Lactose hydrolyzed milk powder: Thermodynamic characterization of the drying process

Tatiana Lopes Fialho, Evandro Martins, Arlan Caldas Pereira Silveira, Carolina Rodrigues de Jesus Silva, Ítalo Tuler Perrone, Pierre Schuck

ABSTRACT

Industrial production of lactose hydrolyzed milk powder (LHMP) remains challenging. Due to the presence of the monosaccharides glucose and galactose, lactose-free powders tend to suffer stickiness, caking, and browning during drying and storage. We sought to find ideal conditions spray dryer inlet air temperature ($\theta_{\text{air,in}}$) and concentrated milk flow rate ($m_{\text{CM}}$) for LHMP production. We tested $\theta_{\text{air,in}}$ settings of 115–160°C and $m_{\text{CM}}$ of 0.3–1.5 kg · h$^{-1}$, and also applied mass and energetic balances. LHMP generally exhibited higher mass and energetic losses than the control (milk powder containing lactose), as a consequence of the relatively low dryability of LHMP. For a lab scale spray dryer, the ideal conditions settings for...
LHMP production were $\theta_{\text{air, in}} = 145 \pm 2^\circ\text{C}$ and $m_{\text{CM}} = 1.0 \text{ kg} \cdot \text{h}^{-1}$, taking into account the mass yield and energetic cost (kJ · kg$^{-1}$ of powder) of the process. These ideal conditions are a potential tool for the industrial development of lactose-free dairy powders.

KEYWORDS: Lactose hydrolyzed milk powder, mass and energetic balances, spray drying

Additional information

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