Hydroxypropyl-Beta-Cyclodextrin as Cryoprotectant in Nanoparticles Prepared By Nano-Spray Drying Technique

Amr Maged Ibrahim Abdelbaky ,Azza A. Mahmoud, Mahmoud M. Ghorab

Abstract

Nano-spray dryer is advanced instrument to produce a stable and spherical nanoparticles with high yield. In this study, econazole nitrate nanoparticles were formulated by nano-spray dryer using 1:1, 1:2 and 1:3 weight ratios of drug to hydroxypropyl-beta-cyclodextrin and stabilizer. The prepared samples were sprayedthrough nozzle size of 7.0 εm using 95ÜC and 45ÜC as inlet temperature and outlet temperatures, respectively. The prepared nanoparticles were evaluated for process yield and percent drug loading. Furthermore, the drug nanoparticles were dispersed in isotonic buffer solution and examined for drug release and their stability at room temperature. The spray dried particles were in the nano-range (148 to 294 nm) and their yield values ranged between 79.1 and 84.9 %. Increasing weight ratio of drug to hydroxypropyl-beta-cyclodextrin to 1:2 and 1:3 showed increases in percent drug release compared to formulation containing 1:1 weight ratio of drug to hydroxypropyl-beta-cyclodextrin. On the other hand, the prepared econazole nitrate nanosuspension containing 1:1 weight ratio of drug to hydroxypropyl-beta-cyclodextrin revealed best stability study during storage period at room temperature compared to other formulations. As a result of in-vitro drug release and stability studies, the optimum weight ratio of 1:1, drug to hydroxylpropyl-beta-cyclodextrin was chosen as a best weight ratio duo to its good balance between drug release and stability of drug loaded nanoparticles

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