

Model-based analysis of a twin-screw wet granulation system for continuous solid dosage manufacturing - DTU Orbit (09/11/2017)

Model-based analysis of a twin-screw wet granulation system for continuous solid dosage manufacturing

Implementation of twin-screw granulation in a continuous from-powder-to-tablet manufacturing line requires process knowledge development. This is often pursued by application of mechanistic models incorporating the underlying mechanisms. In this study, granulation mechanisms considered to be dominant in the kneading element regions of the granulator i.e., aggregation and breakage, were included in a one-dimensional population balance model. The model was calibrated using the experimentally determined inflow granule size distribution, and the mean residence time was used as additional input to predict the outflow granule size distribution. After wetting, the first kneading block caused an increase in the aggregation rate which was reduced afterwards. The opposite was observed in case of the breakage rate. The successive kneading blocks lead to a granulation regime separation inside the granulator under certain process conditions. Such a physical separation between the granulation regimes is promising for future design and advanced control of the continuous granulation process. (C) 2016 Elsevier Ltd. All rights reserved.

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