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Development of coprocessed chitin-calcium carbonate as multifunctional tablet excipient for direct compression

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Abstract

Due to the increasing interest in multifunctional excipients for tableting, coprocessing of individual excipients is regularly used to produce excipients of improved multifunctionality superior to that of individual excipients or their physical mix. The use of chitin as an excipient in tablet formulation is limited due to certain drawbacks such as poor flowability and low true density. The objective of this work is to improve these properties through coprocessing of chitin with calcium carbonate (CaCO_3) by precipitating CaCO_3 on chitin particles using different methods. In addition, optimization of the coprocessed chitin was carried out to improve the excipient's properties. Physico-chemical (CaCO_3 content, true density, X-ray diffraction, infrared spectroscopy and scanning electron microscopy) and functional testing (swelling force, flowability, tensile strength, deformation mechanism and disintegration time) were used to characterize the coprocessed product. Results showed that the calcite CaCO_3 polymorph is precipitated on the chitin surface, and that it interacts with chitin at carbonyl and amide groups level. In addition, the coprocessed excipient has an improved true density and powder flowability

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