

A three component stabilizer system for production of astaxanthin nanodispersion

Chin Ping Tan and Navideh Anarjan

Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

Astaxanthin nanodispersions were prepared via a solvent-diffusion process using Polysorbate 20 (PS20), sodium caseinate (SC) and/ or gum Arabic as stabilizing system, solely or in combinations. The interactions between these three surface active compounds, in the formation, physicochemical and stability characterization of produced nanodispersions were studied by applying a simplex centroid mixture design. Multiple-response optimization predicted that using a three-component stabilizer mixture composed of 29% w/w PS20, 6% w/w GA and 65% w/w SC would produce the astaxanthin nanodispersions with the most desirable physicochemical characteristics and highest physical and chemical stability. At this optimum proportion of three-component stabilizer mixture, the corresponding predicted response values for mean particle size, polydispersity index (PDI), total astaxanthin loss, particle size growth at 25 °C, PDI growth at 25 °C and 5 °C, and also astaxanthin loss at 25 °C after 8 weeks storage were predicted to be 114.6 nm, 0.261, 680 mg/L, 2.06%, 4.56%, and 20% w/w, respectively.