

Induction of a viable but non-culturable state in *Salmonella typhimurium* is correlated with free radicals generated by thermosonication

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It was found that a small subpopulation of *Salmonella typhimurium* in pure culture was induced into a Viable But Non-Culturable (VBNC) state during Thermo-Sonication (TS) processing in our previous study, though few known about the situation in real food and how bacteria were induced into that special state. Based on the speculation that free radicals generated during TS affected induction of VBNC, the relationship between them was investigated preliminarily. It was observed that higher intensity of TS treatment, such as higher power, elevated temperature and prolonged duration resulted in more viable *S. typhimurium* cells in carrot juice been induced into VBNC state. The ESR spectra revealed three kinds of free radicals, including carbon centered (ethanol) radicals, hydroxyl radical and hydrogen protons were generated in carrot juice during TS processing. The intensity of free radicals was tied to the TS processing parameters and also influenced the occurrence of VBNC. A nonlinear sigmoidal curve of the intensity of free radicals VS the VBNC incidence index in three stages, including a slow phase (with free radicals intensity of 0~0.10), a rapid growth phase (with free radicals intensity ranged 0.10~0.14) and a final equilibrium phase (with free radicals intensity greater than 0.14), was observed and well fitted with the Boltzmann model. Moreover, the significance of free radicals generated during TS processing for induction of VBNC state was verified and confirmed with 0~200 mM sodium pyruvate. The obtained results may contribute to understand the complicated phenomenon and guide the application of TS as a decontamination technique.

Biography

Hongmei Liao pursued her PhD from China Agricultural University of Food Science, P R China. Her interest lies in controlling pathogen and spoiling microorganisms in food focused in this area. She has published more than 20 papers in reputed journals.

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