



Seasonal ability of Biofilm formation of *Listeria monocytogenes* strains isolated from slaughterhouses in Quebec

Cherifi Tamazight¹, Neira Kersti², Fournaise Sylvain², Surprenant Charles³, Quessy Sylvain¹, Fravalo Philippe^{1*}

⁽¹⁾ Research chair in meat safety, Université de Montréal, Saint-Hyacinthe, Québec, Canada

⁽²⁾ Olymel, Québec, Canada

⁽³⁾ F.Ménard, L'Ange-gardien, Québec, Canada

*Corresponding author: philippe.fravalo@umontreal.ca

Abstract

Listeria monocytogenes is a pathogenic bacterium found in the environment and food. It causes listeriosis, a serious disease that presents largest fatality rate among foodborne illness. The persistence of these bacteria in food processing plants, favoured by biofilm formation, is a major concern both for industry and public health. The aim of the study was to compare strains isolated from three sectors in slaughter/cutting plants for their ability to form biofilms. The strains were isolated from holding pens, slaughtering, and cutting in 4 slaughterhouses and for 3 different periods of the year. Biofilm formation analyses were performed on 186 strains under static conditions at 30 °C for 48 hours and 7 °C for 15 days, frequent temperature in meat processing plants. Biomass production in BHI was measured in microplates after staining with crystal violet and measuring the absorbance at 595 nm, the data were normalized to obtain inter strain comparability in 96 well plate. Results show significant difference in biofilm formation between strains according to the period of sampling and the origin of strains (slaughterhouse). Biofilm formation by strains isolated during the sampling of period 2 (February to may 2014) were greater than in summer 2015, at 30 °C ($p < 0,0001$) and at 7 °C ($p = 0,019$). Strains isolated from plants 1 and 2 produced more biomass than those collected from plant 4 at 30 °C ($p = 0,0015$) and 7 °C, biofilm formation in isolates from plants 1 and 2 were greater than in strains from plants 3 and 4 ($p < 0,0001$). No difference in biofilm formation ability was revealed depending on the place sampled in the plant (holding pens, slaughter or cutting rooms), whatever the temperature tested. Among strains studied here, strong differences in biofilm forming ability were identified; these results are the beginning of our investigation aiming to further investigate the question of strain persistence.