





Microencapsulation of *Hibiscus sabdariffa* L. extract using porous starch and gum Arabic: Optimized process, characterization, stability, and simulated gastrointestinal conditions

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Abstract

Hibiscus extract exhibits considerable antioxidant activity and a high anthocyanin content, which suggesting potential health benefits. However, these compounds are highly susceptible to environmental factors. The aim of this study was to establish the optimal conditions for the encapsulation of *Hibiscus sabdariffa* extract (HSE) using mixed porous maize starch–gum Arabic to enhance the stability of bioactive compounds under accelerated aging conditions. Response surface methodology (RSM) was used to optimize microencapsulation conditions through spray drying. The optimal conditions for microencapsulation of HSE by RSM were determined to be 126 °C at the inlet temperature (IT) and 8.5% at the total solid content (TSC). Using these conditions, the amount of bioactive compounds in optimized microcapsules (OMs) was 2368 mg GAE/100g, 694 mg QE/100g, and 930 mg EC3G/100g, of phenolic compounds, flavonoids, and anthocyanin, respectively. The release rate of anthocyanins during *in vitro* digestion was more effectively regulated in the OM sample, which retained up to 40% of anthocyanins compared with 10% in the HSE. The experimental values in this study exhibit high assertiveness, which renders the optimization model technologically and financially viable for the encapsulation of bioactive compounds with potential use in the food and pharmaceutical industries.