Streszczenie w języku angielskim

The ability of bacteria to adapt to stressful conditions is a key factor determining their survival and posing a threat to food safety. High-pressure processing (HPP) is of particular significance, as, in addition to inactivating microorganisms, it can induce sublethal stress and trigger changes at the phenotypic and molecular levels.

The aim of this study was to assess the effect of HPP on the survival, virulence, antibiotic resistance and potential for the transfer of resistance genes in *Listeria monocytogenes* strains isolated from food and its production environment, including the durability of the observed changes following cell recovery.

The effectiveness of inactivation was shown to depend on the pressure value and the type of food matrix. A pressure of 200 MPa did not result in a significant reduction in cell numbers, whereas 400 MPa led to their elimination below the detection limit under in vitro conditions. Sublethal parameters allowed for bacterial recovery, which was observed after 72 hours both in vitro and in situ. It was found that HPP treatment led to changes in the antibiotic resistance profile and the modulation of gene expression associated with virulence and resistance. These changes persisted after cell recovery and included an increase in minimum inhibitory concentrations (MICs) and enhanced resistance to, among others, tetracycline, lincomycin and fosfomycin, as well as changes in the expression of the *tet*, *hly,* and *actA* genes. Furthermore, the effect of HPP on increasing the frequency of resistance gene transfer was demonstrated, particularly under in situ conditions.

The results obtained indicate that, despite the high efficacy of HPP, its sublethal effect may promote the consolidation of adaptive changes in *L. monocytogenes*. This highlights the need to optimize process parameters and to consider the regenerative capacity of bacteria in food safety assessments.