

INVESTIGATIONS ON TRIBOCHARGING BEHAVIOUR OF PHARMACEUTICAL POWDERS IN A FLUIDIZED BED DRYER

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Fluidized bed drying is a commonly used methods in pharmaceutical industry due to its excellent performance in solids mixing, heat transfer, and mass transfer. As pharmaceutical powders are typically organic materials, they can easily be charged due to repeated collision and separation of particles along with particle-wall friction in a fluidized bed dryer. This phenomenon, also called "Tribocharging", could adversely affect the process performance.

This work, investigates effects of inlet air with different temperature and velocity on drying performance and electrostatic charges generated during the drying process. Samples of approximately 6 g at discrete time intervals were taken via a sample thief; half of which was used to determine the moisture content, and the rest was used to measure charge density by a Faraday cup connected to an electrometer.

Experimental results showed that, decreasing the drying air temperature increases the drying time as expected. The drying rate is lower at lower operating temperatures. Charge density of granules is found to be a function of moisture content rather than drying temperatures. With a decrease in the moisture content, charge density of pharmaceutical granules increases. At the end of drying process, granules carry similar amount of charges. Moreover, regardless of operating conditions, charge polarity of granules within the bed at the end of the process is positive. The current findings show that charge density is indicative of moisture content in the fluidized bed dryer and monitoring dynamics changes could be used to monitor the drying process in pharmaceutical industry.