

MICROENCAPSULATED ASTAXANTHIN FACE SERUM

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Highlights: Serum is a skincare product that can give a quick result to the skin within a few weeks of application. Face serum contains high concentrated emulsion and contains small particle molecules that can penetrate the skin, thus delivering instantly noticeable results. Therefore, face serum formulation's stability needs to be maintained to increase its effectiveness to the consumer's skin. Astaxanthin is a secondary plant metabolite with various bioactivities such as antimicrobial, antioxidant, and anti-inflammatory effects that are beneficial to the skin. This current invention utilizes microencapsulated astaxanthin as an active ingredient in face serum that resulted in higher stability of the active ingredient in the final product formulation.

Key words: *astaxanthin, face serum, physicochemical properties*

Introduction

Serum is a skincare product containing a gel or lightweight lotion or moisturizing consistency that penetrates the deeper skin to deliver the active ingredients. The ingredients in the serum can help the skin to become firmer, and can increase moisture levels to maintain healthy skin balance (Ojha et al., 2019). All skincare products, including moisturizer, cleanser, cream, anti-wrinkle or anti-aging product, or skin serum products must provide specific functions such as antioxidants, cell-communicating ingredients, and to help maintain skin health. However, some of these active ingredients are not stable when incorporated in the final serum formulation, including astaxanthin.

Astaxanthin is a xanthophyll carotenoid; a secondary plant-metabolite present in bacteria, plant, and yeast (Davinelli et al., 2018). This pigment is reflected in the flesh and skin of aquatic animals that consume the algae such as salmon, red trout, red sea bream, flamingoes and crustaceans. *Haematococcus pluvialis* (algae) is known to produce high amount of astaxanthin in stressed environment, such as prolong exposure to sunlight, high salinity water and restricted nutrients availability (Boussiba & Vonshak, 1991). Moreover, astaxanthin has been reported to be 10 times stronger than other carotenoids including zeaxanthin, lutein, canthaxanthin, and β -carotene, and 100 times greater than that of α -tocopherol (Kurashige et al.1990, Naguib 2000).

Thus, astaxanthin have high potential to be commercialized as an active ingredient in the formulation of face serum because its benefits to the skin, such as antioxidant properties, increases skin moisture, and reduces facial wrinkles. However, this carotenoid also has stability problems when incorporated into skincare formulation such as face serum. Therefore, this present project evaluates the stability of face serum incorporated with microencapsulated astaxanthin.

Content

Description of innovation

This current invention utilizes microencapsulated astaxanthin or astaxanthin beads (Figure 1) as active ingredients in face serum that resulted in higher stability of active ingredients in the final product formulation. The astaxanthin actives are protected in the microcapsules that provide longer shelf life of the final products.



Figure 1: Microencapsulated astaxanthin or astaxanthin beads

Background of innovation

Face serum contains a mixture of concentrated active ingredients and emulsion of different physicochemical properties. Commonly, the formulation of face serum consists of active ingredients with high potency that have high tendency to deteriorate. Astaxanthin is a lipid soluble pigment that is naturally produced by *Haematococcus pluvialis* (algae) and has been shown to have high potency compared to other carotenoids (Naguib 2000). In this present study, astaxanthin was attempted to be formulated in personal care product to obtain a stable and effective formulation. It is very crucial to obtain formulation that could preserve the activity of the active ingredients and the intended action of the face serum to maintain the quality of the product.

Advantages

The microencapsulated astaxanthin developed has higher stability, thus able to prolong the shelf life of the finished product. Furthermore, this invention will provide alternative application of astaxanthin in personal care products development and additional aesthetic value to the finished product with astaxanthin beads floating inside the serum.

Commercial value

This invention has high potential to be commercialize as natural-based personal care product. Moreover, organic and natural-based based cosmetics have been shown to have high market demand worldwide. Statistics on skincare market shows that the skincare industry is estimated to be valued at 180 billion by 2024 (Anwari, 2009).

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