

Title: Chlorination of poultry chiller water: chlorine demand and disinfection efficiency.

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Abstract: A study was conducted to determine the general composition of equilibrated poultry chiller water (near maximum solids content) from a commercial operation, the chlorine consumption by its components, and the chlorine dosage necessary to achieve its disinfection. The equilibrated chiller water contained .35% (CV, 40%) solids, which consisted of lipids (56%), ash (33%), and total nitrogen (4.2%). Residual chlorine and survival of aerobic bacteria were determined in chiller water dosed with chlorine levels ranging from 0 to 400 ppm. Initially, the added chlorine was rapidly consumed by the components of chiller water. However, the consumption rate quickly decreased to 1/1,000 of the initial rate after about 50 min. The change of residual chlorine with time was found to fit mathematically to a two-term exponential equation. The equilibrated chiller water had a chlorine demand greater than the highest chlorine dosage tested (400 ppm). No free chlorine was detected in the water after 30 min of exposure to 300 ppm chlorine. Because of the high chlorine demand, dosages of 100 to 150 ppm chlorine were required to reduce the number of bacteria by at least 99% within 3 to 5 min in laboratory tests. Increasing the time of exposure to chlorine resulted in further reduction, although at a slow rate, of surviving bacteria from treatments that gave incomplete destruction with short exposure.