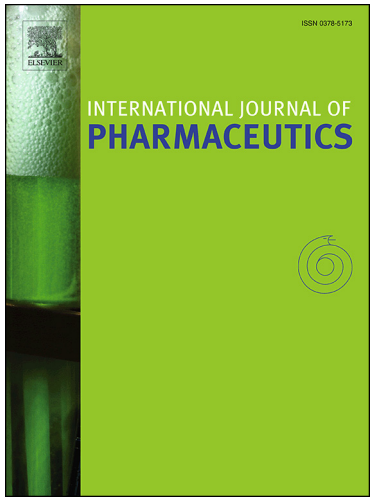

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Impact of functionalized particle structure on roll compaction/ dry granulation and tableting of calcium carbonate

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Keywords

Roll compaction/Dry Granulation, Powder technology, Particle Morphology, Compaction, Excipients, Compression

Abstract

The influence of a functionalized raw material particle structure on the granulation behavior and tabletabilty of calcium carbonate ($CaCO_3$) was investigated. Therefore, a milled grade of $CaCO_3$ was compared to different binary mixtures of milled and functionalized $CaCO_3$. Relevant properties of raw materials, ribbons and granules were measured. The starting materials and two fractions of dry granules were compressed to tablets. The tabletability of granules was compared to that of the powders and the influence of specific compaction force and granule size on tablet tensile strength was evaluated. Adding functionalized particles drastically influenced the granulation and tableting behavior of $CaCO_3$. Increasing proportions increased the ribbon porosity and granule size. Tensile strength of tablets from powder mixtures and granules was increased as well. Nevertheless, adding functionalized $CaCO_3$ led to a loss in tabletability induced by a previous compaction step to an extent depending on its proportion in the formulation. A clear influence of the particle morphology on granulation and tableting behavior was demonstrated by the study. The functionalized structure showed aspects of a more plastic deformation behavior. Adding functionalized $CaCO_3$ to a mixture, even in small amounts, seemed to be beneficial to increase granule size and tablet strength.