Abstract

This research aimed to encapsulate vanilla extract by using inclusion complex of β-cyclodextrin and also investigate the qualities of the encapsulated powder in terms of vanillin content, moisture content, and stability under accelerated condition. Natural vanilla extract was made from solvent extraction of vanilla (Vanilla planifolia) pods from Royal Project, Khun Wang Center, Chaing Mai, Thailand. Vanilla pods were cut and soaked in ethanol for 72 h at room temperature with continuous shaking at 150 rpm. The two studied factors for extraction condition were ethanol concentration (35, 45 and 55%) and ratio between vanilla pods and ethanol (1:4, 1:5 and 1:6). Both ethanol content and ratio of vanilla to ethanol had positive effects on vanillin content. The extraction with 55% ethanol and the ratio of vanilla pods to ethanol as 1:4 provided the highest vanillin content of 341.23 mg/100 mL of vanilla crude extract. Natural vanilla extract was then encapsulated in β-cyclodextrin cavity using kneading method. In this method, vanilla extract (3, 6 and 9%) was added into hydrated β-cyclodextrin paste and then kneaded for 5, 10 and 15 min. The obtained paste was then dried in cabinet dryer at 40°C for 18 h. The vanillin content of encapsulated natural vanilla extract was determined using HPLC. The amount of vanilla extract and kneading time gave significant (p<0.05) effect on the encapsulation efficiency. The greatest encapsulation efficiency found was 94.50% when 9% vanilla extract and 10 minutes of kneading time were used. The stability of encapsulated natural vanilla powder was also investigated at various temperatures (35, 45 and 55°C) and water activities (0.53, 0.64 and 0.75). The interaction of temperature and water activity gave significant effect on the second order kinetic reaction of the encapsulated vanilla powder (p<0.05). The most suitable condition of storage was 35°C with a_w of 0.64, providing the kinetic constant (k) of 0.0024 and R^2 of 0.92 with t_half-life of 4.54 weeks.