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**Effect of heavy water incorporation on the viability of *Listeria innocua***

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*Listeria innocua* is a Gram-positive ubiquitous bacterium, widely distributed in a range of environments (vegetation, water, soil) and in food-processing environments. *L. innocua* has the phenotypic characteristic close of *Listeria monocytogenes* specie, an important foodborne pathogen and the etiological agent of human listeriosis, a rare but frequently fatal disease. *L. innocua* is non-pathogenic bacteria although excessively rare cases of *L. innocua* septicemia and meningitis infections have been reported in human and ruminants. Bacteria in the viable but non culturable (VBNC) state have very low metabolic activity and do not divide. Consequently, VBNC cells do not grow on standard microbiological media but retain the ability to recover and become culturable under favourable conditions (ie. resuscitation). Different environmental stresses can induce the VBNC state during food processing, such as starvation, oxidative stress, temperature changes and disinfection.. An innovative approach is to use mass spectrometry, Raman spectroscopy coupled with heavy water labelling of metabolism appears to be an innovative technique for the study of bacterial metabolism and spectral changes. We evaluated the impact of heavy water incorporation on the viability state of *L. innocua* cells (Viable Cultivable (VC) or VBNC) by Raman spectroscopy. We exposed the *L. innocua* bacterial suspension to different heavy water concentrations (0%, 25%, 50% and 75%) during 0h30, 1h00, 1h30, 2h, 4h, 6h, 12h, 24h, 48h, 72h and 96h. For each conditions, total, viable (VC and VBNC) and VC populations were quantified by qPCR, PMA-qPCR and plate count agar respectively. In parallel, we analyzed heavy water absorption by Raman spectroscopy. The results of the quantification showed that exposure to deuterium does not affect the viability of *L. innocua* cells.

**Mots clés :** Listeria - Heavy water - Metabolism - VBNC - PMA-qPCR.