Cellular response of Campylobacter jejuni to trisodium phosphate

The highly alkaline compound trisodium phosphate (TSP) is used as an intervention to reduce the load of Campylobacter on poultry meat in U.S. poultry slaughter plants. The aim of the present study was to investigate the cellular responses of Campylobacter jejuni NCTC11168 when exposed to sublethal concentrations of TSP. Preexposure of C. jejuni to TSP resulted in a significant increase in heat sensitivity, suggesting that a combined heat and TSP treatment may increase reduction of C. jejuni. A microarray analysis identified a limited number of genes that were differently expressed after sublethal TSP exposure; however, the response was mainly associated with ion transport processes. C. jejuni NCTC11168 nhaA1 (Cj1655c) and nhaA2 (Cj1654c), which encode orthologues to the Escherichia coli NhaA cation/proton antiporter, were able to partially restore TSP, alkaline, and sodium resistance phenotypes to an E. coli cation/proton antiporter mutant. In addition, inhibition of resistance-nodulation-cell division (RND) multidrug efflux pumps by the inhibitor PaβN (Phe-Arg β-naphthylamide dihydrochloride) decreased tolerance to sublethal TSP. Therefore, we propose that NhaA1/NhaA2 cation/proton antiporters and RND multidrug efflux pumps function in tolerance to sublethal TSP exposure in C. jejuni. ©American Society for Microbiology. All rights reserved.