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Fermentation Characteristics of Salinity-Adapted *Lactococcus lactis* subsp. *lactis* Isolated from Coastal Environments

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Summary

The lactic acid bacteria *Lactococcus lactis* subsp. *lactis* plays an important role in traditional fermented milk. Compared to the type strain that isolated from traditional fermented milk starter, the strains isolated from coast (*satoumi*) in Japan had shown some different properties, such as fermentability of soy milk as well as salt tolerance. In this study, effects of salinity adoption on antimicrobial resistance (AMR: which is problematic when used as a starter or probiotic) and fermentability of milk and legumes in the *L. lactis* subsp. *lactis* type strain and a selected *satoumi* strain were examined. The 31 *satoumi* strains rather than type strain were highly AMR to the five antibiotics (vancomycin, ciprofloxacin, streptomycin, gentamicin, kanamycin) examined by the disc method. The selected *satoumi* strain (Himuka-SU2) was able to grow at 6% (w/v) salinity. Interestingly, the AMR was increased by 24h acclimation incubation in a medium containing 3.4% salt, and the effect on the type strain was stronger than that on Himuka-SU2. Fermentability tests on milk and emulsified foods prepared from beans (soya beans, chickpeas and lentils) showed that the type strain could only ferment milk, whereas Himuka-SU2 fermented all samples. The effect of salt acclimatisation incubation on this fermentability was not clear. Comparison of the whole genome sequence of Himuka-SU2 with the type strain showed no difference in the AMR-related genes. In contrast, sucrose degrading enzyme-related genes, such as sucrose operon repressor *scrR,* sucrose-6-phosphate *scrB,* and phosphotransferase system (PTS) sucrose-specific IIB component, were detected only in Himuka-SU2 that were not detected in the type strain. The expression of the relevant genes needs to be studied in more detail in the future.