Abstract

Beta-carotene is a carotenoid widely known for its antioxidant properties, provitamin A activity, and as a natural colorant in food. However, its poor water solubility and sensitivity to heat, light, oxygen, and acidic pH limit its stability and application. This study aims to improve beta-carotene's stability through co-crystallization with four different sweetener co-formers, specifically xylitol, erythritol, sucrose, and dextrose. Co-crystals were made by dissolving sweeteners in heated water, mixing with beta-carotene ethanol solution, followed by drying and grinding. The thermal and pH stability of the co-crystals, as well as their degradation kinetics and half-life, were analyzed over time using UV spectrophotometer and colorimeter. Results showed that co-crystallization significantly improved beta-carotene stability compared to its pure form. Among the co-formers tested, sucrose provided the highest protection under thermal and acidic stress, showing the lowest degradation percentage (43% at 50°C) and longest half-life. Xylitol also showed moderate stability, while erythritol and dextrose were less effective. The findings suggest that co-crystallization with suitable sweeteners is a promising and affordable approach to enhance the functional stability of beta-carotene in food applications.

Keywords: Beta Carotene, Co-crystallization, Dextrose, Erythritol, Sucrose, Xylitol