

Release profiles of β -carotene encapsulated in PHBV by means of SEDS technique

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Introduction

This work investigates the characteristics of the in vitro release of β -carotene encapsulated in poly (hydroxybutirate-co-hydroxyvalerate) (PHBV) using SEDS technique [1]. Release tests were performed using encapsulated complex in ethyl acetate, n-hexane and anhydrous ethanol, and monitored by UV-visible concentration analysis. Results indicated higher initial release rates in ethyl acetate and in n-hexane, with cumulative release percentage varying from 31.50 to 69.58 % and from 42.08 to 55.96 %, respectively. For anhydrous ethanol the maximum concentration was 180 min, 300 min and 10 days, depending on the initial amount of β -carotene, with cumulative release ranging from 45.27 to 88.22 %.

Results e Discussion

The experimental apparatus used in this work for precipitation and co-precipitation is shown in Figure 1 [1].

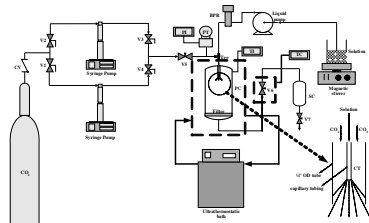


Figure 1. Schematic diagram of the precipitation apparatus. CV - check-valve; V1, V2, V3 and V4 - ball valve; V5, V6 and V7 - needle valve; BPR - back pressure regulator; PT - pressure transducer; PI - Pressure indicator; TI - temperature indicator; TC - temperature control; PC - precipitation chamber; SC - separation chamber; CT - capillary tube.

For in vitro degradation testes, a sample of co-precipitated particles was weighed (from 5 to 35 mg) in an analytical balance with a precision of 0.00001g and added to different volumes of acetone. The suspensions of co-precipitated into acetone were agitated for about 20 seconds and then all samples were filtered using a membrane filter with porosity of 0.22 μ m. Figures 1 to 3 show the release profile of β -carotene in the solvents tested.

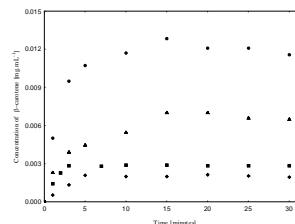


Figure 1. In vitro release profiles of β -carotene in ethyl acetate at 313.15 K and 80 rpm (\diamond , run 1; \blacksquare , run 2; \blacktriangle , run 3; \bullet , run 4).

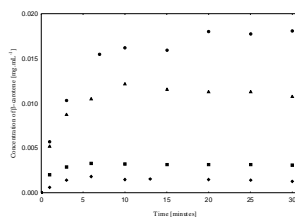


Figure 2. In vitro release profiles of β -carotene in n-hexane at 313.15 K and 80 rpm (\diamond , run 1; \blacksquare , run 2; \blacktriangle , run 3; \bullet , run 4).

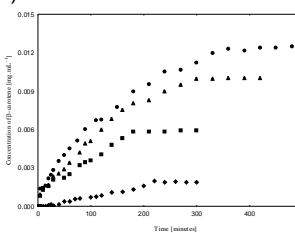


Figure 3. In vitro release profiles of β -carotene in anhydrous ethanol at 313.15 K and 80 rpm (\diamond , run 1; \blacksquare , run 2; \blacktriangle , run 3; \bullet , run 4).

Conclusions

In this work the release profile of β -carotene encapsulated in PHBV through supercritical technology was successfully investigated in three organic solvents.

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