Key messages:
- A rare mutation leading to truncated InlA has been identified in a cluster of isolates correlated to the production chain of two PDO cheeses.
- Truncated inlA is suggestive of adaptation to the niche to the detriment of virulence.

Rare internalin A premature stop codon on Listeria monocytogenes on Italian PDO cheeses isolates

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Background:
Listeria monocytogenes is a widespread foodborne pathogen that causes listeriosis, a human infection with low morbidity but high mortality. Internalin A (InlA), a L. monocytogenes virulence factor, has a key role in the invasion of human intestinal epithelium through the interaction with E-cadherin receptor. Truncated InlA caused by premature stop-codons (PMSC) have been correlated with attenuated virulence. To date, 29 mutations leading to a PMSC have been reported. In this study, we identified a rare PMSC mutation widespread in isolates from the production chain of the Gorgonzola and Taleggio PDO cheeses.
Methods:
Within an ongoing monitoring plan for the characterization of L. monocytogenes, a total of 81 isolates collected in Lombardy (Northern Italy) from food, food processing environments, and clinical cases, between 2013-2021, were characterized using multilocus sequence tying (MLST) and then screened for the presence of PMSC by sequencing the 2400 pb inlA gene.
Results:
A mutation leading to PMSC was identified on the position 277 (PMSC mutation type 26). To date, this mutation has been reported only on a CC7 strain from a clinical case. In our study, all isolates harbouring this mutation (n = 21) belong to ST325 (CC31, serotype 1/2a). Among these, 86% (n = 18) belong to the production chain of the Gorgonzola and Taleggio PDO cheeses.
Conclusions:
To the best of our knowledge, this is the first report of PMSC mutation type 26 on food and environmental isolates. Although PMSC 26 is rarely found worldwide, our findings suggest that ST325 with this mutation is widespread in the production chain of the two PDO cheeses, and the presence of this PMSC may be correlated with the low incidence of ST325 clinical cases.