Thermal resistance of vegetative thermophilic spore forming bacilli in skim milk isolated from dairy environments

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Abstract
Thirteen thermophilic bacilli, major contaminants of powdered milk products, were characterized regarding their heat sensitivity. All strains belong to the two species Geobacillus stearothermophilus and Anoxybacillus flavithermus. Five of the tested strains were classified as heat sensitive, one strain showed a low amount of vegetative cells and was not heat-treated. With the seven heat resistant strains, a pasteurization step (73 °C, 20 s) at laboratory-scale was applied. Two strains, both from the species G. stearothermophilus, could survive the heat treatment without an inactivation effect. One of those G. stearothermophilus strains was pasteurized on pilot-scale high-temperatures-short-time (HTST) and the cells were able to survive the treatment as well. For one A. flavithermus strain, thermal inactivation data was determined and modelled with two approaches. The work emphasizes, that milk pasteurization for the production of a low-spore powder regarding the vegetative cells is not sufficient. The adaptation of the process temperature is necessary.

Keywords
Thermophilic spore formers, Thermal inactivation, Milk powder processing
Pasteurization