Abstract

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Title of Doctoral Thesis:	Study of static and dynamic flow properties of pharmaceutical excipients

Flow properties are among the most significant characteristics of pharmaceutical materials. Recent modern technologies allow preparation of particles with modified surface properties and flow behaviour for the conventional as well as new excipients. In this work, the static (compressibility index, Hausner ratio, angle of repose, shear testing) and dynamic (flow rate, avalanche testing) flow properties of a wide variety of excipients, their particle size fractions and selected model mixtures were evaluated.

In particular, attention was paid to modelling of the flow rate by the equation prospectively suitable for use in the standardization of flow testing in pharmaceutical technology. The power equation in which the equation parameter is a direct prediction of the flow rate through an orifice having a unit diameter is recommended.

The basic granulometric characteristics of particles were completed with the particle fractal dimension (pD_F) and the bulk fractal dimension (bD_F). Although a relatively strong correlation between the flow rate and pD_F was observed, however, the complex character of the particulate matter flowability has not yet enabled the formulation of a clear conclusion. On the other hand, the bulk fractal dimension correlated well with the avalanche behaviour of materials and is a promising criterion in the evaluation of powder excipients flow.