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Quantitative Design of Continuous Mixing Processes for Pharmaceutical Applications

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Powder mixing is crucial for many processing stages within the pharmaceutical, catalysis, food, cement, and mineral industries, to name a few. A significant problem hindering process design is the paucity of information about the effects of changing process parameters on mixing efficiency, especially in the case of continuous mixing.

The main target of this talk is to highlight continuous mixing and to examin the effects of different process and design parameters. Interestingly, continuous processing has been utilized extensively by petrochemical, food, and chemical manufacturing but has yet to reach the pharmaceutical industry to a meaningful extent. Recent research efforts indicate that a well-controlled continuous mixing process illustrates the capability of scale-up and ability to integrate on-line control ultimately enhancing productivity.

In this talk we will decribe the use of engineering methodologies to design continuous pharmaceutical manufacturing systems for solid dose products. We will examine the performance of gravimetric feeders and continuous mixers, and their integrated dynamics, and develop guidelies for the optimal design and operation of the integrated system. Variance components will be characterized, and the monitoring of performance using PAT tools will be discussed.