

The mixing of cohesive and flowable powder materials using a common laboratory powder mixer

ABSTRACT

This study presented the homogeneity obtained when mixing cohesive and flowable powder materials using a laboratory powder mixer. The mixing process parameters studied were the mixing time and the mixer rotational speed (20 rpm, 40 rpm and 60 rpm) at the different ratios (95%: 5%, 50%: 50% and 5%: 95%) of the cohesive cocoa and flowable mannitol powder materials. The homogeneity sampled at the powder bed surface showed that only at the highest rotational speed of 60 rpm used in this work yield acceptable homogeneity at the two extremes of the powder mass ratios; 95%: 5% and 5%: 95% of mannitol: cocoa for some of the locations on the powder bed surface, especially near the wall of the mixer. Other combinations of the experimental conditions did not yield acceptable mixture homogeneity. These results showed the difficulties in obtaining a homogeneous powder mix when mixing cohesive powder materials, especially in academic teaching and research laboratories using a simple powder mixer apparatus.

Keyword: Cohesive; Mixing; Flowability; Tumblers; Homogeneity; Drum mixers