Garbage to glamour: all hail red pitaya by products for innovative and bio-sustainable age-defying beauty

ABSTRACT

With the modernization of cosmetic industries in recent times, not only the health and safety features of the active substances incorporated in their skincare are being primary concerns to the consumers, but other details regarding their origin, ethical value, processing techniques, potency, and environmental footprint are also given great attention. Consequently, the popularity of plant-derived active ingredients with appropriately assessed bioactivities are experiencing a positive shift as dermatologists are adopting multiple strategies for the innovation of the plant active based neoteric formulations. However, a major proportion of actives utilized in the preparation of cosmetic products especially the anti-aging skincare are being acquired from synthetic/animal sources which lead to multiple skin disorders and severe health complications. With the objective to derive a powerful, cost-effective, safe, and bio-sustainable anti-aging active ingredient from agricultural food waste, it is of utmost necessity to merge the food and cosmetic raw materials supply chains into a single supply chain serving both industries without subtracting to one another. Thus, for the first time, this research evaluates the potentialities of the red pitaya byproducts, the peels and seeds to act as effective active ingredients in the topical antiaging nano-formulation. The efficacy assessments revealed that nanoemulsion containing red pitaya peel extract and seed oil visibly reduced the appearance of wrinkles by -5.9% while simultaneously improving the skin texture and energy to stimulate rejuvenation of the aging skin upon 4 weeks of application. Furthermore, the skin moisture content increased substantially which indicates a good hydration provided by the formulation. This is a pre-eminent criterion for anti-aging formulations to act as an ultimate everyday all-rounder solution to counteract multiple skin concerns related to aging such as skin discolouration, decreased collagen production, wrinkle formation and inefficient protection against UV radiations since the natural hydration level of the skin deteriorates with age and dry skin will affect the product's overall efficacy as the skin's barrier function gets impaired.

Keyword: Red pitaya; Plant by-products; Anti-aging; Bio-sustainability; Green cosmetics