



Characterization of relative abundance of lactic acid bacteria species in French organic sourdough by cultural, qPCR and MiSeq high-throughput sequencing methods

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In order to contribute to the description of sourdough LAB composition, MiSeq sequencing and qPCR methods were performed in association with cultural methods. A panel of 16 French organic bakers and farmer-bakers were selected for this work. The lactic acid bacteria (LAB) diversity of their organic sourdoughs was investigated quantitatively and qualitatively combining (i) *Lactobacillus sanfranciscensis*-specific qPCR, (ii) global sequencing with MiSeq Illumina technology and (iii) molecular isolates identification. In addition, LAB and yeast enumeration, pH, Total Titratable Acidity, organic acids and bread specific volume were analyzed. Microbial and physico-chemical data were statistically treated by Principal Component Analysis (PCA) and Hierarchical Ascendant Classification (HAC). Total yeast counts were 6 log₁₀ to 7.6 log₁₀ CFU/g while LAB counts varied from 7.2 log₁₀ to 9.6 log₁₀ CFU/g. Values obtained by *L. sanfranciscensis*-specific qPCR were estimated between 7.2 and 10.3 log₁₀ CFU/g, except for one sample at 4.4 log₁₀ CFU/g. HAC and PCA clustered the sixteen sourdoughs into three classes described by their variables but without links to bakers' practices. *L. sanfranciscensis* was the dominant species in 13 of the 16 sourdoughs analyzed by Next Generation Sequencing (NGS), by the culture dependent method this species was dominant only in only 10 samples. Based on isolates identification, LAB diversity was higher for 7 sourdoughs with the recovery of *L. curvatus*, *L. brevis*, *L. heilongjiangensis*, *L. xiangfangensis*, *L. koreensis*, *L. pontis*, *Weissella* sp. and *Pediococcus pentosaceus*, as the most representative species. *L. koreensis*, *L. heilongjiangensis* and *L. xiangfangensis* were identified in traditional Asian food and here for the first time as dominant in organic sourdough. This study highlighted that *L. sanfranciscensis* was not the major species in 6/16 sourdough samples and that a relatively high LAB diversity can be observed in French organic sourdough.

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