Carvedilol-loaded poly(D,L) Lactide nanoparticles/ microparticles : Preparation, Characterization and drug release profile

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Abstract

The oral solid dosage forms are the most preferred among other dosage forms because they offer some advantages such as the ease of administration with a high patient compliance, the ease to prepare, transport with high store stability and the low cost of manufacturing processes.

Beside of these advantages, the conventional drug release dosage form suffers from various inconvenient that offer many challenges for pharmaceutical industries. Two important factors responsible for these inconvenient are 1) the immediate release of the drug, with little or no control upon the release rate and also 2) their low solubility and/or permeability. One promising method, is the utilization of biodegradable polymer nanoparticles in drug delivery to overcome the disadvantages mentioned previously in the developing of oral solid dosage form. This technology has shown to enhance the solubility and hence; absorption of poorly water-soluble drugs; efficiently target drugs into distant areas in the body; enhance cellular uptake of drugs across tight epithelial and endothelial barriers; deliver two or more drugs using the same carrier.

Carvedilol, is an anithypertensive agent that is used widely in the treatment of hypertension and congestive heart failure. However, it suffers from low water solubility which will decrease its oral bioavailability. In this work we aim to prepare Carvedilol poly (D,L) lactide (PDLLA) nanoparticles/microparticles with high loading efficiency and to optimize the size and morphology of the developed particles in order to study the Carvedilol release profile from the obtained particles at room and body temperatures.

In this communication, the preparation of the PDLLA nanoparticles and microparticles and their loading with Carvedilol will be presented. A full characterization of the obtained particles by AFM in order to optimize their size and morphology will be discussed. Finally, the Carvedilol release profiles from the PDLLA nanoparticles and microparticles have been determined at room and body temperatures.