ACID TOLERANCE AND ASSOCIATED ORGANIC ACID SUSCEPTIBILITY AMONGST GRAM-NEGATIVE FOOD-BORNE BACTERIA

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Acid- and acidified foods have for many years been considered safe without further treatments; primarily as a result of the organic acid(s) present in these products. However, conclusive information is still lacking on the respective inhibitory effects of particular organic acids and pH on food-borne pathogens. It is, therefore, imperative to determine the two-way role of organic acids in acid tolerance and bacterial inhibition. The study investigated the effect of acid tolerance induction on organic acid susceptibility amongst some common Gram negative food-borne pathogens in specific foodstuffs.

Bacterial isolates were screened for acid-tolerance, by determining viable counts before acid challenge and at various times thereafter. Acid tolerance was induced in susceptible strains and minimum inhibitory concentrations of six organic acids were determined at various pH levels for parent- and induced strains.

Susceptibility testing demonstrated varying responses from the different bacterial strains after low pH exposure. No specific relationship was noted between the type of foodstuff and the effectiveness of a specific organic acid. However, decreased susceptibility occurred in each organism to at least one organic acid after exposure to at least one of the acidic foodstuffs e.g. Pseudomonas aeruginosa showed decrease susceptibility to potassium sorbate after exposure to chopped gherkins (64 mM vs 16 mM).

The application of organic acids in effective food preservation and safety control should be executed with caution, specifically in acidic foodstuffs. Organic acid activity was also more effective at lower pH values, which may have influenced the activity of organic acids in acid susceptible strains.