PRODUCTION AND DOWNSTREAM PROCESSING OF COLLAGEN FROM SHRIMP SHELL WASTE AS A RAW MATERIAL FOR "CACA" ANTI-AGING CREAM TO SUPPORT THE HALAL AND COSMETIC INDUSTRY IN INDONESIA

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Background: Anti-aging cream is a cosmetic product designed to effectively reduce the appearance of fine and coarse lines, minimize wrinkles, and significantly improve skin moisture, resulting in a younger and glowing complexion. The main advantage of this product lies in its active ingredient—natural collagen extracted from shrimp shell waste. This collagen is natural and safe, particularly from the halal perspective. Collagen is a key structural protein in the human body that contributes to skin integrity and connective tissue strength. One of its most recognized benefits is maintaining the structural resilience and tensile strength of the skin.
Method: The formulation of the "CACA" anti-aging cream was carried out by preparing two phases. Oil phase: Stearic acid, cetyl alcohol, Span 80, and propyl paraben were melted sequentially in a porcelain dish on a water bath at 70°C with continuous stirring until homogeneous. Aqueous phase: Water was heated to 70°C, methyl paraben was added and stirred until dissolved, followed by glycerin, Tween 80, and triethanolamine (TEA), and stirred until homogeneous. The oil phase was then gradually added to the aqueous phase in a heated mortar and triturated until the temperature reached 25°C, forming a cream mass. The collagen extract and olive oil were added, followed by further trituration until homogeneous. The final product was an oil-in-water (O/W) cream formulated with collagen concentrations of 10% and 15%. The cream was evaluated for its physical quality, including organoleptic properties, homogeneity, spreadability, adhesion, and pH.
Results and Discussion: Spreadability test: The ideal spreadability for topical preparations is 5–7 cm. The spreadability test evaluates the ability of the cream to spread over the skin surface, which is crucial for uniform active ingredient distribution. The results showed that formulations F1, F2, and the base had diameters of 4.2 ± 0.30 cm, 4.1 ± 0.50 cm, and 4.5 ± 0.20 cm, respectively, indicating acceptable spreadability. Adhesion test: This test determines how well the cream adheres to the skin. Longer adhesion time indicates stronger interaction between the formulation and the skin. The average adhesion times were 158 ± 13 s (F1), 187 ± 60 s (F2), and 101 ± 24 s (base), all exceeding the minimum requirement (>4 s), thus meeting the standards for good adhesion. Sun Protection Factor (SPF): The SPF values of F1 and F2 were 1.07 ± 0.11 and 4.48 ± 0.16, respectively. Statistical analysis indicated significant differences between formulations. F1 provided weak protection, while F2 offered moderate protection. These findings suggest that collagen extract from shrimp shells contributes to enhanced sun protection efficacy and supports its use as a bioactive anti-aging ingredient.
Conclusion: The collagen extracted from shrimp shell waste, formulated at concentrations of 10% and 15%, produced creams that met physical quality standards. The 15% formulation demonstrated an SPF value of 4.48, classified as moderate protection. Therefore, "CACA" cream has promising potential as a halal-certified, natural anti-aging cosmetic product with additional antibacterial activity.
Keywords: Anti-aging; antibacterial; shrimp shell; cream; SPF