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Efficacy of the FreshLight® 210 Ultraviolet Light System¹ for Reduction of Natural Microflora in a Commercial Poultry Marinade (Flow Rate = 10, 20 or 30 GPM and Turnover Time = 3, 1.5 or 1 minutes)

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Abstract: The recirculation of marinade used in commercial poultry injection applications can pose a microbiological concern if not handled properly. In an attempt to solve this problem, a spent sample (30 gallons) of a typical poultry marinade was collected after production from a USDA-inspected poultry facility and was shipped overnight to MCA Services (Rogers, AR) under refrigerated conditions. The solution was microbiologically evaluated for natural microflora and had an existing Aerobic Plate Count (using APC Petrifilm™³) of 5.5 logs per mL (colony forming units). Three trials were conducted with the FreshLight® 210 ultraviolet light system (Safe Foods Corporation, N. Little Rock, AR) using three different flow rates and corresponding solution turnover times to determine the optimum flow rate (and turnover time) for microbial control. The three flow rates were 10, 20 and 30 gallons per minute with corresponding solution turnover times of approximately 3, 1.5 and 1 minutes. As solution turnover rate decreased (from 3 minutes to 1 minute), the time necessary to achieve a 1 log microbial reduction (90% reduction) decreased from 9 minutes at a turnover rate of 3 minutes to 7.5 minutes at a turnover rate of 2 minutes and to approximately 5 minutes at a turnover rate of 1 minute. Regardless of flow rate or solution turnover time, the total bacterial count in the marinade solution was effectively reduced by approximately 1 log in less than 10 minutes of operational time with the FreshLight® 210 ultraviolet light system. These trials clearly demonstrate that the commercially available FreshLight® 210 ultraviolet light system (FDA regulated under 21 CFR 179.39) can provide the manufacturer with an effective means of controlling the microbial load in poultry marinade solutions at a very low cost. The data also suggest that as solution turnover rate decreases the time necessary to effectively reduce bacterial levels decreases but that this difference is not substantial in regards to actual time in minutes between normal operational flow rates of 10 to 30 gallons per minute.

Key words: Poultry, marinades, FreshLight®, flow rate, turnover time

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