

CHAPTER

1

INTRODUCTION: THE REGIMEN OF SKIN CARE FORMULAS AND TECHNOLOGICAL ADVANCES

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1.1 INTRODUCTION

The Food and Drug Administration (FDA) has defined cosmetics as “particles intended to be applied to the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance”. Generally, cosmetics are defined as products that amplify skin beauty, appearance, and cleansing intensity. Due to this, cosmetics are segmented into skin moisturizer, anti-aging product series, deodorant, shampoo, and other personal care products that are employed for appearance enhancement (Puebla-Baragan & Reid, 2021; Puglia & Santonocito, 2019).

In the cosmetic arena, cosmeceuticals are a term involving the convergence between pharmaceuticals and cosmetics, where the products are infused with biologically active ingredients to possess therapeutic benefits on human persona appearance (Aziz et al., 2019; Che Marzuki et al., 2019). Skin care products are a cosmetic segment that is enriched with specific pharmacological properties for age-reversing, acne-free, and other purposes (Aziz et al., 2019).

In the Malaysian market, consumers are seeking high-quality products, and their choices are among international premium brands such as SK-II, Lancome, L'Oréal, and others because most of them have strong knowledge of the benefits of using premium skin care and do not mind paying more (Tan, 2020). Besides the quality of biologically active ingredients used, the effectiveness of skin care products can also depend on the technology's employment. Formulated skin care products with a technological basis are expected to promote a high rate of active ingredient penetration and solve skin issues in a healthier way within a shorter timeframe (Aziz et al., 2019).

Nanotechnology is known as the most forthcoming technology of the 21st century and is scrutinized as an inventive approach in the cosmetic industry. It has been defined as an innovative science that includes the design, production, characterizations, and application of science, where the particles can be manipulated in the ranges between 10 nm and 1,000 nm (Salvioni et al., 2021).

Nano-cosmeceuticals are elucidated as a cosmetic formulation incorporated with nanotechnology as a delivery system to promote the enhancement of the performance of bioactive components. This approach enables the formation of smaller nanoparticles of skin care ingredients that can possess active components-readily absorbed onto the skin, repair damage easily, and promote better product efficiencies (Aziz et al., 2019; Salvioni et al., 2021). Liposomes, niosomes, ethosomes, phytosomes, micellar nanoparticles through nanoemulsion systems, solid lipid nanoparticles, dendrimers, and polymeric nanoparticles are the types of nanocarriers being incorporated with various active ingredients (Aziz et al., 2019; Hameed et al., 2019).

Besides, a “beauty device” a new technological trend in the skin care market that enables simple skin care routines for those with a packed schedule and busy lives while still taking care of their skin health at home for convenience (time and energy saving). From cleansing, toning, moisturizing, and rejuvenating, the devices can be used for massage, light-based, radio-frequency, micro-needling, and pore vacuum device treatments.

According to an analysis of the global home-use beauty devices market conducted by an international research firm, Prescient & Strategic Intelligence, in 2021, it was forecast that the market would grow from USD9,571.6 million in 2020 to USD89,535.1 million by 2030, for a compound annual growth rate of 25.5%. As people's incomes increase and women's socioeconomic participation grows, the demand for home beauty devices is rapidly increasing worldwide (Baek & Lee, 2020).

1.2 THE CHEMISTRY OF SKIN CARE FORMULA

The dosage of each chemical composition in skin care ingredients determines the formulation's impact on our health. Daily skin care routines usually need 15–20 ingredients, considering the use of at least five skin care products per day; hence, we are placing around 75–100 chemical substances on our skin through skin care implementation. Even though the formula of each skin care product may differ, there are seven key ingredients in a skin care formulation: Water, emulsifiers, thickeners, preservatives, fragrances, emollients, and colour (Mohiuddin et al., 2019).

Every skin care product, such as cleanser, moisturizer, creams, serum, and sunscreen, needs ultra-pure distilled water as a base ingredient. Polysorbates and potassium cetyl sulfate are widely used as emulsifiers in skin care formulas. They are added to reduce oil and water interfacial tension, to form a homogeneous and uniform texture, and as carriers to effectively absorb the active compounds onto the skin. Salicylic acid, formaldehyde, paraben, and benzyl alcohol are the water-soluble preservatives added to skin care formulas to extend shelf life and prevent microorganism growth (Mohiuddin et al., 2019).

Thickeners can be synthetic, natural, lipid-based, or mineral. They have been used in skin care formulas to increase the viscosity by absorbing water and oil. Besides, to achieve consumer appeal and demands, colouring agents or pigments are added to the formula. Organic and inorganic substances have been used as skin care