

Physical Property Characterization of Adult Dairy Nutritional Products for Powder Reconstitution

Authors : Wei Wang, Martin Chen

Abstract : The reconstitution behaviours of nutritional products could impact user experience. Reconstitution issues such as lump formation and white flecks sticking to bottles surfaces could be very unappealing for the consumers in milk preparation. The controlling steps in dissolving instant milk powders include wetting, swelling, sinking, dispersing, and dissolution as in the literature. Each stage happens simultaneously with the others during milk preparation, and it is challenging to isolate and measure each step individually. This study characterized three adult nutritional products for different properties including particle size, density, dispersibility, stickiness, and capillary wetting to understand the relationship between powder physical properties and their reconstitution behaviours. From the results, the formation of clumps can be caused by different factors limiting the critical steps of powder reconstitution. It can be caused by small particle size distribution, light particle density limiting powder wetting, or the rapid swelling and dissolving of particle surface materials to impede water penetration in the capillary channels formed by powder agglomerates. For the grain or white flecks formation in milk preparation, it was believed to be controlled by dissolution speed of the particles after dispersion into water. By understanding those relationship between fundamental powder structure and their user experience in reconstitution, this information provides us new and multiple perspectives on how to improve the powder characteristics in the commercial manufacturing.

Keywords : characterization, dairy nutritional powder, physical property, reconstitution

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