

6. SUMMARY

A contribution to the bacteriological and hygienic risk assessment of raw milk and raw milk products from farm marketing with emphasis on pathogenic bacteria

During the last years farm marketing has significantly increased. The present study deals with the bacteriological-hygienic quality, particularly with pathogenic microorganisms of raw milk and raw milk products from farm marketing. 709 samples of raw milk and raw milk products were collected nationwide. Certified milk (a kind of raw certified grade A milk), ex-farm milk, raw milk cheeses (soft cheese, semihard and hard cheese) and other products made of raw milk underwent quality checks for *Listeria monocytogenes* (*L. monocytogenes*), *Bacillus cereus* (*B. cereus*), Verotoxin-producing *Escherichia coli* (VTEC), *Salmonella spp.* and *Campylobacter jejuni* (*C. jejuni*). *Staphylococcus aureus* (*S. aureus*), *Escherichia coli* (*E. coli*) and coliforms, which were valued as hygienic parameters according to the milk regulations 1995 (Milk Ordinance '95), were checked. The total bacterial count (TBC) and somatic cells of certified milk and raw milk were determined. Pursuant to the Milk Ordinance '95 raw milk cheese was investigated for staphylococcal enterotoxins. 35 strains of *B. cereus* isolated from raw milk and raw milk products were examined for cytotoxicity. 21 raw milk products were examined for heat-stable (ST) and heat-labile enterotoxin (LT).

12 of 74 bulk milk samples from farms producing certified milk contained *L. monocytogenes*. However, all the 12 *L. monocytogenes* positive samples came from one and the same farm of the 35 farms producing certified milk. The fact that the certified milk of this farm was sold over a longer period gives cause for concern. 54 % of the samples contained *S. aureus*, 59,5 % *E. coli* and 87,8 % coliforms. In 17 % or 22 % of the cases, the counts of *S. aureus* or coliforms exceeded the threshold value „M“ stipulated in the Milk Ordinance.

10 % of 149 bulk milk samples from farms selling raw milk were contaminated with *L. monocytogenes*, 8 % with *B. cereus*, 0,7 % each with VTEC and *C. jejuni* as well as 47 % with *S. aureus*. More than 80 % of the samples contained *E. coli* and coliforms.

In 22,8 % and in more than 80 % of 35 raw milk fresh cheese samples respectively *S. aureus* or *E. coli* as well as coliforms could be detected.

In 2,2 % of the samples from 89 raw milk soft cheeses *L. monocytogenes* was isolated. 5,6 % contained *B. cereus* and 2,4 % VTEC. In 28,1 % or in over 90 % of these products respectively *S. aureus* or *E. coli* as well as coliforms were detected.

2,0 % of the 245 semihard and hard cheese samples were contaminated with *L. monocytogenes*, 15,1 % with *B. cereus* and 1,4 % with VTEC. 31,4 % or more than 90 % of the samples respectively contained *S. aureus* or *E. coli* and coliforms.

All the VTEC serotypes in the present study have already been isolated in connection with human diseases.

Neither LT-, ST-enterotoxins nor *S. aureus* toxins could be detected in the subsequently analyzed products.

71,4 % of the 35 analyzed *B. cereus* strains showed cytotoxic activity.

The results of the present study show that part of the raw milk and raw milk products from farm marketing offered to the consumers do not fulfil the requirements of the food hygienic standards. Basically, the occurrence of pathogenic microorganisms in raw milk and raw milk products has even to be expected, to a smaller or larger extent. Thus there exists a health risk for the consumer.