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Market: Agriculture
Subcategory: Sanitation
Product: PCA320

Monitoring Water Disinfection in Poultry Farming

Description

Poultry represents a significant amount of protein consumed in the average American's diet. The consumption of poultry has vastly risen over the past 50 years. In 1950 the average American ate 16 lbs. of chicken per year; in 2012 the average American consumed closer to 60 lbs. of chicken each year. As a result of the growing demand, large-scale poultry farms have cropped up around the United States. With hundreds, if not thousands, of chickens in close proximity, farmers must take care to prevent disease outbreak and maintain chicken health. One key factor in this is ensuring chickens have a clean water source.

Poor water quality affects aspects of poultry physiology such as egg production, weight retention, and body temperature regulation. To meet the high water consumption needs, many farms source water from a combination of municipal drinking water and private wells on the property. A contaminated water source can cause rampant illness to spread throughout a flock. Water contaminants may come from the poultry themselves; particulates of feed, feces, soil, dust, parasites, and disease can all contaminate a water supply. One way to prevent contaminants from harming the poultry is by ensuring proper and continuous sanitation of their drinking water. Maintaining sanitized water on a poultry farm can be difficult do to with warm water temperatures, long holding times, and poor initial water quality. Therefore, the water quality must be vigilantly monitored and corrected.

Chlorine is a popular disinfection choice for maintaining water cleanliness and protecting against biofilm growths. Some farms perform their own drinking water sanitation by adding diluted bleach (sodium hypochlorite) further up the water lines to provide a residual level of disinfectant throughout the water system. The chlorine level of the water needs to be monitored to ensure the water is properly sanitized and the chlorine levels are safe for consumption. Maintaining a pH between 6.5 and 7.5 ensures that the chlorine is effective against pathogens. Total chlorine in poultry drinking water should not exceed 5 ppm.

Application

A poultry farming operation contacted Hanna Instruments to update their water sanitizing system. Previously the farm had regulated pH and chlorine levels through spot checks and manual dosing. Because the operation was growing, the customer wanted a way to automate regulation of their chlorine and pH. Hanna Instruments suggested the **PCA320** Chlorine, pH and Temperature Analyzer to meet the customer's in-process needs.

The PCA320 allows the user to have a customizable measurement and control cycle to fit their needs for both pH and chlorine. Each parameter (chlorine, pH, and temperature) has programmable high and low alarms to alert if the reading is outside of acceptable limits. The analyzer can correct the pH and chlorine in a system through the use of two external pumps connected to the 4-20mA outputs. These pumps in turn automatically dose chorine and/or an acid/base into the system through user-set parameters. The unit is capable of measuring either free or total chlorine depending on the customer's preference and the reagents utilized. The customer appreciated the ability set their sampling period for chlorine between 3 and 90 minutes; this allowed them to sample more frequently during periods when water consumption was higher. At each sampling interval, a water sample is brought into a flow cell where it reacts with DPD reagents; the color change is then read and correlated to a chlorine concentration.

The analyzer has a range of 0 to 5 ppm chlorine. When connected to a dosing pump, the chlorine-dosing relay is activated any time that a sample reading is below the programmed. The customer chose a set point of 3.5 ppm free chlorine to guarantee the water would maintain its disinfecting power throughout the water system while remaining below their 5 ppm upper limit. The PCA utilizes an internal algorithm to determine the correct amount of chlorine to dose into the system. The customer appreciated the PCA's built in overdosing protection. Overdosing protection turns off the dosing relays whenever the dosing has been on for the maximum time and the reading value is below 0.05 ppm consistently, protecting the user from overloading their system with chlorine.

The PCA320 has a pH measurement range of 0 to 14 pH with an accuracy statement of ±0.05 pH. When connected to a dosing pump, the dosing relay can be activated based on a minimum or maximum pH set point, and dose acid or base accordingly. As the customer's well water was slightly alkaline, they maintained a pH set point of 6.5 and dosed dilute acid when outside of this range. This safeguarded the effectiveness of the chlorine disinfectant.

Lastly, the customer appreciated that the PCA could hold up to 3500 logs (e.g. seven days at three-second interval readings) worth of data. This would allow them to track and trend water changes to anticipate chemical needs. The PCA320 provided a comprehensive, automated solution for the customer's water disinfection needs.