

## **EFFECT OF THE MIXING STRATEGY ON THE UNIFORMITY OF POWDER MIXTURES FOR DIRECT COMPRESSION**

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In the direct compression of tablets, it is crucial to have the input tableting mixture well homogenized. Widely used tumbling blenders are usually not very effective in the disintegration of aggregates of cohesive powders, which can be vital in such mixtures. Therefore, specific strategies, such as subdividing the mixing process into multiple steps and introducing sieving before each one of them, are being adopted in industrial practice. Presented work deals with an active substance (API) intended for direct compression, where some specific mixing strategy is necessary. The examined mixture consists of the API and a placebo mix. Each of the evaluated mixing processes for its preparation involved a different number of mixing steps, some with preceding sieving. The homogeneity of every mixture prepared through a specific process was evaluated by a variation coefficient (CV). The complexity and time demand of each mixing process were described by a process complexity index (PCI). Both of these process properties were then used to assess the suitability of the given mixing strategy for the direct compression of tablets. The most promising for the manufacturing of the tested API proved a process consisting of two mixing steps with one sieving, which represents simplification compared to the process currently utilized in the industry. Its implementation thus could save a significant amount of time and energy needed to prepare a suitable tableting mixture. Based on this case study the use of the proposed quality by design approach in the industrial practice could significantly streamline the model mixture preparation and it can be adopted as a profiling approach to prevent overdesigning in the newly developed direct compression processes.

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