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The survival and growth of *Bacillus cereus* and *Listeria monocytogenes*, during the manufacture of Ricotta Salata cheese

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Abstract

This study was conducted with the following objectives: 1) to investigate the survival and growth of *Bacillus cereus* during the manufacture of Ricotta Salata cheese; and 2) to investigate the survival and growth of *Listeria monocytogenes* during the manufacture of Ricotta Salata cheese.

The Ricotta Salata cheese was made by heating the whole milk to 95°C, and adding citric acid to coagulate the cheese curd. The cheese curd was inoculated with 7 log₁₀ CFU/g *B. cereus* broth and 8 log₁₀ CFU/g *L. monocytogenes* broth. After moulding for 12h, Ricotta Salata cheese was stored at 4°C for 1 week. During manufacture, the physico-chemical properties [pH, water activity (a_w), and Sodium chloride (NaCl) concentration] and bacterial counts were recorded.

The pH change fluctuated between 6.00 to 6.10 on the surface and 6.00 to 5.95 in the centre; the lowest a_w was approximately 0.96 on the surface and 0.97 in the centre; and the highest NaCl concentration was 3.3% on the surface and 3% in the centre.

The survival and growth of the two *B. cereus* strains (D1 and ATCC 13061) during the manufacture of Ricotta Salata cheese were similar. The *B. cereus* grew from approximately 5 log₁₀ CFU/g to a maximum of 7.7 log₁₀ CFU/g of cheese curd during moulding (20h at room temperature).

The survival and growth of the two *L. monocytogenes* strains (W1 and ATCC 35152) during the manufacture of Ricotta Salata cheese were similar. The difference between the bacteria count on the surface and in the centre was very small. *L. monocytogenes* increased from 5 to 6 log₁₀ CFU/g to a maximum of 8.6 log₁₀ CFU/g during manufacture and maintained a level of around 8 log₁₀ CFU/g in the final product.

The Ricotta Salata supported the survival and growth of *B. cereus* and *L. monocytogenes* during manufacture. It is important to improve the management of process hygiene for reducing the environmental contamination. Ideally, some lethal treatments should be

applied after the packaging of the cheese, to limit the contamination of Ricotta Salata with these two bacteria.

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