

Absence of growth of *Listeria monocytogenes* in naturally contaminated Cheddar cheese.

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Short-title: *L. monocytogenes* in Cheddar cheese

Abstract

Each cheese producer is responsible by the legislation for the number of *L. monocytogenes* in cheese and is required to prove that numbers will not exceed 100 cfu/g throughout the shelf-life of the cheese. Even in the case of hard-cheese such as Cheddar cheese, the absence of growth of *L. monocytogenes* over the cheese ripening has to be demonstrated to comply with EU legislation. Studies dedicated to assessing *L. monocytogenes* growth throughout cheese shelf-life are generally based on artificially contaminated cheeses. Contrary to the majority of works, the current study focused on the growth of *L. monocytogenes* in naturally contaminated raw milk farmhouse Cheddar cheeses during a five-month ripening period. *L. monocytogenes* growth was assessed by direct count and its presence was detected by enrichment in two naturally contaminated cheese batches. In order to track routes of contamination, 199 processing environment samples from inside and outside the processing facility, and their analysis for the presence of *L. monocytogenes* was performed on four occasions over a 9-month period. *L. monocytogenes* isolates were differentiated using PFGE and serotyping. *L. monocytogenes* never exceeded 20 cfu/g in the cheeses and could not be detected after five months of ripening. Eleven pulsotypes were identified. One pulsotype was found in the yard outside the processing facility, in a vat, on the processing area floor and in a cheese. This indicated that the outside environment constitutes a potential source of contamination of processing environment and of the cheese. These results demonstrate that this farmhouse Cheddar cheese does not support *L. monocytogenes* growth and suggests that the efforts to reduce processing environment contamination are worthwhile.

Keywords: Natural contamination, Farmhouse cheese, Cheese processing facility, *Listeria monocytogenes*, Food safety.