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The Combined Effect of Moderate Pressure and Chitosan on *Escherichia coli* and *Staphylococcus aureus* Cells Suspended in a Buffer and on Natural Microflora of Apple Juice and Minced Pork

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Summary

The effect of chitosan and pressure of 193 MPa at $-20\text{ }^{\circ}\text{C}$ on *Escherichia coli* and *Staphylococcus aureus* cells suspended in a buffer at $\text{pH}=5.8$ as well as on the natural microflora of minced pork and apple juice has been evaluated. Immediately after pressure treatment of the tested bacteria in the presence of chitosan, the synergistic antimicrobial effect was higher against *E. coli* than against *S. aureus*, which amounted to additional 3.6 and 0.7 log cycles, respectively, compared to either treatment acting alone. However, incubation of *S. aureus* cells for 20 h at $37\text{ }^{\circ}\text{C}$ after pressure treatment in the presence of chitosan led to complete inactivation of these bacteria. The combined effect of moderate pressure and chitosan did not decrease the total bacterial or psychrophilic and psychrotrophic count in minced pork in comparison with meat treated only with one factor, but the growth of psychrophilic and psychrotrophic bacteria was inhibited during storage up to 8 days at $5\text{ }^{\circ}\text{C}$. In apple juice, the combined effect of moderate pressure and chitosan only slightly increased the inactivation of bacterial population. However, during storage of samples at $5\text{ }^{\circ}\text{C}$ for 15 days, the total bacterial count was about 1 log cycle lower than after the pressure treatment, while psychrophiles and psychrotrophs were not detected in 1 mL of the samples. The yeasts in apple juice were inactivated after pressure treatment alone. Synergistic reduction of moulds amounted to 2 log cycles and increased during storage at $5\text{ }^{\circ}\text{C}$. After 5 days, moulds were not detected in 1 mL of the samples.

Key words: inactivation of microorganisms, moderate pressure, subzero temperature, chitosan

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