

Title Prediction of coliforms and *Escherichia coli* on tomato fruits and lettuce leaves after sanitizing by using Artificial Neural Networks

Author Suwimon Keeratipibul, Apiniharn Phewpan and Chidchanok Lursinsap

Citation LWT - Food Science and Technology, Volume 44, Issue 1, January 2011, Pages 130-138

Keywords Sanitizer; Lettuce; Tomato; *Escherichia coli*; Prediction; Artificial Neural Networks

Abstract

The objectives of this study were to investigate the efficacy of two sanitizers, i.e. hypochlorous and peracetic acids, in reducing coliforms and *Escherichia coli* levels on tomato fruits and lettuce leaves, and to mathematically predict the relationship among the initial bacterial load, type of vegetable/fruit, types and concentration of sanitizer and residual microorganism levels after the sanitizing, by applying artificial neural networks (ANNs). The *E. coli* and coliforms used in this study were isolated from the two food types, and their cultures were activated in Tryptic Soy Broth (ca. 6–7 log₁₀ cfu/ml) before inoculating onto the fruit and vegetable. Both sanitizers reduced the number of the micro-organisms. However, as the hypochlorous acid concentration was increased, the level of viable coliforms and *E. coli* on the tomato fruits was reduced around 2–3 log₁₀ cfu/g ($p \leq 0.05$), compared to only about 1 log₁₀ cfu/g reduction on lettuce leaves ($p \leq 0.05$). Conversely, when the peracetic acid concentration was increased, the coliforms and *E. coli* levels on tomato fruits were reduced by some 3–4 log₁₀ cfu/g ($p > 0.05$) compared to only about 2 log₁₀ cfu/g on lettuce leaves ($p > 0.05$). The best sum square error from the neural prediction of residual coliforms and *E. coli* were 0.50 and 0.84, respectively, and the maximum R² of residual coliforms and *E. coli* were 0.85 and 0.72, respectively. Only one hidden layer with three hidden neurons for coliforms and five for *E. coli*, were required to model this data.