

Listeria Monocytogenes Lineage Type I: The Dominant Type in Two Ready-to-Eat Food Factories Despite Absence of Certain Sanitiser Resistance Genes

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Abstract

Listeria monocytogenes lineage type II is better suited for growth within food factories over the more pathogenic lineage I. Seeing an increased prevalence of lineage type I in factories producing ready-to-eat (RTE) food would be concerning as it would show that L. monocytogenes with a higher virulence potential can survive more readily. To reduce the risk of listeriosis infections an understanding of a factory's sanitiser use, and bacterial sanitiser resistance profile is important to ensure appropriate sanitiser selection. Quaternary ammonium compound (QAC)-based sanitisers have been used extensively in food processing environments (FPEs) as part of sanitation procedures and L. monocytogenes resistance towards QACs is well noted internationally.

The purpose of this study was to lineage type and screen for sanitiser resistance genes in L. monocytogenes from two South African factories producing RTE food. We determined the effect of historical sanitiser usage on strains from a factory that had never used a QAC (Factory A) and another with extensive QAC usage (Factory B). L. monocytogenes (N=48) from these two food factories (Factory A (n=24) and Factory B (n=24)) were phenotypically isolated from the factory environment (floors, drains) and food contact surfaces and confirmed as L. monocytogenes through PCR of the hlyA housekeeping gene.

PCR-RFLP of the hlyA gene assigned lineage types. A PCR assay identified chosen QAC sanitiser resistance genes (bcrABC and emrC). All the isolates (N=48) were confirmed to be L. monocytogenes due to the presence of the hlyA housekeeping gene. All the isolates were typed as lineage type I and only two isolates, both from factory B, were found to have the emrC gene: encoding resistance towards QACs.

This research highlights that lineage I isolates are outcompeting lineage II isolates within these two factories, despite a notable absence of these chosen QAC-resistance genes. This is concerning for both food producers and the wider community, should lineage I isolates enter final product.

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Kyle Corbett is a PhD Food Science candidate and the Centre for Food Safety at Stellenbosch University's Food Science department. His research focuses on the control of Listeria monocytogenes in food factories. He is passionate about ensuring the production of safe food.