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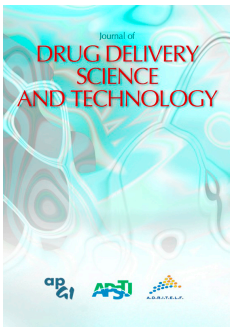

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Metformin hydrochloride microencapsulation by complex coacervation: Study of Size distribution and encapsulation yield using response surface methodology

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Abstract

Metformin hydrochloride is a biguanide antihyperglycemic agent, widely used in the management of non-insulin dependent diabetes mellitus (type 2), it has a short biological half-life of 1.5–1.6 h, and its daily requirement is 1.5–3 g/day with an absolute bioavailability of 50–60%, when administered orally. However some gastro-intestinal symptoms, like abdominal discomfort, nausea and diarrhea may occur during the treatment.

This study was carried out to optimize conditions for metformin microencapsulation by complex coacervation using response surface methodology (RSM). Sunflower oil was used to obtain the primary emulsion, whereas the coating materials of microencapsulation were soybean protein isolate (SPI) and pectin. For the complex coacervation process, soy lecithin and Tween 80 were used as surfactants to enhance W/O/W double emulsion stability. Thus, double emulsion followed by complex coacervation is studied.

The microencapsulation of metformin under the optimized conditions ensures the mean size of 16 µm of microcapsules combined with the narrow size distribution of 1.3 (span) and the highest yield reaching up to 84 %.

These results show that complex coacervation using SPI/pectin as wall material was an efficient method which have never been reported in literature as microencapsulation process of metformin hydrochloride.

Keywords: Metformin hydrochloride; complex coacervation; double emulsion; response surface methodology (RSM); soybean protein isolate (SPI); pectin,