

**143 Monitoring endospores and endospore-forming bacteria populations in commercial skim milk powder production plants.** C. Murillo\* and Rafael Jimenez-Flores, *California Polytechnic State University, San Luis Obispo, CA.*

The microflora of milk powder consists of a wide array of microorganisms of which special attention is given to *Bacillus* endospores. *Bacillus* endospores survive pasteurization and spray drying and inhabit the final powder product in the dormant state indefinitely. Once the powder is reconstituted, endospores may germinate, and through their enzymatic activity become detrimental to quality. The objectives of this study are to 1) enumerate mesophilic and thermophilic endospore populations during commercial, low-heat skim milk powder production, and 2) characterize the microbial ecology of this process using Terminal Restriction Fragment Patterns (TRFPs) in conjunction with the Ribosomal Data Base, and 3) compare the changes in bacteria populations during processing of low-heat, skim milk powder. Our approach is to observe these changes in commercial operations and to use the DPTC pilot plant as a model system. Fluid and powder skim milk samples were collected from two commercial milk powder facilities. Sampling points included the raw milk silo, separator, evaporator, and spray dryer. Microbial evaluation was normalized based on total solids. Every sample was evaluated for total aerobic plate count and mesophilic and thermophilic endospore counts. For TRFPs community DNA was extracted, amplified by PCR using 16s rDNA probes, and digested with *Hae*III and *Dpn*II. Endospore formers are predominant in condensed and powdered milk, and tend to increase in the powder with increasing processing time. In raw milk mesophilic and thermophilic endospores ranged from <25CFU/g to 70CFU/g and <25CFU/g to 10<sup>2</sup> CFU/g, respectively. In powder they ranged from <25CFU/g to 10<sup>3</sup> CFU/g and <25CFU/g to 10<sup>5</sup> CFU/g, respectively. Both endospore counts from skim milk showed an increasing trend with run time and rendered the powder out of the 10<sup>3</sup> CFU/g limit. In commercial samples TRF patterns successfully described microbial populations and a drastic change was observed between raw and powder milk for most runs.

**Key Words:** Endospore, Milk Powder, Production