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Formulation and Evaluation of Antioxidant Cream using Turmeric Leaves Extract

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ABSTRACT: This study explores the formulation and evaluation of a topical antioxidant cream incorporating turmeric (*Curcuma longa*) leaf extract. Turmeric leaves are known to contain bioactive compounds such as curcuminoids, flavonoids, and phenolic acids, which possess strong antioxidant properties. The extract was obtained using ethanol-based solvent extraction, and its antioxidant activity was assessed via DPPH radical scavenging assay. The extract was then incorporated into an oil-in-water emulsion cream base at varying concentrations. The resulting formulations were evaluated for physicochemical properties, including pH, viscosity, spreadability, and stability under different storage conditions. Preliminary results demonstrated that the cream containing turmeric leaf extract maintained desirable consistency and stability while exhibiting significant antioxidant activity, suggesting potential in preventing oxidative damage in skin cells. This natural, plant-based antioxidant cream presents a promising alternative in the development of herbal skincare products aimed at combating skin aging and environmental stress.

KEYWORDS: Turmeric leaves, stearic acid, cetyl alcohol, methyl paraben, glycerin

I. INTRODUCTION

In the pursuit of natural skincare solutions, antioxidants have emerged as essential components in protecting the skin against environmental damage, premature aging, and oxidative stress. Among various botanicals, turmeric (*Curcuma longa*) leaves—often overshadowed by the well-known rhizome—are gaining recognition for their potent antioxidant properties.

Turmeric leaves are rich in polyphenols, flavonoids, and curcuminoids, compounds known for their ability to neutralize free radicals and enhance skin vitality. Harnessing these bioactive compounds, we have developed an antioxidant cream formulated with turmeric leaf extract, designed to nourish, protect, and revitalize the skin naturally.

This innovative cream not only helps defend the skin against oxidative damage caused by pollution and UV exposure but also promotes a brighter, more even complexion. With regular use, it supports skin barrier function, reduces signs of aging, and restores a healthy glow—all while remaining gentle and suitable for various skin types.

By combining the wisdom of traditional plant-based remedies with modern dermatological science, this antioxidant cream offers a safe, effective, and eco-conscious choice for holistic skincare.



Curcuma Longa L. (Zingiberaceae), commonly called turmeric, is an herbaceous plant and cultivated in many Asian countries including India and China

Traditionally, turmeric has been used as a medicinal plant with its various biological activities such as strengthening energy, antioxidant, antibacterial, anti-inflammatory, anticancer, and wound healing

These functional properties result from curcuminoids, the major components of turmeric, including dimethoxy curcumin, bisdemethoxycurcumin & curcumin

Curcumin, a well-known yellow pigment, is a potential substance that may control oxidative stress-induced cellular damage owing to its radical scavenging activity

Similarly, turmeric leaves are an ingredient added to various dishes in South-East Asia, as they are believed to have antioxidant properties

However, turmeric leaves are mostly wasted as byproducts, except for animal feeds after harvesting.

Turmeric leaf extract has shown antioxidant activity, which may help protect against oxidative stress and cell damage

According to the research paper, turmeric leaves also contain bioactive compounds, such as curcumin, several phenolic compounds, and flavonoids. These compounds have been known to act as an antioxidant owing to its effective radical-scavenging activity

ANTIOXIDANTS:

Antioxidant is defined as a substance that protects cells from the damage caused by free radicals (unstable molecule made by the process of oxidation during normal metabolism).

Antioxidant is a molecule capable of inhibiting the oxidation of other molecules.

Oxidation reactions can form free radicals and these start chain reactions that damage cells. Antioxidant terminate the chain reactions by removing free radical intermediates and inhibit other oxidation reactions. Antioxidant is a synthetic or natural substance that prevent or delay deterioration of a product or can counteract the damaging effects of oxidation in animal tissues.

BENEFITS OF ANTIOXIDANTS

- Improving hydration.
- Stimulating the production of collagen and elastin.
- Reducing the appearance of wrinkles and pigmentation.
- Supporting healing processes.
- Reducing inflammation.
- Softening

II. RELATED WORK

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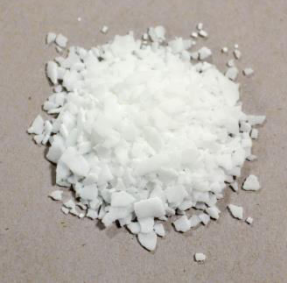
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III. METHODOLOGY

Material

images	Herb name	Benefits
	Turmeric Plant	Skin care Anti-inflammatory, Pain relief ,digestive health
	Bees Wax	Anti bacteriall Anti inflammatory Moisturing Use in cosmetics
	Polyethylen eglycol	It's humectants, Retain moisture, Emollient
	Glycerine	Soften the skin, Hydration and moisture retention

	Mineral oil	Softening , Protecting the skin barrier
	Stearic acid	Improve product texture ,cleansing property

Prepare the turmeric leaves extract :

1. Collection : Collect fresh turmeric leaves in farm.
2. Cleaning : Remove dirt, insects and any debris from leaves . this clean with water and allowing them to dry naturally.
3. Drying : Using dried in sunlight
4. The turmeric leaves were own in April and fresh turmeric leaves were harvested in November They were washed three times to eliminate impurities, and hot-air dried at 50°C for 24h .Then , the leaf powder was extracted with Ethanol at 85°C for 150 min with 1:25 extraction ratio as an optimal extraction condition. After filtration of the turmeric leaf extract (TLE) with 0.22µm PVDF filter, the leaf extract was diluted with distilled water at 10 mg/mL and stored at 20 °C until use.

B. phytochemical screening :

TESTFOR ALKALOID:

Mayer’s reagent: -Add 2-3 ml of filtrate e, few drops of Mayer’s reagent along sides of the test tube. Formation of white or creamy precipitate indicates the presence of alkaloids.

Wagner’s reagent:-Add 1-2ml of filtrate , few drops of Wagner’s reagent in a test Tube .Formation of reddish-brown precipitate indicates the presence of alkaloids.

TESTFOR CARBOHYDRATES:

Molisch test:- The filtrate was treated with 2–3 drops of 1% alcoholic alpha naphtholand add 2ml of concentrated Sulphuric acid along sides of the test tube .Formation of red o purple color.

TESTFOR GLYCOSIDE:


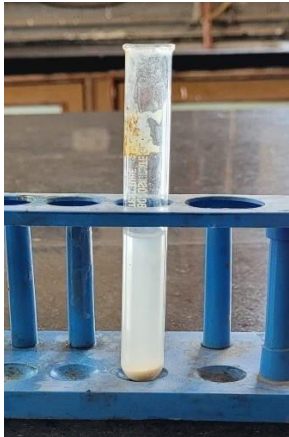
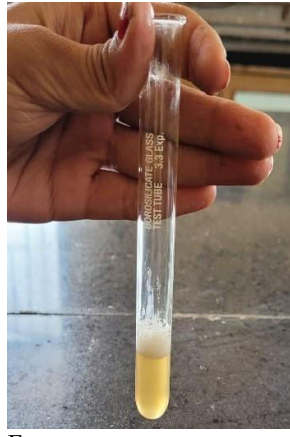

Keller- Killiani test: - To 2 ml of extract, add specific quantity of glacial acetic acid ,on edrop 5% ferric chloride and concentrated sulphuric acid. Appearance of reddish-brown color at the junction of the two liquid layers indicates the presence of cardiac glycoside.

TESTFOR FLAVANOIDS:

Shinoda’s test: -To theextract, 5 ml (95%) of ethanol will be added. The mixture then treated with few fragments of magnesium turning, followed by drop wise addition of concentrated hydrochloric acid. Formation of pink color indicates the presence of flavonoids

TEST FOR FIXED OIL:Spot test: - Press a small quantity of the extract between two filter papers. Appearance of oil stain on paper indicates the presence of fixed oils.

TEST FOR SAPONIN: Foam test: - The extract diluted with distilled water and shaken in graduated cylinder for 15 minutes. The formation of layer of foam indicates the presence of saponins.

			
<p>Flavonoids test:- Yellow color became colorless</p>	<p>Lead acetate test:- White ppt</p>	<p>Foam test :- Formation of foam layer</p>	<p>Wagner's test:- Reddish brown ppt</p>

C. Preparation of cream:

Firstly prepared the oil phase side by side water phase.
Then oil phase adds in the water phase , Continuously stirring
Cool the cream and fill in the container.

Ingredients	Amount
Extract of turmeric leaves	2.5 ml
Methyl paraben	2.5 gm
Bees wax	2 gm
Polyethylene glycol	0.5ml
Glycerin	2ml
Mineral oil	2ml
Steari cacid	1.5gm
Cetyl alcohol	1.5 gm
Distilled waterq.s.	8 ml

IV. EXPERIMENTAL RESULTS



Evaluation test :

Parameter	Observation
PH	6.4
Homogeneity	Homogenous
Appearance	White color semisolid cream
Odor	Mildlyaromatic
Spreadability	Good (15g.cm/s)
After feel	Emollient and slipperiness
Removal	Easily removed with water
Stability	Stable throughout the study
Irritancy	No Irritation
Viscosity	10568cp at12 RPM

V. CONCLUSION

The study accomplishes that due to the impressive antioxidant activity, the topical application of the formulated cream from turmeric leaves extract will help in overcoming oxidative damage and can be considered as another source in cosmetic industries. The free radical scavenging activity was studied by using stable 2,2 - Diphenyl-1-picrylhydrazyl (DPPH). The turmeric leaves extract showed impressive high radical scavenging activity, the IC50 value shows that leaves of turmeric shows good antioxidant properties with 24.77µg/ml. Throughout the study focused on masking the color and aromatic odor of the cream to make it more attractive and tempting the consumer. Moreover, the formulation

of the cream can also be focused to increase the potency of the antioxidant activity, which will create more importance in the future cosmetic product development.

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