



# International Journal of Meat Science

ISSN 2071-7113

**science**  
alert

**ANSI***net*  
an open access publisher  
<http://ansinet.com>

# **Efficacy of the FreshLight® 220 Ultraviolet Light System<sup>1</sup> for Control of Natural Microflora and *Listeria* in Non-Soy Nitrite Beef Brines and Soy-Based Beef Brines (Flow Rate = 30 GPM and Turnover Time 1 = minute)**

K.L. Beers, K.W. Beers and P.E. Cook

MCA Services, 200 S. First Street, Rogers, AR 72756, USA<sup>2</sup>

## **ABSTRACT**

Various types of commercially available brine solutions can become contaminated with naturally occurring microorganisms and potential pathogens during the injection process used with raw meat products. In an attempt to investigate a possible solution for this problem, samples (30 gallons each) of typical non-soy nitrite brine and soy-based brine were collected from a commercial USDA-inspected beef processing facility and were shipped overnight to MCA Services (Rogers, AR) under refrigerated conditions. Upon arrival at the laboratory, representative samples were collected from both brines and were evaluated for naturally occurring microflora using Aerobic Plate Count Petrifilm™. The non-soy nitrite brine had an initial bacterial count of 2.3 logs per mL while the soy-based brine had an initial count of 2.1 logs per mL. Both brines were then inoculated with an overnight culture of *Listeria innocua* to achieve a total level of bacteria of 5.1 logs per mL for the non-soy nitrite brine and 5.3 logs per mL for the soy-based brine. Brines were thoroughly mixed for 10 mi to allow for even distribution of the inoculated organisms. After mixing, each of the brines was subjected to 30 min of treatment utilizing the FreshLight® 220 ultraviolet light system (Safe Foods Corporation, N. Little Rock, AR). The flow rate of the ultraviolet light system was 30 gallons per minute and the solution turnover time was 1 min. For the non-soy nitrite brine, there was a 1.4 log reduction (96%) in the total level of bacteria after 30 min of ultraviolet light treatment. For the soy-based brine, the microbial reduction after 30 min of ultraviolet light treatment was 2.1 logs (greater than 99%). For both brines, the reduction in bacteria over time was gradual and linear. It is hypothesized that a longer ultraviolet light exposure time of perhaps 60 min would have significantly enhanced the bacterial reductions in both of the brine solutions. In conclusion, the commercially available FreshLight® 220 ultraviolet light system offers beef processors a cost effective solution for controlling naturally occurring microorganisms and *Listeria* in non-soy based nitrite brines and soy-based brines.

**Key words:** Beef brines, *Listeria*, FreshLight® 220 ultraviolet light system, cost effective

---

<sup>1</sup>Safe Foods Corporation, N. Little Rock, AR 72118, USA

<sup>2</sup>Address correspondence to: alwaldroup@safefoods.net

<sup>3</sup>Medical-Surgical Division/3M Corporation, St. Paul, MN, 55144, USA