Conductivity and pH for PeraGreen IS Dilutions

Background

PERAGREEN is a peroxyacetic acid-based microbiocide developed for use in Federally Inspected meat and seafood, fruit and vegetables processing locations. If used as directed, it will help to reduce contamination and cross-contamination of edible food products. Its use is acceptable for direct or indirect contact in or on food, including fruits, vegetables, meat and seafood in accordance with FCN 699, FCN 887, FCN 908, and 21 CFR 173.315. PERAGREEN is approved to be used at concentrations no greater than 220 ppm as PAA for red meat and no greater than 190 ppm as PAA for seafood. Most commonly, customers use this product between 50 – 200 ppm as PAA in city (hard) water. A study was completed using PERAGREEN to dose both city water and DI water to 100 ppm and 200 ppm PAA to observe the effects it has on pH and conductivity. For concentrations above and below these levels one can easily calculate the approximate pH and conductivity.

Methods

Typical dilutions used by meat and seafood processing locations were replicated in this study. De-ionized (DI) with a conductivity of 0 μS and city water (140 ppm as $CaCO_3$) with conductivity equaling 705 μS were used to prepare three sets of dilutions. The dilutions prepared were as follows:

PERAGREEN Dilutions
100 ppm as PAA in DI water
150 ppm as PAA in DI water
200 ppm as PAA in DI water
100 ppm as PAA in City water 150 ppm as PAA in City water 200 ppm as PAA in City water

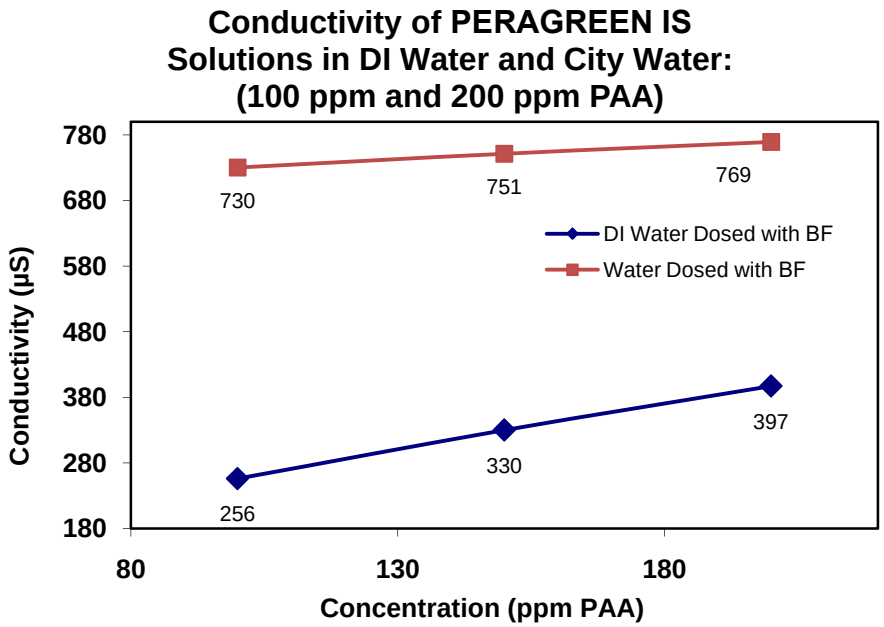
The pH and conductivity of the dilutions were recorded. The pH was measured using a HANNA Instruments pH 210 Microprocessor pH Meter. The conductivity was measured using a HANNA Instruments DIST 3 conductivity meter with a range of 0-1999 *u*S. The results are illustrated in graphs below for easy viewing.

Results

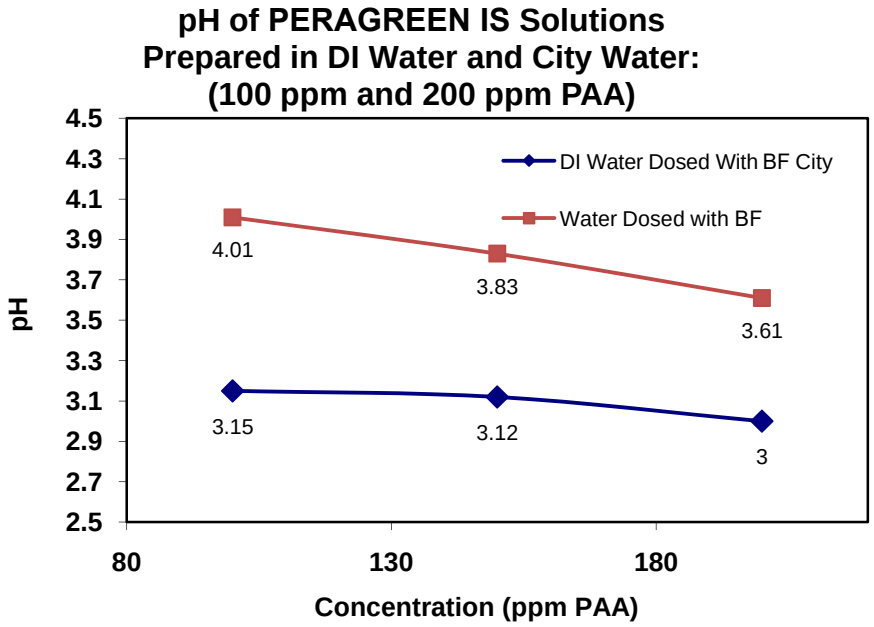
Graph 1 illustrates the different conductivity measurements for the three solutions in DI and city water. As the solutions increase, the conductivity increases for solutions prepared in both types of water. The conductivity ranges from 256 *u*S for the 100 ppm PAA to 397 *u*S for the 200 ppm PAA solution prepared in DI water. Similarly, the conductivity ranges from a low of 730 *u*S for the 100 ppm PAA to a high of 769 *u*S for the 200 ppm PAA prepared in city water.

Graph 2 illustrates the expected pH for each solution. The pH is not linear therefore the graph will not produce a completely straight line, unlike the results in Graph 1. The pH ranges from 4.01 for the 100 ppm PAA solution prepared in DI water to a low of 3.61 for the 200 ppm PAA solution prepared in city water. Similarly, the PAA solutions prepared in DI water displayed the same trend. The pH ranges from a high of 3.15 for the 100 ppm PAA solution prepared in city water to a low of 3.00 for the 200 ppm PAA solution prepared in city water. As the solutions become more concentrated, the pH decreases because there is a lower ratio of water to acid.

Graph 1



Graph 2



Conclusion

- This study was designed to parallel PERAGREEN solutions used in the meat, poultry, seafood and fruit & vegetables processing industries.
- Neither pH or conductivity characteristics seem to be sufficient parameters to automatically control the dosing of this antimicrobial.

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