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Modeling the combined resistance to microwave treatments and salt conditions of *Escherichia coli* and *Staphylococcus aureus*.

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Abstract

In the present study, the efficiency of the combined effect of microwave irradiation treatments together with salt concentration was assessed against *Escherichia coli* and *Staphylococcus aureus*. Microbial survival has been modeled through a one-step Weibull equation considering the non-isothermal profiles during the heating treatments. Three sodium chloride concentrations 0.5%, 3.5%, and 8.5% (w/v) treated under three microwave power levels (450, 600, and 800 W) were studied. Predictive models were validated using the determination coefficient (R^2), root mean squared error and the acceptable prediction zone with external data obtained from ultra high temperature milk. The results obtained suggested that increasing microwave power levels and decreasing salt concentrations led to a higher microbial inactivation, being the δ values (time for achieving a first decimal reduction) for *E coli* of 19.57 s at 800 W and 0.5% NaCl. In contrast, experimental data of *S aureus* showed a higher variability since it presented more resistance to the microwave treatments. The results obtained and generated models can be used as decision-making tools to set specific guidelines on microwave treatments for assuring food safety.

Keywords: Dynamic inactivation; *Escherichia coli*; *Staphylococcus aureus*; Weibull models; hurdle technology.