Title Modeling the growth of *Salmonella* spp. on cut tomatoes

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Abstract

Tomato-associated *Salmonella* outbreaks have recently become a significant food safety concern. Temperature abuse of cut tomatoes may have played a role in some of these outbreaks.

The purpose of this study was to develop a mathematical model to describe the growth of *Salmonella* on cut tomatoes at various temperatures.

Four *Salmonella* serotypes (*Salmonella* Typhimurium, *Salmonella* Newport, *Salmonella* Javiana, *Salmonella* Braenderup) obtained from previous tomato-linked cases of salmonellosis were used in this study. These four serotypes were cultured separately, combined into a cocktail and inoculated onto whole red round tomatoes and allowed to dry overnight. The tomatoes were then cut into pieces and incubated at a predetermined range of temperatures (10, 12.5, 15, 18.5, 20, 22.5, 25, 27.5, 30, and 35°C). *Salmonella* concentration was measured at specified time intervals to determine the growth curve for *Salmonella* on cut tomatoes at each temperature. The growth rates were calculated using DMFit and used to build a mathematical model to illustrate the relationship between the growth rates of *Salmonella* on tomatoes and incubation temperatures from 10-35°C.

The resulting model compared favorably with a *Salmonella* growth model for raw poultry developed by our laboratory. The Pathogen Modeling Program under-predicted growth at low temperatures and over predicted growth at high temperatures. ComBase predicted consistently slower growth rates than were observed in tomatoes, but showed parallel increases in growth rate with increasing temperature.