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Production of spherical microparticles with Eudragit L100 by the PGSS process in supercritical CO_2-ethanol mixtures

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Abstract (less than 300 words)

Microencapsulation technology has attracted attention because it can add new functionality to the core substance [1]. In this study, we aim to form spherical microparticles coated with Eudragit L100, which is enteric polymer [2] and hard to dissolve in supercritical CO_2 ($scCO_2$), using the particles from the gas-saturated solutions (PGSS) process with $scCO_2$. In the PGSS process, it is necessary to saturate the polymer in a supercritical fluid, so the solubility of Eudradit L100 in mixtures of $scCO_2$ and ethanol as a cosolvent were determined by observing the cloud point visually with the experimental apparatus. Next, phenylalanine loaded $CaCO_3$ particles (adsorption amount: 26 mg/g, average particle size: 49.2 μm), Eudragit L100, and ethanol were charged into a high pressure cell, and the mixture was stirred. After 1 h, the system was depressurized through a nozzle (φ = 2.0) into an atmospheric collector leading to formation of microparticles coated with Eudragit L100 by precipitation onto a Teflon sheet. The microcapsules (average particle size: 181.39 μm) were found to be completely covered with a smooth shiny surface and did not adhere to each other. The pH dependence of sustained release rate of phenylalanine from the microcapsules was confirmed using a UV-vis spectrophotometer. It was carried out with stirring using the Franz cell. We found that when the low pH was used, phenylalanine from microcapsules were released slowly. On the other hand, when the high pH was used, phenylalanine from microcapsules were released early.

References

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