

Poultry Tissue Uptake of Solutes upon Exposure to 2500 mg/L Peracetic Acid (PAA) for a 24-Hour Time Interval

October 6th, 2016
Joseph Donabed, B.S.

Introduction

During processing, carcasses are exposed to water used for washing and chilling purposes. Poultry tissue naturally retains some of this water. Frequently, for sanitizing reasons, microbiocidal chemicals such as peracetic acid are introduced to the processing waters. Recently the question has been posed whether peracetic acid is being retained in poultry tissues that are soaked in a peracetic acid solution for an extended period of time (2-3 hours).

Poultry tissue takes up most water during the chilling operations when exposure times that typically range from 45 minutes to 3 hours. To determine the extent to which poultry tissue takes up and retains peracetic acid, a laboratory simulation of the chilling operation was performed and Poultry carcasses was exposed to 2500 mg/L (ppm) peracetic acid (PAA) for a 24-hour time interval.

This report presents the results on the extent to which poultry skin and muscle meat takes up and retains peracetic acid following extended exposure to high concentrations of peracetic acid.

Experimental

A total of five freshly slaughtered, post-eviscerated, whole boiler chicken carcasses were obtained from a local poultry processing facility in Modesto, CA. The five poultry carcasses were submerged in a 95-L solution dosed with nominal 2500 ppm PAA solution, at 2.2°C (35°F) for 24 hours and agitated via air. Following a 24-hour contact time, the whole carcasses were hung with the body cavity facing down for 10 minutes to ensure adequate drainage of any residual solution. Next, using a scalpel and Metzenbaum scissors, precise amounts of skin and muscle from the surface of the poultry carcasses were excised (approximately 3 mm thick). Each piece of excised tissue was stomached with 10 mL reverse osmosis (RO) water for 5 minutes to extract any tissue-retained PAA into the aqueous phase. PAA was determined using the modified DPD procedure (detection limit 0.1 ppm as PAA).

Results & Discussion

Following a 24-hour exposure to 2500 ppm PAA solution there was no PAA residues detected when 20-g of muscle meat and 15-g of skin was extracted into 10 mL RO water (10 replicates for each tissue).

Absence of PAA in Extracted Poultry Tissue

Regardless of the PAA concentration in the soak solutions, no residues of PAA were found in poultry tissue extracts. This was an expected result. PAA is a highly reactive and short-lived species because of the inherent instability of the peroxide [-O-O-] bond. Poultry muscle and skin tissues abound with cellular enzymes such as catalase and glutathione peroxidase that detoxify PAA and hydrogen peroxide by accelerating its decomposition rate. This means that PAA residues are undetected in poultry tissue despite being exposed for an extended period of time.



Joseph Donabed
R&D Chemist/Microbiologist
Direct: (209) 232-2201
JDonabed@envirotech.com