Study of the ability to form biofilms of microorganisms isolated from the milk industry in Canada

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The ability of microorganisms to form biofilms has become a major problem in the dairy industry in Canada, notably by affecting the quality and the safety of the by-products. Established biofilms are difficult to remove during the CIP cleaning system and may become resistant to sanitizers. Therefore, it is important to identify and characterize the microorganisms associated to biofilm in the Canadian dairy industry, allowing to develop improvement strategies of biofilm control. The purpose of this study is to evaluate the ability to form biofilms by spoilage microorganisms isolated in processing plants in Canada. For this purpose, 19 strains were isolated from problems associated with the formation of biofilms in the dairy industry and identified using a MALDI-TOF mass spectrometer. The single species biofilm production of these isolates was then measured after a crystal violet coloration using 96-well microplates. The results revealed different biofilm formation profiles depending of the isolates in culture medium. Indeed, 7/19 isolates are moderate or strong biofilm producers and 12/19 isolates are negative or weak biofilm producers. Furthermore, enzymatic treatments revealed that the composition of the biofilms was different depending of the species but also the isolates. In conclusion, the results suggest that some of the isolates collected in the dairy industry have the ability to produce moderate or strong biofilms and thus, to facilitate the persistence of other spoilage microorganisms but also potential pathogenic microorganisms such as Listeria monocytogenes. The characterization of those biofilms will be helpful to the development of an effective approach allowing a better control of the biofilms in the dairy industry.