

The modification of physical characteristics of microcrystalline cellulose by codrying with beta-cyclodextrins

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Abstract

In an attempt to modify the physical properties of microcrystalline cellulose (MCC), the slurry form of this material was codried with beta-cyclodextrin (beta-CD). MCC slurry was blended with beta-CD at concentrations of 10%-50% w/w as a dried mass relative to MCC. The mixtures were then granulated with water and codried at 60 degrees C for 12 h or until a constant weight was reached. Codried granules were pulverized, and the fraction between 61 and 150 microns in size was reserved. The powder and tableting properties of the codried products were compared to those of various grades of MCC and the corresponding components and physical mixtures. The results showed that the products of MCC codried with beta-CD significantly improved the flowability of MCC powder. It is probable that the improved flowability was due to the more rounded shape of particles formed with this codried process, which was confirmed by SEM photographs. Moreover, the compactibility and disintegration properties of tablets produced from the codried products were even better than those using MCC alone, physical mixtures, or various grades of MCC. MCC in a slurry form was more efficient than the existing MCC products in achieving these results, which is postulated to be due to the greater amount of water required and the higher solubility of beta-CD in water promoting the interaction between beta-CD and MCC during granulation. In conclusion, MCC codried with beta-CD provides a useful excipient for direct compression.