

## Abstract

Increasing demand for functional beverages arises from greater consumer awareness of irregular eating patterns and unhealthy lifestyles. This trend encourages development of drinks enriched with bioactive compounds that offer health benefits. Red fruit contains abundant bioactive components known for antioxidant potential. As fast-paced lifestyles become more common, instant powder drinks gain popularity due to ease of use. Product development involves combining red fruit extract with sucrose, dextrose, and xylitol as coformers, along with maltodextrin addition. Co-crystallization technique is applied to enhance active compound stability, while maltodextrin helps maintain dispersion and prevents separation between red fruit oil and water during reconstitution. A preliminary study determined a fixed maltodextrin concentration, selecting 10% as most suitable. Evaluation focused on total carotenoid content (TCC), color, and dissolution time during four weeks of storage. Results showed that xylitol and xylitol combined with maltodextrin produced the most stable outcomes. Xylitol with maltodextrin gave favorable results, with TCC of  $55.47 \pm 11.72$ , dissolution time of  $16.98 \pm 0.44$  seconds, and color values marked by decreasing  $L^*$  and increasing  $a^*$  and  $b^*$ . Without maltodextrin, xylitol resulted in lower TCC of  $12.89 \pm 5.37$ , slightly longer dissolution time of  $17.22 \pm 0.32$  seconds, and less stable color. Co-crystallization using xylitol and maltodextrin provided the most stable result for powdered functional beverage development.

Keywords: RFO, co-crystallization, instant powdered drink, stabilizer, carotenoid content