

## Microbiological spotlights

## P5.47

**Sale of raw milk by vending machines in northern Germany: Food safety implications and other aspects****Böhnlein C.<sup>1</sup>, Eickelberg V.<sup>1</sup>, Habermann D.<sup>1</sup>, Fiedler G.<sup>1</sup>, Gieschler S.<sup>1</sup>, Franz C.M.A.P.<sup>1</sup>, Kabisch J.<sup>1</sup>**<sup>1</sup>Max Rubner-Institut, Department of Microbiology and Biotechnology, Kiel, Germany

The safety of raw milk sold in northern Germany was investigated in relation to hygiene quality parameters, the presence of food-borne pathogens (*Salmonella* spp., *Yersinia* spp., *Listeria monocytogenes*, *Staphylococcus aureus*, thermotolerant *Campylobacter*, shigatoxin-producing *Escherichia coli* (STEC)) and by way of consumer interviews.

With regard to EU regulation 853/2004, 2 of 50 milk samples exceeded the limit of the somatic cell count, which is 400,000 cells/ml. The aerobic mesophilic count was higher than 100,000 CFU/ml in 17 (34%) of the milk samples with a mean value of 4.7 log<sub>10</sub> CFU/ml. Counts of *Enterobacteriaceae*, pseudomonads and yeasts were detected at mean values of 2.5 log<sub>10</sub> CFU/ml, 3.7 log<sub>10</sub> CFU/ml and 3.1 log<sub>10</sub> CFU/ml, respectively. However, 24% of the raw milk samples exceeded *Enterobacteriaceae* counts of 3 log<sub>10</sub> CFU/ml, with up to 6.1 log<sub>10</sub> CFU/ml in one sample. More than 100 CFU/ml of *E. coli* were observed in 16% of the samples, whilst levels of *Pseudomonas* spp. greater than 5 log<sub>10</sub> CFU/ml were detected in 26% of raw milk samples. Overall, only every second raw milk sample tested met the previously mentioned hygiene criteria.

*Staph. aureus* occurred in 11% of raw milk samples, while foodborne pathogens such as *Salmonella* spp., *Listeria monocytogenes* and STEC could not be cultivated. *Campylobacter jejuni* was determined in an enrichment broth of one raw milk sample, while *Yersinia enterocolitica* was present in 66% of the raw milk samples, which was confirmed by 16S PCR analyses. However, for the *Y. enterocolitica* isolates, the virulence associated *ail* gene was not detected, which suggested that the isolates belonged to the apathogenic biovar 1A.

Evaluation of consumer habits, as determined in the interviews, revealed that their behavior may enhance the risk of infection linked to raw milk consumption, as about 75% of the interviewed consumers did not boil milk before consumption.

Although vending machines dispense raw milk, the consumers are generally instructed to boil the milk prior to consumption. If consumers follow these instructions, the microbiological risks associated with raw milk would be eliminated. Improved risk communication to consumers is therefore recommended.

**Keywords:** raw milk sale, food hygiene, food safety, consumer habits