had a slightly higher pH. The viscosity of the formulations varied, with Gel-CRB 100 exhibiting a 1 cps drop at 4°C, Gel- HPMC 50 exhibiting a 7 cps variance between 4 and 40°C, Gel-HPMC 100 exhibiting a 2 cps increase at 40°C, and Gel-HPMC 200 exhibiting a 1 cps drop at 4°C. The gels showed no signs of syneresis. Therefore, it may be said that the stability characteristics of all formulations are comparable.

There were no indications of sensitivity, erythema, or edema in the skin irritation test. Therefore, it was decided that the created formulations were non- irritating. All of the formulations of the anti-acne gels showed somewhat lower efficacy compared to standard drugs, equal absorbance to Clindamycin gel. Even with the same higher absorbance than Gel-HPMC 100, suggesting higher microbial proliferation. Therefore, HPMC is said to be the ideal for making anti- acne gels. Figure 1 displays a comparison of the gels with the control and standard. although Gel-HPMC 200 shown about extract content, Gel-CRB 100 displayed

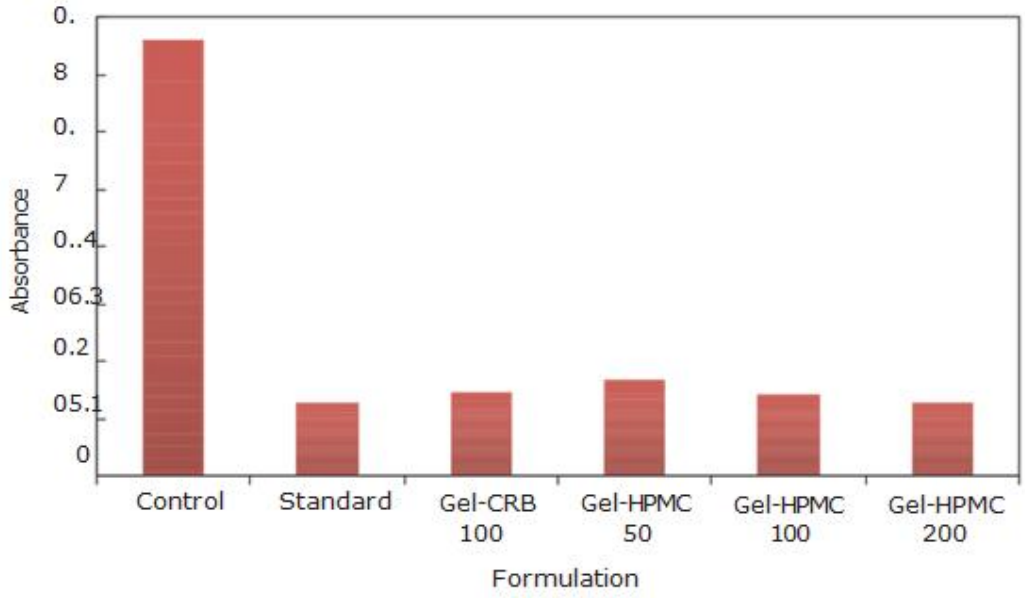

Figure 1. Anti-acne efficacy of formulations.

IV. CONCLUSION

Using extracts of Rawvolfia serpentina, Curcuma longa, and Azadiracta indica in an aqueous-based Carbopol and HPMC gel system, this study sought to create polyherbal gels for the treatment of acne. By altering the ratios of polymers, four gel formulations were created, and their physicochemical characteristics— such as pH, spreadability, viscosity, and microbiological assay—were assessed.

In comparison to the standard marketed formulation, the microbiological assay of all the formulations showed superior inhibitory effectiveness against Propionibacterium acnes, Staphylococcus epidermidis, and Malassezia furfur.f

It was determined that the current study may lead to improvements in the use of herbs to treat acne and in the creation of polyherbal formulations for the safe and efficient management of illnesses.

Declaration of interest

No conflicts of interest are disclosed by the writers. The paper's writing and content are entirely the authors' responsibility.

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REFERENCES

[1]. Gowda B, Shariff A, Priyadarshini SRB. (2009). Formulation and evaluation of topical polyherbal anti-acne gels containing *Garcinia mangostana* and *Aloe vera*. *Pharmacog Mag*, 5, 93–99. Harisaranraj R,

[2]. Saravanababu S, Suresh K. (2010). Antimicrobial properties of selected Indian medicinal plants against acne-inducing bacteria. Ethnobot Leaflets, 14, 84–94.

[3]. Hiremath SSP, Dasankoppa FS, Nadaf A, Jamakandi VG, Mulla JS, Sreenivas SA, Sholapur HN, Ahmed A, Nanjunda Swamy NG. (2008). Formulation and evaluation of a novel *in situ* gum based ophthalmic drug delivery system of linezolid. Sci Pharm, 76, 515–532.

[4]. Mondal S. (2004). Evaluation of the antimicrobial efficacy and safety of pure hands herbal hand sanitizer in hand hygiene and on inanimate objects. The Antiseptic, 10, 55–57.

[5]. Panigrahi L, Ghosal SK, Pattnaik S, Maharana L, Barik BB. (2006). Effect of permeation enhancers on the release and permeation kinetics of lincomycin hydrochloride gel formulations through mouse skin. Ind J Pharm Sci, 68, 205–211.

[6]. Rashmi MS. (2008). Topical gel: A review. Pharm Rev, 6, 1–3. Schoch TJ. (1968). Effects of freezing and cold storage on pasted starches. In: Tressler DK, Van Arsdel WD, Copley MJ, eds. The Freezing Preservation of Foods-Vol. 4. Westport: CT, 44–56