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Efficacy of the Precure™ Antimicrobial[1] at Various pH Values for Controlling Microorganisms on Broiler Paws

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Abstract: The objective of the following study was to evaluate the most efficacious pH for treatment of post-chill, cleaned broiler paws with the Precure™ (Safe Foods Corporation, N. Little Rock, AR) antimicrobial. Precure™ is listed as a solution of GRAS acids for use by FDA and is listed as a safe and suitable ingredient by USDA for use on poultry. This study was done at the request of a poultry processor who was being asked by the customer to adhere to strict microbial standards for poultry paws. Thus, a bag of randomly collected, chilled and cleaned paws was obtained from a local broiler processing facility and was transported on ice to MCA Services (Rogers, AR). Upon arrival at the laboratory, the bag of paws was held frozen (< 28°F) for 2 days and was then tempered (40 to 42°F) for two days prior to initiation of the study. For the experiment, there was a control group and three treatment groups. The control group and each of the three treatment groups consisted of three replicate samples (n=3). Each replicate sample consisted of three randomly selected paws. Thus, a treatment group consisted of a total of nine paws. The three treatment groups evaluated were Precure™ at pH=1.5, Precure™ at pH=1.7 and Precure™ at pH=1.85. For treatment of the product, the nine paws for each treatment group were placed on a wire rack and were allowed to touch and overlap as would be typical in a processing environment. Each treatment group of paws was sprayed with the appropriate Precure™ treatment at 20 mL per second for 5 seconds. Thus, each group of nine paws was sprayed with 100 mL of the appropriate Precure™ treatment solution. The sprayed paws were then allowed to drain for 10 seconds. After draining, paws were placed three to a bag in sterile rinse bags and were held at 40°F for < 4 hours until initiation of the microbiological analyses. Each sample was evaluated for Aerobic Plate Count, coliforms and *Escherichia coli*, as well as for presence or absence of *Salmonella* in accordance with USDA/FSIS standard laboratory procedures using 100 mL Butterfield's Phosphate Diluent. Petrifilm™[3] was utilized for enumeration of organisms and *Salmonella* incidence was determined using the BAX®[4] System PCR assay. The lower detection level for all quantified groups of organisms was 1 colony forming unit per mL. The control group of paws had an Aerobic Plate Count of 4.3 logs, a coliform count of 1.6 logs and an *E. coli* count of 1.6 logs. Two of the three control groups of paws were positive for *Salmonella*. Log reductions in Aerobic Plate Count were 0.3, 0.2 and 0.6 for the Precure™ treatments at pH = 1.85, 1.7 and 1.5, respectively. Reductions in coliform levels were 0.1, 0.2 and 0.4 logs at pH=1.85, 1.7 and 1.5, respectively. The reduction in *E. coli* was log 0.2 for all pH treatment groups. It should be noted that the control level of *E. coli* was only 0.2 logs, thus all treatment groups resulted in no recovery of *E. coli*. As for *Salmonella* incidence, 0 of 3 samples was positive in the Precure™ pH=1.85 group, and 1 of 3 samples was positive in both the pH=1.7 and pH=1.5 treatment groups. Results from these trials indicate that a Precure™ spray at pH=1.5 is the most effective Precure™ treatment for reduction and elimination of microorganisms on chilled, cleaned broiler paws. However, it should be noted that microbial reductions were not greatly enhanced by lowering the pH of the Precure™ treatment from 1.85 to 1.5. In summary, effective application of Precure™ to broiler paws can provide the processor with an approved and very economical means of controlling spoilage and potentially pathogenic microorganisms.

Key words: Precure™, broiler paws, decontamination, *Salmonella*, cost effective

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