
Extension of a classification scheme for cleaning mechanisms from steady to unsteady data and application to further soils

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Cleaning is an important process step in the food industry, especially to avoid contamination during increasingly frequent product changes. The machine equipment is cleaned almost daily therefore causing high ecological and economic expenses. An established approach to reduce these costs is conducting cleaning simulations, however, suitable models for the soils must be chosen. The appropriate model depends on the cleaning behaviour of the soil, i.e., the cleaning mechanism active in a particular situation.

In the recent past, the authors developed a neural network based approach to identify the governing cleaning mechanism from experimental data. The neural networks were trained and validated with model soils representing a given cleaning mechanism in prototypical manner. In the present work, the model is applied to realistic soils and the cleaning mechanism is determined with respect to varying operating conditions, like type of cleaning fluid, temperature of cleaning fluid, and flow velocities. Furthermore, a time-resolved determination of the cleaning mechanism is targeted. This requires extension towards machine learning methods that can handle time series data efficiently. These results will be used to draw conclusions on how suitable cleaning simulations of the investigated soils could be conducted.