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SIGNIFICANCE OF DRAGON FRUIT PEEL EXTRACT AS ACTIVE CONSTITUENT IN ANTI- AGING CREAM – A REVIEW

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ABSTRACT

Dragon fruit (Hylocereus undatus) is a tropical fruit belonging to the Cactaceae family. It is widely recognized for its attractive appearance, nutritional value, benefits vibrant pink or red outer skin with white or red pulp containing numerous small black seeds fibre, and antioxidants, which contribute to its nutritional importance. Dragon fruit has potential role in promoting human health, while its dietary fibre supports digestive health. The fruit is also cultivated commercially because of its adaptability to different climatic conditions and its growing demand in the market. However, proper water management and suitable cultivation practices production. This study aims to review the nutritional value, health benefits, and medicinal importance of dragon fruit and highlight its potential applications in promoting human health.

KEYWORDS: Dragon Fruit, Nutritional Value, Health Benefits, Antioxidants, Medicinal Importance.

INTRODUCTION

The fruit native American cactus species is also called dragon Polyrhizus Hylocereus and two types of the so-called dragon fruits, Hylocereus undatus, are members of the Cactaceae family and more popular worldwide. growing spines.to a weight of one kilogram. The edible flesh of dragon fruits may be white, while the skin may be yellowish to dark red, type. Its large number of edible black tiny seeds. contains the majority of the abundant in dragon fruit. Phytoalbumins which are antioxidant qualities. It aids in the body's defense against free radicals. Additionally, it aids in reduce the number of free radicals, which will slow down the aging process.



Fig. 1: Dragon Fruits.

The skin appears tight, youthful, and flexible as a result. High concentrations of vitamins C, B1, B2, and B3 can be found in dragon fruit. It also contains a vital mineral. such as calcium, phosphorus, and iron. as a healthy amount of fiber, protein, and niacin. Finally, but Eighty percent of it is water. Therefore, it's easy to refer to it as a "super fruit" that improves nutrition and treats physical illnesses. Additionally, essential part of your everyday beauty routine. fight bad cholesterol and contain unsaturated fat.

The largest organ in the human body, the skin is crucial to the body's defense.

Against UV light, microbes, and environmental contaminants. Constant exposure to Oxidative stress, pollution, and sunlight can harm skin cells and hasten the aging process.

Wrinkles, fine lines, dryness, and uneven skin are common skin issues linked to aging.

tone. Cosmetic masks are popular skincare items that enhance the state and look of the skin. Peeling off masks are especially well-liked among these since they create a thin layer over the skin that is simple to remove once it has dried.

This film's removal aids in the removal of dead skin cells excess oil and contaminants from pores.

The use of natural ingredients in cosmetic formulations is growing because They are safe, biodegradable, and full of advantageous phytochemicals. Two examples are match green tea and dragon fruit.

components with a high level of antioxidant activity the state of the environment right now worries us about the future effects, when the environment is not clean, mosquitoes and flies will proliferate quickly, and the most Its effects on human health are chronic. By making use of the attainment of balance and harmony among people and surroundings in addition to the understanding of Indonesian as environmental people with behaviours and attitudes to safeguard the environment. Given the environmental complex in the future, and its accumulation, the author brings up one of the environmental wastes, using leftover dragon fruit peel as a natural food coloringThe fruits' unique red hue and flavour are extremely delicious and sweet, particularly when we eat them in the These details about dragon fruit make them extremely appealing. Although dragon fruit plants are sharp and prickly, the Colo released from flowers to the fruit, making them extremely intriguing.

One of the unusual plants that is quite widely accepted worldwide, particularly in Southeast Asia. Even so, this plant, which is highly well-known in Southeast Asia, actually originated from South America's Mexico. In Indonesia right now, dragon Fruit is grown, and the products are shipped overseas, and dragon fruit lately because numerous advantages.

AIM AND OBJECTIVE

Aim

Significance of Dragon Fruit Peel Extract as active constituent in Anti-aging Cream.

Objective

1) To review component peel of dragon fruit.
2) To study extract's potential as an antioxidant.
3) To study appropriate techniques for removing the peel's bioactive components.
4) To study which excipients are suitable for making a topical cream that contains the extract.
5) To study the methods of formulation employed in the creation of herbal creams.
6) To go over the prepared cream's physicochemical evaluation parameters.
7) To review the data on antioxidant activity and possible anti-aging
8) To study the stability, safety, and research needs in order to create an appropriate cosmetic formulation.

Advantages and Limitation

Potential advantages

1. Investigates a plant derived cosmetics ingredient.
2. Explores the possible value of fruit processing waste.
3. provides a basis for studying antioxidant rich botanical extracts.
4. Supports further research into herbal topical formulation.

Limitations

Phytochemical composition may vary between batches.

1. Pigments and other active constituents may degrade during processing or storage.
2. Extract compatibility with the cream base must be established.
3. Antioxidant activity in a laboratory assay does not prove clinical anti-aging efficacy.
4. Safety, microbial quality and stability require experimental verification.

Feature	Dragon Fruit [Pitaya]
Common Name	Dragon fruit
Scientific name	Selenicereus undatus
Synonym	Hylocereus undatus
Biological Source	Fruit of Selenicereus undatus
Family	Cactaceae
Plant Type	Perennial, Climbing, epiphytic vine cactus
Native Region	Central and south America
Genus	Selenicereus
Species	Undatus
Key Health Focus	Skin health and antioxidant protection
Part used in the present study	Fruit peel
Major phythochemicals	Phenolic componuds, flavonoids and betalain pigments
Important property	Potential antioxidant activity
Pharmaceutical application	Formulation of anti- aging cream using dragon fruits peel extract
Study Topic	Formulation of anti- aging cream

Plant profile



Fig. 2: Plant Profile-*Dragon Fruit.*

Phytochemical constituents

The red peel of fruit is bioactive compounds like betalains, phenolic compounds, flavonoids and other phytochemicals. These constituents are of interest in cosmetic formulations due to their potential antioxidant properties.

Benefits of drgon fruits

Sr.no	Phytochemical constituents	Examples	Potential relevance in cream formulation
1	Betalains	Phyllocactin, betanin and betacyanins	Contribute to antioxidant activity and produce red pigmentation
2	Flavonoids	Rutin, kaempferol and quercetin	May increase antioxidant activity and aid in preventing oxidative damage
3	Acids with phenols	Ferulic acid, gallic acid, caffeic acid and chlorogenic acid	May increase the activity of antioxidants
4	Additional phenolic substances	Vanillic acid, ellagic acid, syringic acid and protocatechuic acid	May enhance the extracts biological activity
5	The betaxanthins	Indicaxanthin and associated pigments	Contribute to pigment profile of betalain
6	Polysaccharides	Polysaccharides pectin and additional polysaccharides	May enhance the functional qualities of ingredients derived from peels



Fig. 3: Benefits of *Dragon Fruit.*

Mode of Action

dragon fruit (Selenicereus spp.). These substances might support antioxidant and other biological processes. Their potential use in skincare is primarily linked to lowering oxidative stress, one of the causes of aging skin. However, more research is needed to determine the exact mechanism of in a final anti-aging cream.

1. Antioxidant Activity

The antioxidant activity is attributed to a number of including flavonoids, and betalain pigments. Antioxidants lessen oxidative reactions and counteract free radicals. Excessive oxidative stress is linked to skin aging and can harm cellular components. Using laboratory techniques like radical-scavenging assays, studies have in dragon fruit peel extracts. Therefore, research into dragon fruit peel extract in skincare formulas based on antioxidants may be worthwhile. However, more formulation and skin-safety research are needed to determine how effective an anti-aging cream. Flavonoids and betalains scavenge reactive oxygen species (ROS) and reactive nitrogen species (RNS), shielding DNA from oxidativedamage, lipids and and reactive nitrogen species (RNS), shielding DNA from oxidative damage, lipids and proteins.

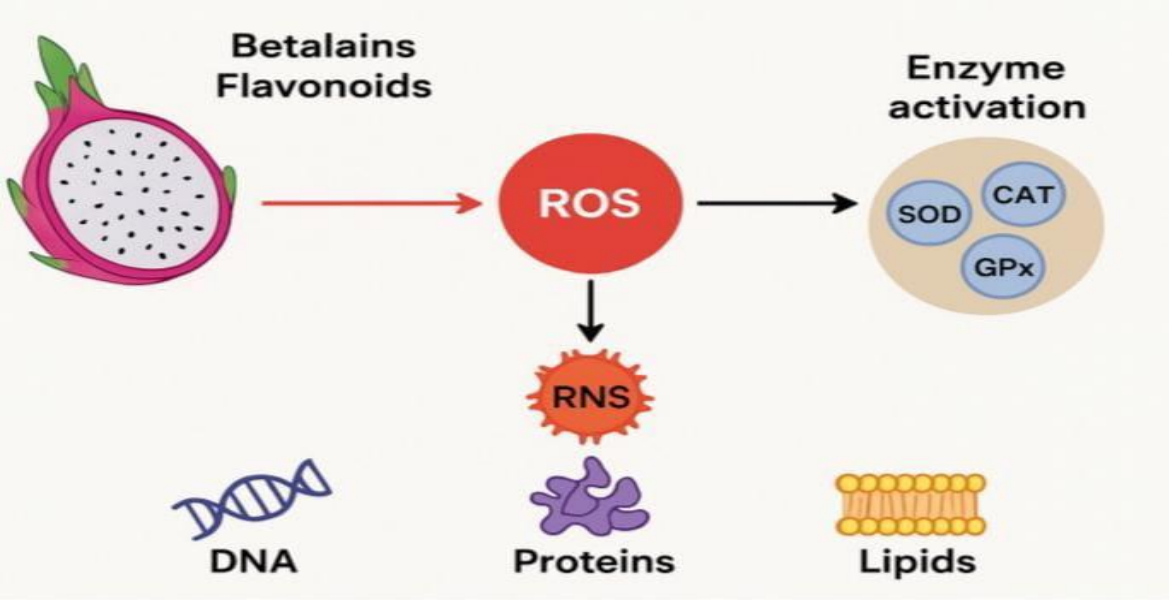


Fig. 4: Antioxidant Mechanism of Against Oxidative Stress.

2. Collagen protection

The dermis contains structural proteins like collagen and elastin. Elastin adds to the elasticity of the skin, while collagen gives it strength. UV radiation increases the production of reactive oxygen species (ROS) and triggers signalling pathways, such as activator protein-1 (AP-1), during photoaging. Matrix metalloproteinases (MMPs), especially MMP-1, which aids in the degradation of collagen, may rise as a result.

Important structural proteins found in the skin's dermis are collagen and elastin. While elastin aids in preserving the elasticity and flexibility of skin, collagen offers strength and structural support. Reactive oxygen species (ROS), which can activate matrix metalloproteinases (MMPs), are produced in greater amounts when skin ages due to ultraviolet (UV) radiation. Collagen and broken down by these enzymes. Wrinkles, decreased elasticity, and sagging skin are caused by increased deterioration of these structural elements.

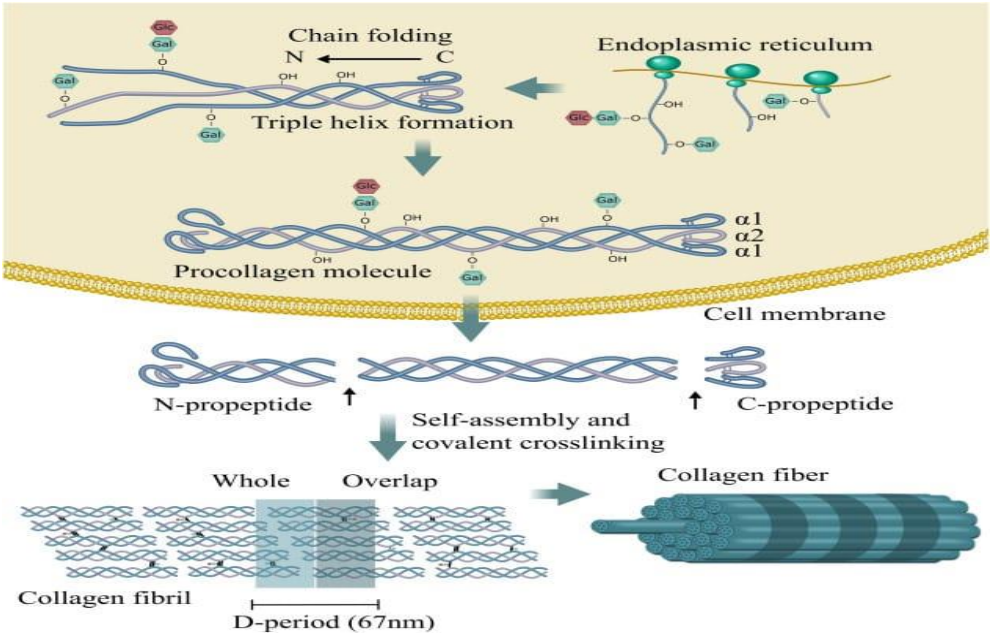


Fig 5: Collagen Synthesis and Formation of Collagen Fibres in the Skin.

3. Reduction of Wrinkles

Wrinkles develop through several processes, including collagen degradation, changes in elastin, reduced skin elasticity and dehydration. Oxidative stress is one of the factors contributing to these changes. Visible indicators of aging skin include wrinkles and fine lines, which are linked to alterations in the extracellular matrix, collagen, elastin, and skin hydration. By accelerating the breakdown of structural proteins in the skin, oxidative stress and ultraviolet (UV) radiation can hasten these changes. By boosting hydration and smoothing the skin's surface, moisturizing creams may momentarily reduce the visibility of fine lines brought on by dryness.



Fig. 6: Mechanism of wrinkle reduction by anti-aging cream.

4. Skin hydration

Epidermis, the stratum corneum, is crucial for preserving and holding onto moisture. Dryness and roughness can be caused by an increase in trans epidermal water loss (TEWL) due to changes in skin lipids and barrier function.

The water content of the stratum corneum, the skin's outermost layer, is referred to as skin hydration. Sufficient hydration contributes to the preservation of a healthy skin barrier, softness, and flexibility. The skin may become dry, rough, and less flexible when it loses too much water due to trans epidermal water loss (TEWL). Three primary mechanisms are used by moisturizing creams to improve skin hydration: occlusive agents prevent water loss, emollients soften the skin, and humectants draw in water.

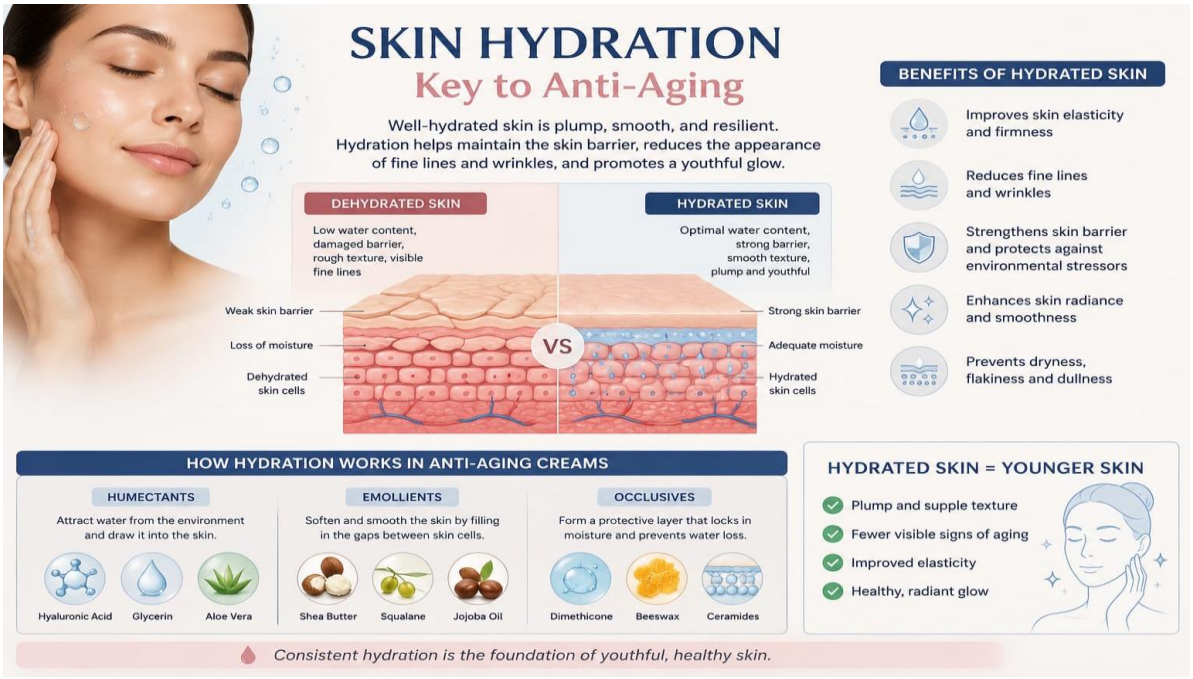


Fig. 7: Role of skin hydration in anti-aging and maintenance of healthy skin.

5. Protection Against Environmental

Environmental contaminants and ultraviolet light can encourage the production of ROS in the skin. Overproduction of ROS can trigger inflammatory signalling pathways and oxidatively alter proteins, lipids, and DNA. These alterations lead to photoaging and extracellular matrix degradation. Reactive oxygen species (ROS) production in the skin can be accelerated by environmental factors like air pollution. Overproduction of ROS oxidative stress, harm cellular components, collagen degradation, uneven skin tone, dryness, fine lines, and early aging of the skin. Some of these free radicals may be neutralized by topical antioxidants, which could lessen oxidative stress.

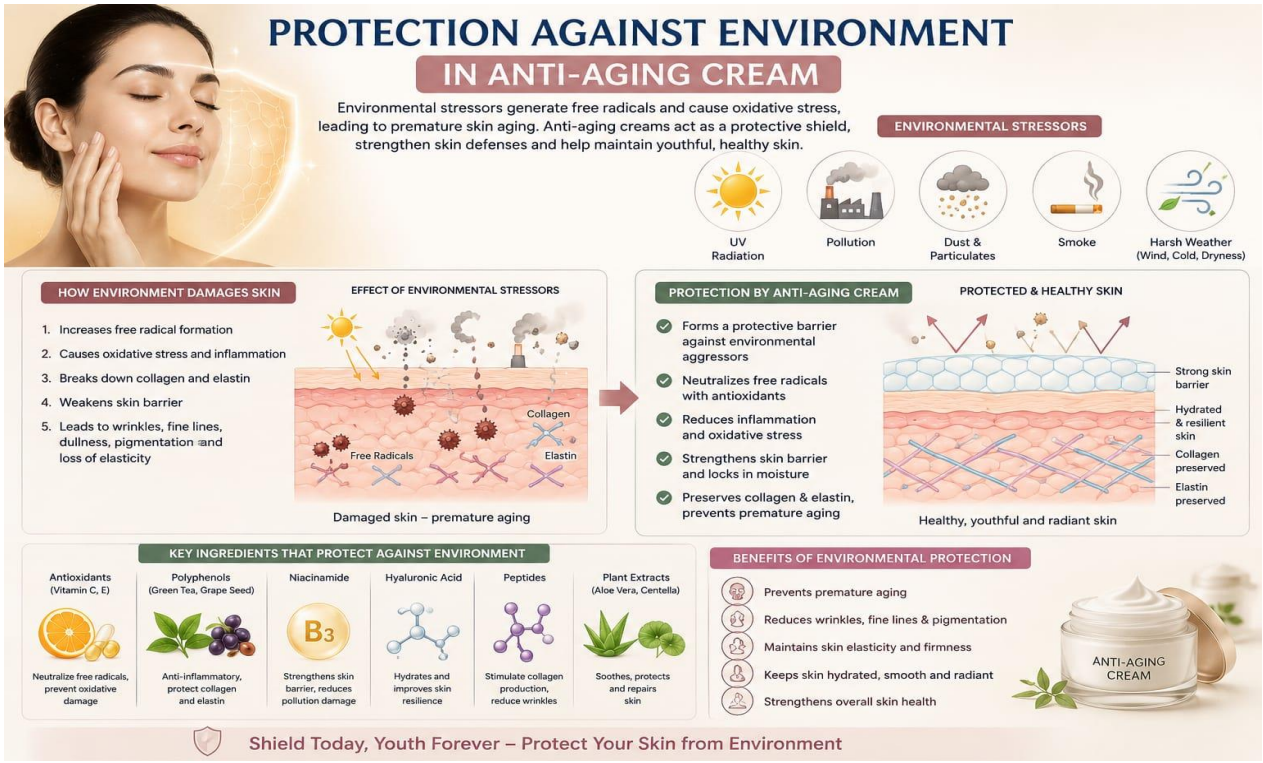


Fig. 8: Protective role of anti- aging cream against environmental stressors and oxidative skin damage.

Future Scope

1. Creation of Herbal Cosmetics: Dragon fruit a natural component that could be used herbal anti-aging cream.
2. Antioxidant Activity: More research can be done to assess dragon fruit peel extract's linked to aging skin.
3. Formulation Optimization: To find an appropriate cream formulation, various dragon fruit peel extract concentrations can be investigated.
4. Stability Studies: To ascertain the prepared cream's shelf life and ideal storage conditions, long-term stability studies can be carried out.
5. Skin Hydration: The moisturizing qualities and effects of the cream on skin hydration can be further studied.
6. Safety Evaluation: Studies on skin compatibility and irritation can be carried out with suitable, proven techniques.
7. Advanced Anti-aging Studies: To determine its anti-aging potential, more research can assess effects on wrinkle-related changes, skin elasticity, and collagen degradation.
8. Waste Utilization: Dragon fruit peel, which is frequently thrown away, can be used as a raw material with added value for the creation of sustainable cosmetic products.
9. Commercial Development: The formulation may be developed further into commercial herbal cosmetic products once its safety, stability, and effectiveness have been established

CONCLUSION

The peel of dragon fruit may contain bioactive substances, such as flavonoids, betalain pigments, and phenolic antioxidant qualities. Dragon fruit peel extract may be regarded as a promising natural ingredient for the creation of anti-aging cream formulations based on the literature that is currently available. Its antioxidant potential offers a scientific use in skincare products intended to shield environmental factors. dragon fruit peel in cosmetic formulations may be advantageous for both the sustainable use of fruit-processing plant-based skincare products. required to

enhance the formulation skin compatibility, and potential anti-aging effects. Appropriate safety and its effectiveness for cosmetic applications. In conclusion, dragon fruit peel extract is an into natural anti-aging cosmetics. Its potential benefits and the possibility of sustainable waste utilization highlight the importance of further scientific research to develop safe, stable, and effective anti-aging cream formulations.

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