



Worthwhile Operational Guidelines & Suggestions

BROILER PROCESSING TIMELY INFORMATION – DECEMBER 2003

Chlorine Use Terminology

Recent FSIS Directive 45-03, dated 11/3/2003, on the use of chlorine to treat poultry chiller water has prompted a lot of confusion regarding chlorine terminology that needs clarification. Chlorine has been popular choice as a chemical disinfectant for most poultry processors, because of its efficacy, availability and low cost. Chlorine, when added to the processing water, reacts with microorganisms, as well as many other inorganic and organic materials that may be present, which together create a **chlorine demand** by the water (i.e., clean potable water has very low chlorine demand as compared to used chiller water!). Many products of these reactions have no or very little disinfectant value. Chloramines, formed as a result of reaction with organic materials, are not as bactericidal as chlorine and represent the **combined available chlorine** in the water. The amount of chlorine required for disinfection is then proportional to the chlorine demand of the water. Only after all these reactions are completed (i.e., chlorine demand is met!) that **free available chlorine** (hypochlorous acid and hypochlorite ions) appear in the water. **Total available chlorine** is the sum of combined and free available chlorine. The bactericidal action of free and combined chlorine is a function of temperature, pH and time.

The FSIS policy calls for free available chlorine level of no more than 50 ppm in clean potable water (i.e., water used to fill the chillers initially or that used for makeup), measured at the intake (influent). Re-used water from the red water system may contain no more than 5 ppm free available chlorine, measured again at the intake point. In order to ensure that these minimum and maximum levels are met to comply with SSOP or HACCP plans, make sure that appropriate chlorine test kits are being used and “correct chlorine” parameters are monitored.

Every attempt should be made to reduce the organic load of chillers, so that the chlorine demand of the chill water minimal. This could be accomplished by increasing the effectiveness of pre-chill I/O washers, by using multi-stage chillers (where chlorination may be more effective in a particular stage), by increasing chiller overflow or reducing chiller carcass load, or by utilizing some type of filtration system. It is important to note that there is a concern over certain chemical derivatives (i.e., trihalomethanes, chloroform) formed by chlorine reaction with organic materials. Some of these compounds have been implicated as human carcinogens and their presence may require hazard analysis and assessment.



Contact: S. F. Bilgili, Ph.D.

Phone: (334) 844-261

E-mail: sbilgili@acesag.auburn.edu

Poultry Science Department, Auburn University, Auburn, AL 36849-5416

www.ag.auburn.edu/dept/ph/