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Formulation and Evaluation of Herbal Face Cream enriched with chia seed mucilage and green tea extract

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ABSTRACT: The aim of my current study is to create and assess an herbal face cream using green tea extract and chia seed mucilage. The team developed the formulation using an emulsifying technique. We calculated it for physicochemical parameters including ph, viscosity, spreadability , homogeneity ,irritancy and antioxidant activity from hydrogen peroxide scavenging test. The results came out and the formulation had suitable properties for tropical use and moderate antioxidant potential.

KEYWORDS: Herbal cream, antioxidant, chia seed, green tea extract.

I. INTRODUCTION

Green Tea is generally used in skincare products. As a natural ingredient because it contains compounds like epigallocatechin gallate (EGCG) which is a part of catechin group. These compounds are commonly known for their antioxidants and anti-inflammatory actions. In our work, adding Green tea to skincare products showed some good effects on the skin, it slightly helps to reduce irritation and protect the skin from environmental damage.However, the results were not very strong and may depends on the amount of green tea used and the overall product formulation might affect the results. Green tea is rich in polyphenols that help in reducing free radical activity and keeps the skin healthy without reducing its glow.

In recent years, herbal and natural cosmetics are becoming more popular. As people have started becoming more careful about the products they put on their Skin, instead of choosing products randomly. There is a growing awareness about how these ingredients can affect their skin in the long run. Sulphates,Parabens and artificial fragrances are some ingredients, which may not suit everyone and sometime causes irritation and other skin related problemswith continuous use. As a result, demand for skin care products that are gentle safe and obtained from natural sources is increased. Nowadays, herbal cosmetics are gaining attention as they are more skin-friendly and less likely to cause adverse effects, their natural origin makes them eco-friendly.[1,2]

Skin, which is the largest organ of our body, protect us from pollution harmful UV rays as well as microorganisms that can hurt us. But when skin get exposed to these factors daily, its condition can slowly affect these may lead to problems like dark spots, skin breakouts, dryness, early, ageing and loss of elasticity. One of the major reasons behind this damage is the presence of free radicals, which are unstable molecules that attacks healthy skin cells and result in oxidative stress, this process causes the ageing and enhances skin concerns, antioxidants are important part of skincare routine as they are used to neutralize the unstable harmful molecules and keeps the skin healthy and glowing naturally.[3] Because of its natural properties, Green tea extract is now common ingredient, which offers benefits to the skin. It has a lot of beneficial plant-based compounds such as polyphenols, especially catechins like EGCG, that are widely known for antioxidants and as well as anti-inflammatory effects. These compounds help to keep skin healthy, protect it from exposure to pollution, sunlight and harmful elements and slow down the ageing process, Green tea extract protect the skin from infection and acne due to its antibacterial effects. It is also known for its soothing action and reducing redness. That's why it is good for people with sensitive and soft skin. [4,5,6]

Another natural ingredient that is becoming popular in skincare preparation is chia seeds because they contain nutrients which are beneficial for skin, like omega 3 fatty acid, fibre and proteins, the best part is their mucilage, which forms a soft gel like texture when soaked in water chia seed mucilage have great moisturizing and skin protective qualities. When this gel is applied to the skin, it feels lightweight, gentle and non greasy as it helps to hold moisture and keep the skin hydrated. Due to this the

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skin feel safe, soft, fresh and well hydrated for a long period of duration. It is helpful in cream formulation because it also works as a natural thicker.[7,8]

Moisturization is important for a healthy skin as it helps to keep the skin soft, smooth and glowing while supporting its natural barrier. When the skin loses moisture it become dry, irritated ,and more exposed to damage. As numerous commercial moisturizers use synthetic ingredients but natural alternatives like chia seed mucilage provide similar or even better results without any harmful side effect. Moreover, the essential fatty acids present in chia seed helps in nourishing and repairing the skin and promotes overall skin health.[9,10]

II. MATERIALS AND METHODS

All the ingredients which are used in the formulation were of pharmaceutical grade and the ingredients were green tea extract, almond oil, chia seed mucilage, kokum butter, emulsifying wax, glycerin, rose water, sodium benzoate and vitamin E.

Table no. 1 FORMULATION COMPOSITON (20gm)

INGREDIENT	QUANTITY	ROLE
Green Tea Extract	1g	Antioxidant
Chia seed mucilage	3g	Hydrating agent
Almond oil	2g	Emollient
Kokum butter	1.5g	Moisturizer
Emulsifying	2g	Emulsifier
Glycerin	1g	Humectant
Vitamin E	0.5g	Antioxidant
Sodium benzoate	0.2g	Preservative
Rose water	q.s. to20g	Vehicle

PREPARATION OF GREEN TEA EXTRACT

According to standard pharmacognosy procedure, green tea extract was prepared by maceration technique (12,13).

In this process, dried green tea leaves were ground coarsely, and then steeped in distilled water for 24 hours. During this time, the mixture was stirred at intervals to help the active compounds dissolve appropriately into thesolvent. After maceration, the mixture was first filtered through muslin cloth to remove crushed particles and then further filtered with Whatman filter paper for better yielding of clear extract. Finally, concentrated the filtrate on water bath, which resulted in a semisolid green tea extract (14,15).

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PREPARATION OF CHIA SEED MUCILAGE

Chia seeds were first soaked in distilled water for a duration of 2 to 3 hours, maintaining a 1:20 ratio. During this time, the hydrated mixture was continuously stirred to release their natural mucilage. After complete hydration, the mixture was separated by filtering mucilage from the seed residue. The Obtained mucilage was then dried at low temperature and stored for later use.[16,17]

CREAMFORMULATION

The cream was formulated using the oil in water (o/w) emulsion method following standard pharmaceutical and cosmetic formulation procedures

Oil phase: Almond oil, emulsifying wax and kokum butter heated together in a beaker at 70-75° C until they melted completely and formed a clear oil phase.

Aqueous phase:

In another beaker, rose water, glycerin and preservative were heated at same temperature(70-75°C) to create uniform aqueous phase.

Emulsification process:

Once both phases were appropriately heated, the aqueous phase was gradually added to the oil phase while continuous stirring to ensure proper blending of both phases,stirring continued until a smooth cream was formed.

Addition of active ingredients:

After this green tea extract, chia seed mucilage, and vitamin E were added to the mixture with constant stirring to make sure even distribution of all active compounds.

Final product:

The manufactured cream was stored into suitable container for further use. [18,19,20,21]

EVALUATION

Colour and Odour: The creams light green colour and agreeable herbal fragrance shows that it was made with care and is acceptable. Results shown in table 2.

pH Assessment:

Method: We used 1 g of cream in 10 mL of distilled water with a digital pH meter. The cream's pH was 5.5 ± 0.2, which is normal for skin and safe for use.

Assessment of Viscosity:

Method: We used a Brookfield viscometer at room temperature for measuring the viscosity and the result was 13,800±250cP. Observation shown in table 2.

Spreadability Evaluation:

Method: We took 0.5 g sample of cream and spread it between two slides with a 50-gram weight and the time it took to separate was recorded.Observation shown in table 2. [22]

FORMULA - Spreadability= $\frac{\text{Weight tide to upper slide (W) x Length of glass slide}}{\text{Time taken to separate slide}}$

Result: Spreadability = 17.5 ± 0.6 g·cm/sec

Table 2 Results of Herbal cream

SR.NO	PARAMETERS	RESULTS
1	Colour	Light green
2	Odour	Herbal
3	pH	5.5
4	Viscosity	13,800
5	Spreadability	17.5
6	Washability	Easy washable
7	State	Semi solid
8	Consistency	Smooth
9	After feel	Emollient
10	Antioxidant activity	62.5
11	Irritancy test	Non-irritant

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Irritancy Test:
Method: We applied a small amount of cream to the forearm and observed it for 24 hours if any redness itching or swelling found. Observation shown in table 2.
Result: No sign of redness, itching or swelling was found. The cream is safe for skin use. [23]
Washability: The cream formula was applied on the skin and then the ease of washing with water was checked. It was easily washable.Results shown in table 2.
State: The cream was in semi solid form after we examined the state visually. Observation shown in table 2.
Consistency-The formulation wasexamined by rubbing cream on hand manually. The smoothness of cream was consistent.Observation shown in table 2.
After Feel: The amount of residue left after the application of the fixed amount of the cream was found to be emollient and good. Observation shown in table 2. Result shown in table 2.

Antioxidant activity test:
Hydrogen peroxide scavenging assay
We use the hydrogen peroxide scavenging method for the evaluation of formulated cream.
Stock solution: 1 g cream is dissolved in 10ml of phosphate buffer(PH 7.4). In the same buffer a fresh 10mM (H_2O_2) solution was also prepared.
For test:1ml of stock solution was mixed with 2 ml ofH_2O_2 solution and let it sit at 37°C for 10 minutes. After incubation, the dilution was transferred into a clean cuvette and UV-visible spectrophotometer was used to measure absorbance at 230 nm. Here, phosphate buffer is used as the blank, while the H202 solution without the cream served as the control. The antioxidant activity was then calculated in terms of percentage inhibition using standard formula. [24,25]

$$\frac{A_{control} - B_{sample}}{A_{control}} \times 100$$

Formula- % Scavenging=$A_{control}$

Where:
A(control) = absorbance of H_2O_2 solution without sample
A(sample) = absorbance of H_2O_2 solution with cream extract
Result: The sample showed a moderate scavenging activity with % inhibition of 62.5+- 1.5%

III. RESULT

After the study ,the herbal cream appeared pail green along with herbal soothing aroma, indicating good incorporation of the natural ingredients. The texture was smooth and creamy. The formulation was well blended no lumps were found, showing proper emulsion formation.The cream was skin friendly and with no signs of redness itching or any kind of irritation which was observed during the safety evaluation. It easily spreads and can be washed with no hassle which makes it suitable for dermal application.Evaluation of antioxidant potential shows that the cream has moderate free absolute scavenging ability. Which indicates that the combination of green tea extract and chia seed mucilage comes up with protective and anti-aging effects on the skin.

IV. DISCUSSION

In in the study the colour smell and smooth texture suggest an evenly mix of herbal ingredients like green tea extract and rose water. The moderate thickness and spread ability indicate that the cream can be applied easily along with staying stable. And after using there is no irritation which confirms that the formulation is safe and good for use on the skin.

The modest antioxidant activity shown in the analysis indicates that green tea polyphenol and chia mucilage helps in nutrilizing free radicals and offering protective and anti-aging benefits. In general d formulation provides a safe, effective and multi benefits herbal cream.

V. CONCLUSION

The study shows that the herbal cream made with green tea extract, chia seed mucilage, almond oil, rose water and kokum butter is good for the skin and safe for dermal use. It has almost no antioxidant activity and good physical properties, which makes it a useful herbal skin care product for daily use.

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