

Abstract

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Physico-chemical characterization of microcrystalline celluloses

Microcrystalline cellulose is very important pharmaceutical excipient. The aim of the study was to evaluate the different types by using physico-chemical characteristics. Particle size was evaluated by optical microscopy. The flow properties were evaluated by flowability and by the angle of repose. Bulk and tapped properties were evaluated by bulk and tap density and by compressibility index. Temperature and heat of fusion, glass transition temperature and specific heat improvers were evaluated by DSC. Compaction process was evaluated by compaction equations, stress relaxation test and record the force-displacement. The compressed tablets were evaluated by kinetics crushing tablets and had fixed radial strength.

Particle sizes correspond to the declared values stated by the manufacturer. The largest deviation was found for Avicel PH-200 (difference 20,0 μm). With increasing particle size reduces friction between particles and increases the flowability. The tapped density is higher than the bulk density and the copies. From the results of three-exponential compression equation indicate that the lowest volume reduction in the precompression stage for Avicel PH-112, PH-200 a PH-302. With the decline of the parameter E_1 from compression equation also reduces the parameter E'_1 of recording force-displacement. Other results show that the highest volume reduction in the phase of elastic deformation found for Avicel PH-200 and PH-112. For other Avicels was volume reduction lower. Energies E_2 copy the value of volume density. A comparison of the elastic behavior of the material in the phase of compression and relaxation implies a direct link between the elastic parameters. Direct associations were also found

between the parameter E'_3 of the phase relaxation and path determination of the kinetics of crushing tablets. Different behavior has only Avicel PH-105. In the phase of plastic deformation was observed in the largest volume reduction of Avicel PH-302, or less than at Avicel PH-105. For other Avicels was detected at the phase of plastic deformation lower volume reduction. With the increase of volume reduction reduces the speed of the action. A direct relationship was also found between the plasticity parameter P'_3 and the parameter W determination of the kinetics of crushing tablets.