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Listeria monocytogenes is a pathogenic foodborne microorganism noted for its ability to survive in the environment and food processing facilities. Survival may be related to the phenotype of individual strains including the ability to form biofilms and resist desiccation and/or sanitizer exposure. The objectives of this research were to compare 14 L. monocytogenes strains isolated from blood (3), food (6) and water (5) with respect to their benzalkonium chloride (BAC) sensitivity, desiccation resistance, and ability to form biofilm. Correlations were tested between those responses, and the presence of the SSI-1 (Stress Survival Islet) and LGI1/CC8 (Listeria Genomic Island 1 in a clonal complex 8 background) genetic markers. Genetic sequences from four strains representing different phenotypes were also probed for predicted amino acid differences in biofilm, desiccation, and membrane related genes. The water isolates were among the most desiccation susceptible strains, while strains exhibiting desiccation resistance harboured SSI-1 or both the SSI-1 and LGI1/CC8 markers. BAC resistance was greatest in planktonic LGI1/CC8 cells (relative to non-LGI1/CC8 cells), and higher BAC concentrations were also needed to inhibit the formation of biofilm by LGI1/CC8 strains during incubation for 48 h and 6 days compared to other strains. Formation of biofilm on stainless steel was not significantly (p > 0.05) different among the strains. Analysis of genetic sequence data from desiccation and BAC sensitive (CP4 5-1, CP5 2-3, both from water), intermediate (Lm568, food) and desiccation and BAC resistant (08 5578, blood, human outbreak) strains led to the finding of amino acid differences in predicted functional protein domains in several biofilm, desiccation and peptidoglycan related genes (e.g., lmo0263, lmo0433, lmo0434, lmo0771, lmo0973, lmo1080, lmo1224, lmo1370, lmo1744, and lmo2558). Notably, the LGI1/CC8 strain 08-5578 had a frameshift mutation in lmo1370, a gene previously associated with desiccation resistance. In conclusion, the more desiccation and BAC resistant LGI1/CC8 isolates may pose a challenge for sanitation efforts.

General information
State: Published
Organisations: National Food Institute, Research Group for Analytical and Predictive Microbiology, Dalhousie University, Agriculture and Agri-Food Canada
Pages: 254-261
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: International Journal of Food Microbiology
Volume: 257
ISSN (Print): 0168-1605
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.76 SJR 1.366 SNIP 1.436
Web of Science (2017): Impact factor 3.451
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.97 SJR 1.481 SNIP 1.553
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.02 SJR 1.614 SNIP 1.683
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 3.62 SJR 1.493 SNIP 1.695
Web of Science (2014): Impact factor 3.082
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.8 SJR 1.612 SNIP 1.841
Web of Science (2013): Impact factor 3.155