A shift from batch processing towards continuous processing is of interest in the pharmaceutical industry. However, this transition requires detailed knowledge and process understanding of all consecutive unit operations in a continuous manufacturing line to design adequate control strategies. This can be facilitated by developing mechanistic models of the multi-phase systems in the process. Since modelling efforts only started recently in this field, uncertainties about the model predictions are generally neglected. However, model predictions have an inherent uncertainty (i.e. prediction uncertainty) originating from uncertainty in input data, model parameters, model structure, boundary conditions and software. In this paper, the model prediction uncertainty is evaluated for a model describing the continuous drying of single pharmaceutical wet granules in a six-segmented fluidized bed drying unit, which is part of the full continuous from-powder-to-tablet manufacturing line (Consigma™, GEA Pharma Systems). A validated model describing the drying behaviour of a single pharmaceutical granule in two consecutive phases is used. First of all, the effect of the assumptions at the particle level on the prediction uncertainty is assessed. Secondly, the paper focuses on the influence of the most sensitive parameters in the model. Finally, a combined analysis (particle level plus most sensitive parameters) is performed and discussed. To propagate the uncertainty originating from the parameter uncertainty to the model output, the Generalized Likelihood Uncertainty Estimation (GLUE) method is used. This method enables a modeller to incorporate the information obtained from the experimental data in the assessment of the uncertain model predictions and to find a balance between model performance and data precision. A detailed evaluation of the obtained uncertainty analysis results is made with respect to the model structure, interactions between parameters and uncertainty boundaries.

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