Preparation and Evaluation of Pistachio Shell Cream

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Abstract - Pistachio shells, often considered waste, possess beneficial bioactive compounds such as polyphenols, flavonoids, tannins, and fatty acids, making them a valuable ingredient for skincare formulations. This study focuses on the preparation and evaluation of a pistachio shell-based cream, utilizing its exfoliating, antioxidant, and moisturizing properties. The formulation includes natural ingredients like aloe vera gel, coconut oil, beeswax, glycerine, and vitamin E to enhance skin hydration and protection. The prepared cream exhibited a smooth texture, good spread ability, and a skin-friendly pH of 6.2. Evaluation parameters confirmed its stability, washability, and non-irritating nature, with no microbial contamination observed. These findings suggest that pistachio shell powder can be effectively incorporated into cosmetic formulations as a natural exfoliant and skin-nourishing agent. Future studies could explore its long-term effects and potential commercial applications.

Index Terms—Antioxidant, Exfoliation, Pistachio Shell, Skincare Formulation, Stability.

INTRODUCTION

Nuts have been regular diet components since long as they have excellent functional and nutritional properties. out of these nuts pistachio (pistachio Vera L) is one of the most populare as a "green gold".[1] The Fruit is semi dry drape which comprises of single edible seed called 'kernel' which is encased by a thin & soft coat called as a 'Testa'. This structure is enclosed by a lignified shell called as a 'endocarp'. In addition, the whole structure is covered by 'mesocarp' (woody shell) and 'epicarp' (hull) [2] [3]

Pistachios have a high oil content (50 to 62%) comprised of healthy fatty acid profile. Lipids in the raw nut consist of 53% monosaturated, 33% polysaturated, & 13% saturated fatty acids. The fatty acid consists of oleic acid (51 to 81%), Linoleic acid (8 - 31%) & palmitic acid (7 - 15%). It is also a considerable source of the protein which ranges between the (19 - 31). Apart from protein, pistachios are rich in the dietary fibres which are beneficial for the gut microbiota. Moreover, the pistachio Hull have a higher antioxidant property then it's the skin & kernel. It has the major properties of the minerals like a Calcium, Magnesium, Zinc, Iron, Phosphorus, Potassium and Vitamins such as Vitamin E, Vitamin A, Vitamin C and Vitamin B (3,4,5)

The main phenolic components in the pistachio nuts are the anthocyanins, flavan-3-ols, proanthocyanidins, flavonols, flavonoids, tocopherols, carotenoids, chlorophylls, isoflavones, flavonones, stilbenes and the phenolic acid. All those compounds are not only known for their high antioxidant activity but also associated with chemo preventive cardioprotective and Vaso protective capacities. [6] Pistachio shells are made up of the lignocellulosic fibre, cellulose and triglycerides. They have an excellent mechanical property and have thermal stability. They contain no trace inorganic compound. shells are used as a natural exfoliant and the renew the skin. If use regularly as

a part of a skin care routine, it helps remove the dead skin cell, dirt and impurity, thus leaving the skin refreshed and revitalised. The powdered shells are very useful as facial scrub, body scrub and lip scrub. It is suitable for the most skin type.[7] The shells are used as an absorbent and also as an economical as well as the environmental options.[8]

Pistachio shell is a natural skin care product which can be used in the powder form to the gently exfoliate and renew the skin. If it is used regularly on all the types of the skin, it removes the dead skin cells, dirt and the impurities thus making the skin refreshed and revitalised. This is study aim at the preparation and evaluation of pistachio shell cream as a skincare product.

Table 1: Drug profile and Ingredients

Sr. No.	Ingredient	Active Constituents	Properties
1	Pistachio Shell Powder *(Pistacia vera)*	Polyphenols, flavonoids, tannins, fatty acids, vitamin E	Anti-inflammatory, antioxidant, exfoliating, moisturizing
2	Aloe Vera Gel *(Aloe barbadensis miller)*	Polysaccharides, vitamins (A, C, E), enzymes	Hydrating, anti-inflammatory, soothing, wound healing
3	Coconut *(Cocos nucifera)*	Fatty acids (lauric acid, oleic acid), vitamin E	Emollient, nourishing, anti-microbial, anti aging
4	Beeswax	Fatty acids, esters, hydrocarbons	Emulsifying agent, humectant, skin protective barrier
5	Emulsifying Wax	Fatty alcohols, esters	Surfactant, stabilizer
6	Glycerine	Humectant, sugar alcohol	Hydrating, skin softening, improves absorption
7	Stearic Acid	Saturated fatty acid	Thickener, emollient, stabilizer
8	Vitamin E (Tocopherol)	Alpha tocopherol	Antioxidant, anti-aging, skin protective
9	Essential Oil (Optional)	Volatile oils, terpenes	Antimicrobial, soothing, fragrance enhancer

Table 2: Formulation Ingredients and Their Quantities

Sr. No.	Ingredients	Quantity
1	Pistachio shell powder	5g
2	Aloe vera gel	30ml
3	Coconut oil	15ml
4	Beeswax	3g
5	Emulsifying Wax	3g
6	Glycerine	2ml
7	Stearic Acid	2g
8	Vitamin E	0.5ml
9	Essential oil (Optional)	3-4 drops
10	Methyl Paraben	0.3ml
11	Distilled water	q.s to 100 ml

METHOD OF PREPARATION

Oil Phase Preparation: Combine beeswax, emulsifying wax, carrier oil, and stearic acid in a heat-resistant beaker. Heat to 70°C while stirring until fully melted and homogeneous.

Water Phase Preparation: In a separate beaker, mix aloe vera gel, glycerine, and distilled water. Heat to 70°C, ensuring uniformity. Slowly add the heated water phase to the oil phase while stirring continuously. Use an overhead or magnetic stirrer for 10–15 minutes to achieve a stable emulsion.

Cooling and Final Additions: Allow the mixture to cool to 40°C while stirring. Add pistachio shell powder, vitamin E, and optional essential oil. Mix thoroughly.

Preservation and Storage: Incorporate methyl paraben as a preservative and stir well. Transfer the cream into airtight containers and store in a cool, dry place.

Fig.(a) Pistachio shells

Fig.(b) Pistachio shells powder

Fig.(c) Pistachio shells Face cream

Evaluation Parameters

Table 3: Evaluation and Observation

Evaluation Parameter	Results & Observations
1.Organoleptic Test	
Appearance	Smooth, creamy texture with uniform consistency
Odour	Mild, pleasant scent; no rancidity detected
Colour	Creamy light brown
2.Physical test	
pH Measurement	6.2 (within the skin-friendly range of 5.5–7.0)
Spread ability test	5.8 cm (good spreadability)
Viscosity	14,000 cP (indicates ideal cream consistency)
3. Skin Compatibility & Irritation test	
Washability	Easily washable with water,leaving no residue
Grittiness	No gritty particles detected smooth application
Absorption Test	Absorbed within 2 minutes without greasy feel
Irritation Test	No redness, itching, or irritation observed
4. Thermal Stability	No phase separation or consistency changes
5. Microbial Test	No microbial growth detected

DISCUSSION

The study aimed to develop a natural skincare product utilizing pistachio shell powder, leveraging its bioactive components for skin health benefits. The positive outcomes in organoleptic and physical evaluations suggest that pistachio shell powder can be effectively incorporated into topical formulations. The absence of skin irritation and microbial contamination further supports its potential as a safe cosmetic ingredient. Future research could explore the long-term effects of regular use and compare its efficacy with existing commercial products.

CONCLUSION

The formulated pistachio shell cream demonstrated promising characteristics as a skincare product. The incorporation of pistachio shell powder, rich in polyphenols, flavonoids, tannins, fatty acids, and vitamin E, contributed to the cream's antioxidant, anti-inflammatory, and exfoliating properties. The cream exhibited a smooth, creamy texture with a mild, pleasant scent and a skin-friendly pH of 6.2. It showed good spread ability, ideal viscosity, and was easily washable without leaving residue. Importantly, no skin irritation or microbial growth was observed, indicating its safety and stability for topical application.

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