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Thermal treatment of skim milk concentrates in a novel shear-heating device: Reduction of thermophilic spores and physical properties.

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Abstract

Endospores of thermophilic bacilli are a major concern for producers of dairy powders. In this study, we heat treated 10 different spore suspensions at 110 °C in skim milk and skim milk concentrate (36% dry matter) of the species *Geobacillus stearothermophilus* (10 min) and *Anoxybacillus flavithermus* (5 min) in a new shear-heating device. The highest log reduction in skim milk concentrate was 3.5. The death behavior of the spores was strain dependent. Particle formation and Maillard reaction were observed. By increasing the shear-rate up to 1500 s⁻¹ the particle size was reduced for both heating times (D90 reduction: 57.4 and 77.0%, respectively). The particle size was lessened by a reduction of dry matter of 27%, compared to 36%. This work emphasizes, that heat treatment of concentrated dairy products represents a technological option to reduce thermophilic spores in skim milk concentrate and powders produced thereof.

KEYWORDS:

Anoxybacillus flavithermus; Milk concentrates; Skim milk powder; Thermal processing; Thermophilic spore formers

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