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Characterization of diversity and probiotic efficiency of the autochthonous lactic acid bacteria in the fermentation of selected raw fruit and vegetable juices

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The diversity of indigenous lactic acid bacteria (LAB) in fermented broccoli, cherry, ginger, white radish and white fleshed L pitaya juices were analyzed using culture independent and dependent approaches. The major properties of selected probiotic strains using broccoli as the fermented substrate, including dynamic variations in pH, viability counts, antibiotic resistance, bacterial adhesion to hydrocarbons and survivability during simulated gastrointestinal transit were investigated. Within broccoli and ginger juices, Lactobacillus occupied the dominant position (abundances of 79.0% and 30.3% respectively); within cherry and radish, Weissella occupied the dominant position (78.3% and 83.2% respectively); and within pitaya, Streptococcus and Lactococcus occupied the dominant position (52.2% and 37.0% respectively) Leuconostoc mesenteroides, Weissella. cibaria/ soli/confusa, Enterococcus gallinarum/durans/hirae, Pediococcus pentosaceus, Bacillus coagulans and Lactococcus garvieae/ lactis sub sp., cremoris were identified by partial 16S rRNA gene sequencing. Overall, the selected autochthonous LAB isolates showed no significant differences compared to commercial strains with regards to growth rates or acidification in fermented broccoli juice; meanwhile, among all isolates of L. mesenteroides B4-25 showed the highest antibiotic resistant profile equal to that of L. plantarum CICC20265 and suitable adhesion properties, demonstrating binding of 13.4±5.2%~36.4±3.2% and 21.6±1.4%~69.6±2.3% to ethyl acetate and xylene, respectively. Furthermore, P. pentosaceus Ca-4 and L. mesenteroides B-25 featured the highest survival rates after simulated gastro intestinal transit of 22.4±2.6% and 21.2±1.4% respectively. These results indicated a high level of diversity in the autochthonous bacterial community in fermented fruit and vegetable juices (FVJs) and demonstrated the potential of these probiotic candidates for applications in fermentation.

Recent Publications

- 1. Haiyan Gao and Xinxing Xu (2016) Isolation, identification and characterization of bacillus subtilis CF-3, a bacterium from fermented bean curd for controlling the postharvest diseases of peach fruit. Food Science and Technology Research. 22(3):377-385. Doi:10.3136/fstr.22.377.
- Haiyan Gao and Xinxing Xu (2017) Optimization of headspace solid-phase microextraction for GC-MS analysis of volatile compounds produced by biocontrol strain Bacillus subtilis CF-3 using response surface methodology. Food Science and Technology Research. 23(4):583-593. Doi:10.3136/fstr.23.583.
- Haiyan Gao, Peizhong Li and Xinxing Xu (2018) Research on volatile organic compounds from Bacillus subtilis CF-3: biocontrol effects on effects on fruit fungal pathogens and dynamic changes during fermentation. Frontiers in Microbiology 9:456. Doi:10.3389/fmicb.2018.00456
- Dongsheng Luo, Xueli Pang and Xinxing Xu (2018) Identification of cooked off-flavor components and analysis of their formation mechanisms in melon juice during thermal processing. Journal of Agricultural and Food Chemistry. 66(22):5612-5620. Doi: 10.1021/acs.jafc.8b01019.
- Xinxing Xu (2018) Comparative study of high hydrostatic pressure and high temperature short time on quality of clear and cloudy se-enriched kiwifruit juices. Innovative Food Science and Emerging Technologies. Doi: 10.1016/j. ifset.2018.07.010.

Biography

Xinxing Xu is currently a PhD candidate at China Agricultural University, P R China. She has her expertise in processing and storage of agriculture products, especially on food flavor, fruit and vegetable processing and preservation technology and theory, fruit and vegetable resources comprehensive utilization.

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