Efficacy of the FreshLight® 210 Ultraviolet Light System¹ for Control and Elimination of Listeria innocua in a Commercial Poultry Marinade-Part B (Flow Rate = 8 GPM and Turnover Time 2.5 = minutes)

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Abstract: The presence of Listeria in marinade used to inject fresh whole muscle poultry products poses a potential threat to processors. In an attempt to offer a solution to this problem, two representative samples (20 gallons each) of fresh poultry marinade solution were collected on two separate days from a USDA-inspected poultry processing facility and were shipped overnight to MCA Services (Rogers, AR) under refrigerated conditions. Upon arrival at the laboratory, the marinade solutions were inoculated with overnight cultures of Listeria innocua to a level (colony forming units) of 5.0 logs per mL (Trial 1) or 6.6 logs per mL (Trial 2) of marinade solution. The inoculated marinade was then passed through a FreshLight® 210 ultraviolet light system (Safe Foods Corporation, N. Little Rock, AR) for 20 minutes (flow rate = 8 gallons per minute and solution turnover time = 2.5 minutes). Samples of the marinade were collected at 0, 2.5, 5, 7.5, 10, 12.5, 15 and 17.5 minutes which corresponded to 0, 1, 2, 3, 4, 5, 6 and 7 passes through the ultraviolet light system. Aerobic Plate Count Petrifilm™ was utilized to determine log reductions in Listeria innocua due to the ultraviolet light treatment. In both trials, after only 2.5 minutes of ultraviolet light exposure (1 pass through the ultraviolet light system), a > 2.2 log reduction was achieved in the level of the inoculated culture in the marinade solution. At 10 minutes of exposure (4 passes), a 4 log or greater reduction was achieved in both trials. After 15 minutes (5 passes), Listeria innocua could not be recovered from the marinade solution in either of the two trials (the lower detection level for the organism was 1 log colony forming unit per mL). Thus, in 15 minutes of ultraviolet light system exposure, the total level of Listeria innocua in the poultry marinade was reduced in linear fashion from 5 logs per mL (Trial 1) or 6 logs per mL (Trial 2) to less than 1 log per mL (no detectable organisms). This represents a > 99.99% to a > 99.999% reduction in the original starting level of inoculum in the poultry marinade solutions. In conclusion, the commercially available FreshLight® 210 ultraviolet light system (FDA regulated under 21 CFR 179.39) offers an extremely effective means for controlling and eliminating the incidence and levels of Listeria innocua in poultry marinade solutions at a very low cost to the processor.

Key words: Poultry, marinades, Listeria innocua, FreshLight®

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