

Impact of high pressure processing extraction on antibacterial activity of white tea extracts

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Tea mainly produced as white, green, Oolong, and black is a common consumed beverage after water all around the world. White tea, an unfermented tea, is made from very young tea leaves or buds. White tea extracts (WTE) have shown as an antioxidant, antibacterial, and antifungal activities. Although there is a little information on antibacterial activity of white tea, its antibacterial activity is thought to be due to a group of polyphenols called catechins, caffeine and theobromine. However, there is no reported study about the effect of high hydrostatic pressure processing (HPP) on antibacterial activity of white tea. Therefore, effects of HPP on antibacterial activity of WTE against different microorganisms at different solid/liquid ratio under different HPP processing parameters were investigated.

Antibacterial assay was conducted by dilution method at three different concentrations (50, 150, 300 $\mu\text{L}/\text{mL}$) of HPP white tea extracts obtained by different solid/liquid ratio (0.01-0.03%), pressure (300-500 MPa) and infusion time (120-600 s) in water as an extraction solvent against *Escherichia coli O157:H7* and *Salmonella Enteritidis*. HPP treatment is applied at room temperature and the levels of HPP parameters were determined by preliminary studies. Among the variables studied, solid/liquid ratio and infusion time showed significant effects ($p < 0.05$) on antibacterial activity against *E. coli O157:H7*, whereas only pressure presented significant effects ($p < 0.05$) on antibacterial activity against *S. Enteritidis*. Depending on the various process parameters, the antibacterial effect against *S. Enteritidis* was 4 log cfu/mL reduction in the control samples of 6 cfu/mL initial count ($p < 0.05$). Moreover, the antibacterial effect against *E. coli O157:H7* was 6 log cfu/mL reduction in control samples of 7 log cfu/mL initial count ($p < 0.05$). While WTE had strong antibacterial activity against *S. Enteritidis* with solid/liquid ratio of 0.01% at the highest pressure (500 MPa) and longest infusion time (600 s); its stronger antibacterial activity against *E. coli O157:H7* was observed with solid/liquid ratio of 0.01% at the highest infusion time (600 s). Thus, it is concluded that depending on the HPP parameters and solid/liquid ratio WTE carries out the good antibacterial activity against zero tolerance foodborne pathogens of *E. coli O157:H7* and *S. Enteritidis*.

Keywords: Antibacterial activity, white tea extracts, high hydrostatic pressure