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FORMULATION & EVALUATION OF HYDRATING LOTION BY USING *PSIDIUM GUAJAVA* (LINN.) LEAF EXTRACT

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ABSTRACT:
The present research aimed to formulate and evaluate hydrating lotion formulation as a substitute for synthetic products. Herbal remedies are used to cure a variety of skin conditions and to improve a person`s look by moisturizing and nourishing the skin. *Psidium guajava* (Linn.) leaf extract was used in the formulation of hydrating lotion, which may help maintain skin hydration by holding on to moisture and maintaining it`s softness, suppleness, and health. The fresh green leaves of guava were shade-dried, and the powdered material was extracted using a maceration process. Under carefully monitored conditions, Phases A, B, C and D components were added to create the lotion base. After the base stabilized, guava leaf extract was added. The prepared herbal lotion was subjected to the evaluation of parameters including physical and chemical evaluation and stability studies. The formulation was found to be more stable, and homogenous throughout the stability studies and it can be removed easily after application. Thus, the present investigation validates the formulation and evaluation studies on the leaf extract of *Psidium guajava*.

Keywords:- *Psidium guajava* leaf extract, Herbal lotion, physicochemical parameters.

INTRODUCTION

The skin requires care and protection since it plays a crucial part in shielding the body's tissues and organs (Desri et al., 2022). A herbal body lotion is a liquid composition applied to the skin to improve aesthetics that can chill, calm, or protect the skin locally. Lotions remove sebum and cleanse the skin. This enriched blood circulation, skin moisturization, astringency, freshness, bleaching, and therapeutic effects (Rathi et al., 2022; Mishra et al., 2023). Many ingredients can be added during manufacture to improve lotion dispersion, cooling, soothing, drying, or protective properties (Hajare, 2017; Das, 2020; Pal et al., 2024).

Psidium guajava Linn. (Guava) is an evergreen fruit plant of Myrtaceae. Guava leaves are rich in vitamin C, B, K, phenolic compounds, alkaloids, steroids, flavonoids, tannins, iso-flavonoids, gallic acid, catechin, quercetin, epicatechin, kaempferol, naringenin, rutin, saponins, etc. (Afifi and Erlin, 2017; Growther L, Sukirtha 2018). They are used to treat various diseases such as ulcers, diabetes, diarrhea, cough, bacterial infections and rheumatism. A pharmacological study showed that the guava leaf extract possesses anti-bacterial, anti-allergic, anti-inflammatory (Ojewole et al., 2008), anti-diarrhoeal (Manikanda et al., 2013), anti-diabetic (Lee et al., 2019), anti-cancer (Wang et al., 2007), and hepatoprotective activities (Puntawong et al., 2012; Samejima & Park, 2019; Jain et al., 2023). Targeting the growing demand for herbal products for skin health, more studies on using guava extracts as additives could result in creating a range of cosmetic goods with added value (Hernandeza et

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al., 2021). Plant extracts with antioxidant capacity are of great interest in the field of phytocosmetics because they include chemicals that may promote skin homeostasis, prevent erythema and premature skin aging, and neutralize reactive oxygen species (Giradekar and Rodde, 2021).

Thus, this study concentrated on creating and testing a herbal lotion formulation that contains *Psidium guajava* (Linn.) leaf extract to maintain skin hydration levels by retaining moisture and keeping the skin soft, and healthy.

MATERIAL AND METHODS

The fresh green leaves of guava (*Psidium guajava* Linn.) were collected from Vidya Bharati Campus, dried in the shade, and then coarsely ground using a mechanical grinder. Store the powder in an airtight container for further use.

2.1 Preparation of Extract: The extraction was performed by a maceration method in which the coarse powdered material was placed in a container, and the menstruum (70% ethanol and distilled water) was poured over it until the drug material was completely covered. Then, seal the container and store it for at least 3 to 7 days.

Fig. 1 Powdered Guava leaves used for extraction

Fig.2 Preparation of Extract (Maceration)

After the 7th day, the aluminum foil was removed from the container and mixed well again. A muslin cloth was utilized to filter the extract, yielding a liquid byproduct or extract of around 125 milliliters. Then ethanol was allowed to evaporate from the extract to get the crude extract (10ml). After the 7th day of maceration, the color of the substrate was found to be changed.

Fig.3: Before7th day of maceration

Fig.4: After 7th day of maceration

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Formulation of lotion

The herbal formulation was prepared by adding the ingredients of Phase A. Then the slurry of Phase B to the main phase with stirring. Heat the phases to 80^{0}C. Weigh phase/mixture C as well as add it to the main phase under stirring. Cool up to 45^0 C under stirring. Add phase D-one by one, and mix until it becomes uniform. Adjust the pH using NaOH solution if required. Store the lotion-based product for 7 days to check its stability. After 7 days when the lotion-based product was stable. Add 2.5 ml of the macerated product i.e. guava leaf extract, into the lotion-based and mix it well. Then, again keep it for 45 days to check their physical evaluations.

Table 1: Ingredients used for the preparation of herbal lotion

Phase	Sr. No.	Ingredients	Quantity (gm)
A	1	Distilled water	78.71
	2	Titanium Dioxide	0.20
	3	Disodium EDTA	0.10
	4	VP Copolymer	0.50
B	5	Xanthum gum	0.20
	6	Glycerine	5.00
C	7	Capriccaprylic triglyceride	2.00
	8	Triethylhexanoin	2.00
	9	PEG-100 Stearate	3.00
	10	Argania Spinosa Butter	2.00
	11	Butyl Hydroxy Toulene	0.10
	12	Cetyl Palmitate	1.00
	13	Cetearyl Alcohol	1.00
D	14	Tocopherol Acetate	0.20
	15	*Psidium guajava* extract	2.50
	16	Sodium Hydroxide	0.19
	17	Fragrance	0.50
	18	Phenoxyethanol	0.80

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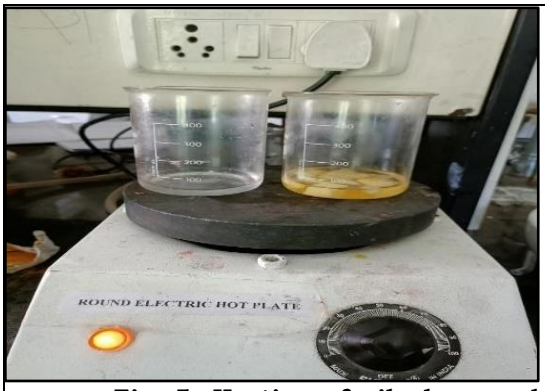

Fig. 5: Heating of oil phase and water phase

Fig. 6: Mixing the oil phase and water phase

Fig.7: Formation of lotion base

Fig.8: Addition of extract in lotion base

Fig.9: Addition of extract in lotion base

Fig. 10: Finished product

Evaluation of lotion:

According to Kamalapurkar (2021) and Sankara Bhavani *et al.* (2023), the lotion's physiochemical parameters such as pH, dye test, viscosity, appearance, homogeneity, type of smear, after-feel, removal, acid value, accelerated stability testing, irritancy test, etc. were assessed, and a Corneometer was used to assess its moisturizing qualities.

RESULTS AND DISCUSSION

The present research aimed for the development and formulation of a herbal lotion with *Psidium guajava* (Linn.) leaf extract which may help keep skin hydration levels by retaining moisture, and preserving its softness, suppleness, and health. 70% ethanol was used to extract 100 g of powdered guava leaves. Following maceration, a thick extract with a characteristic odour and

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dark brown color was the end product of the extraction process.

The ingredients indicated in Table 1 were added to the lotion-based formulation (fig.5-10). Since paraben sensitizes the skin, producing allergic responses and possibly even skin cancer, the herbal lotion was made without the use of paraben or artificial fragrances as preservatives. An O/W ratio was applied when making herbal lotion since there is more water than oil. To verify their stability and additional testing, guava leaf extract was mixed with the lotion base and left for seven days at room temperature.

Evaluation of Lotion-

The findings of evaluation of formulated lotion are recorded in Table 2.

Physicochemical Properties:

The physical properties of formulated lotion was assessed by colour, odour and texture.

1. Colour, Odour & Texture: The Prepared formulation was Cream in colour with pleasant odour and smooth texture**.**

2. pH of the cream: The pH was found to be 5.9. The pH range between 5.6 to 6.95 is a suitable range for skin pH (Kamalapurkar *et al.*, 2021). The herbal formulation was shown pH nearer to skin required i.e. pH 7.1.

3. **Viscosity:** The lotion's viscosity, which ranged from 22000 to 32000 cps, suggests that it spreads easily under light shear.

4. Irritancy test: When applied to the skin, the formulation did not cause any irritation, shows no redness, oedema, irritation and inflammation during studies. The formulated cream is safe to use.

5.**Washability**: Washing with tap water made it simple to remove the lotion that had been applied to the skin.

6.Homogeneity: The homogeneity of the formulated lotion was tested by the visual appearance and touch. The formulation gives a translucent appearance with a cooling sensation, and was homogenous throughout the studies, which was observed after storing it at appropriate room temperature throughout the evaluation period.

7.**Spread ability test**: The formulation has good spreadable qualities, according to the spread ability test. Additionally, the formulation underwent a four-week stability assessment at various temperatures, including 20°C, 25°C, and 37°C. Diffusion experiments, irritation, and spreading ability showed no changes.

8.**The hydration/moisturizing activity**: The hydration level or moisturizing activity of the lotion was measured through a chronometer. As shown in the table 3 and fig.11, the findings were recorded as initial days, after 7 days and after14 days. The skin's moisture content was found to be lower before the application of lotion and higher following its application**.**

Table 2: Evaluation of physiochemical parameters of guava leaf extract

Sr. No.	Parameters Evaluated	Results
1	Color	Creamish
2	Odour	Characteristics
3	Texture	Smooth
4	State	Semi-solid
5	Consistency	Smooth

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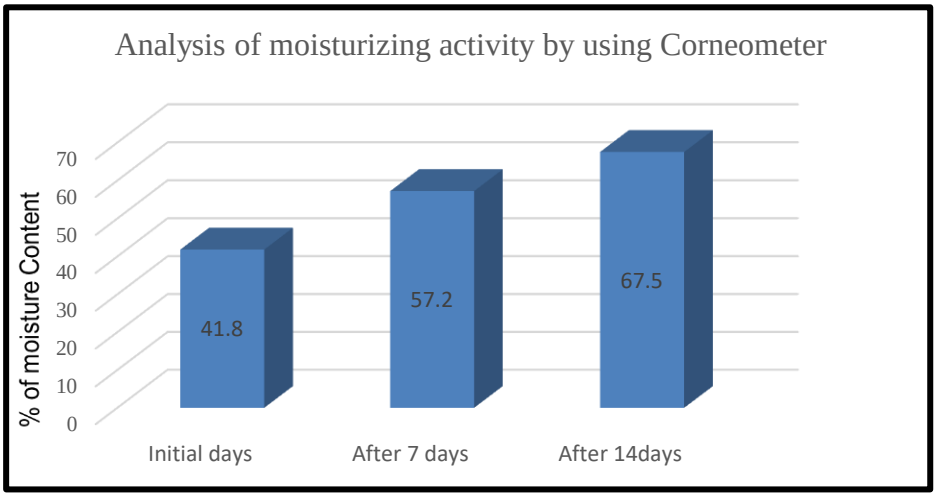
6	pH	5.9
7	Homogeneity	Homogeneous
8	Spreadability	Good
9	Irritancy	Non-irritant
10	Viscosity	24500
11	Appearance	Translucent
12	Type of smear	Non-greasy
13	Phase separation	No phase separation
14	After feel	Emollient
15	Ease of Removal	Easy to remove

Table3. Analysis of moisturizing activity by using a Corneometer

Sr.No.	Time Interval	% of moisture Content
1	Initial days	41.8
2	After7days	57.2
3	After14days	67.5

Fig.11. Analysis of hydration/ moisturizing activity by using a Corneometer



In this research study, the herbal lotion formulation made with *P. guajava* leaf extract was observed and assessed for physicochemical characteristics These characteristics included colour, odour, texture, pH, spreadability, quality, stability, appearance, irritancy, and moisturizing properties. The formulation's smooth consistency, stability with constant pH

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values, emollient texture, homogenous color and behavior, non-greasy, good cleansing properties, non-toxicity, and non-irritability to the skin were all considered to be of good quality. Similar physicochemical evaluations were reported in various studies where the extract of *P. guajava* leaf was used in preparing body lotion and treating skin disorders (Mukharjee *et al.*, 2010); Emugel formulation was made by using Carbopol 934, *Psidium guajava* leaves hydroalcoholic extract, propylene glycol, methyl paraben, propyl paraben, and required amount of distilled water (Shitole *et al.*, 2023); herbal lotion was prepared by using Soxhlet extraction method with ethanol as a solvent (Jain *et al.*,2023) and face serum by using guava leaves as a main active ingredient with *Aloe vera* gel, glycerin, coconut oil & rose water (Tikhande *et al.*, 2024). Aqueous gel formulation of guava leaf extract shows potential as an efficient and natural treatment option for mouth ulcers (Depeeka *et al.*, 2024). A literature review indicated that guava leaves are rich in bioactive substances that support healthy skin. As a result, this plant could serve as a foundational component in creating cosmetic preparations.

CONCLUSION:

Based on the findings, it can be concluded *Psidium guajava* leaf extract improves skin moisture and works well as a moisturizing ingredient in lotion formulations.

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