



FIT TECHNICAL DATA

Summary of Research Studies and Production Trials

Fit Efficacy vs. Bacteria Pathogens

Bacteria Pathogen	Log Reduction @ 1 minute
Staphylococcus Aureus (ATCC 6538)	> 5 log ₁₀
Listeria Monocytogenes (ATCC 19117)	> 6 log ₁₀
Escherichia Coli (ATCC 11229)	> 6 log ₁₀
Pseudomonas Aeruginosa (ATCC 15442)	> 6 log ₁₀
Pseudomonas Cepacia (ATCC 25416)	> 6 log ₁₀
Salmonella Choleraesuis (ATCC 10708)	> 4 log ₁₀

Method: In Vitro Suspension Testing - AOAC 960.09

AOAC suspension testing for Germicidal and Detergent Sanitizing Action of Disinfectants - using recommended Fit concentration

Fit Efficacy vs. Bacteria in Full Scale Production

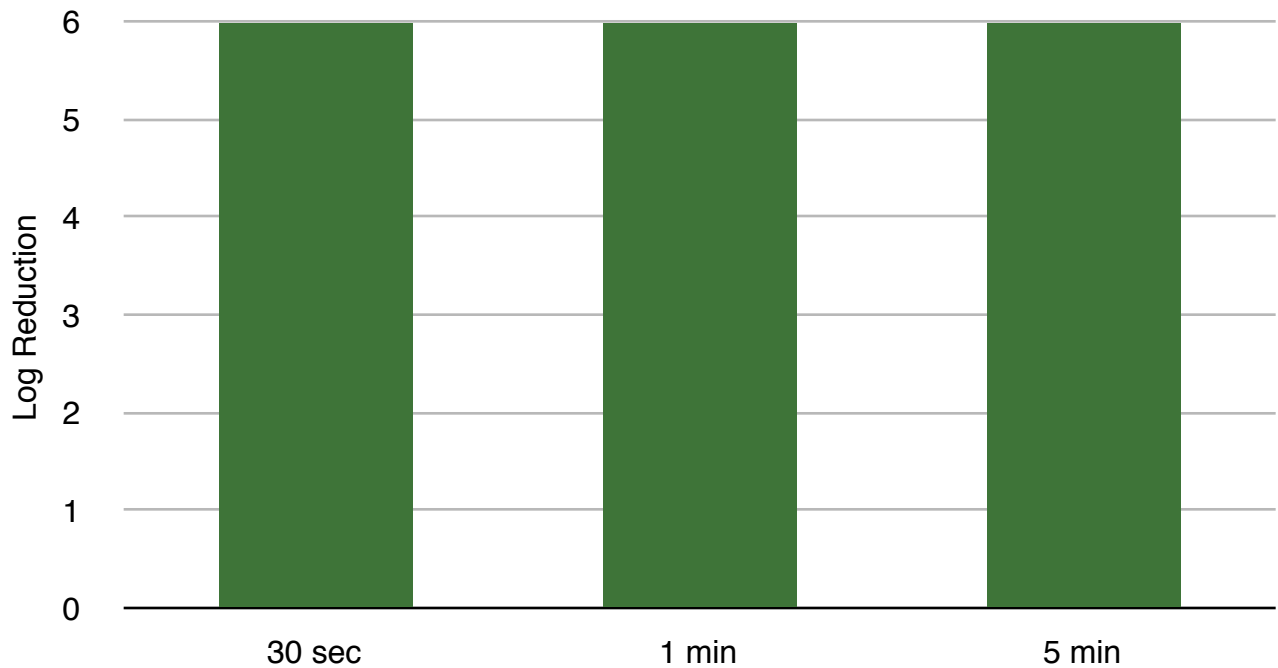
Chopped Onions

	Log Reduction
APC	>6
Coliform	>3

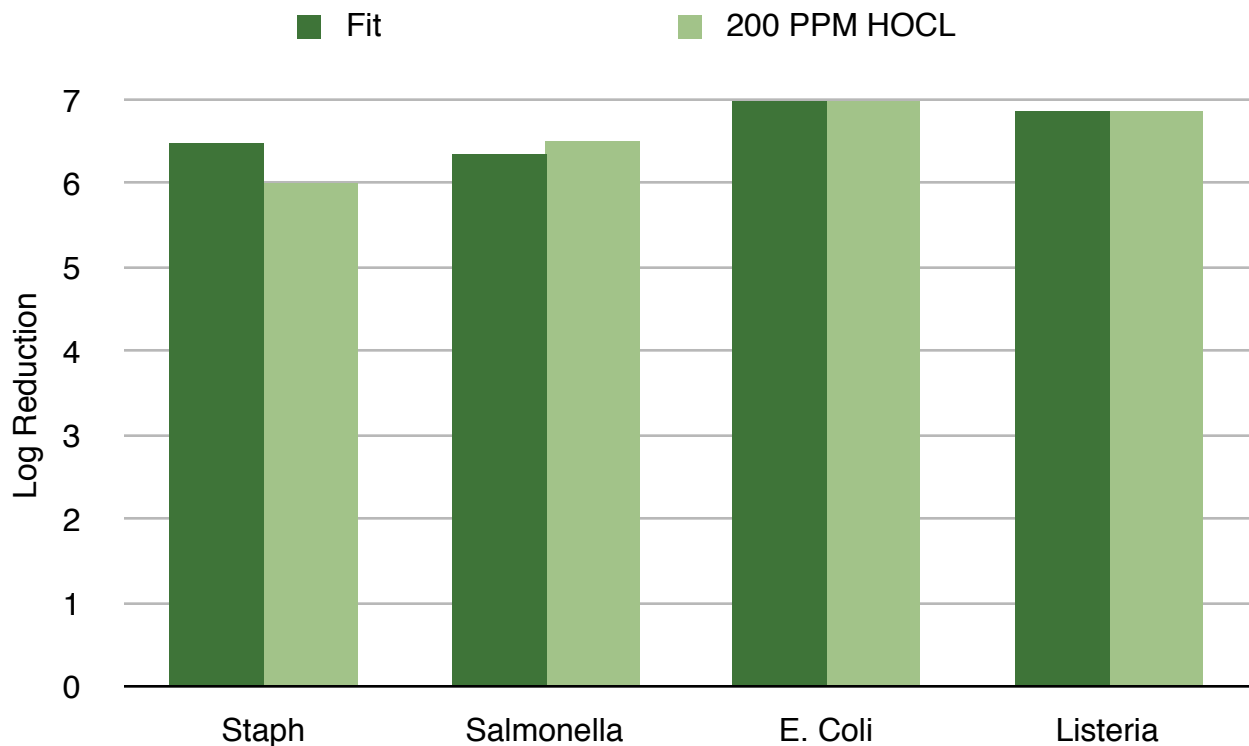
Lettuce

	Log Reduction
APC	>6
Total Coliform	>6
E. coli	>6

Fit Efficacy vs. *Listeria Monocytogenes*

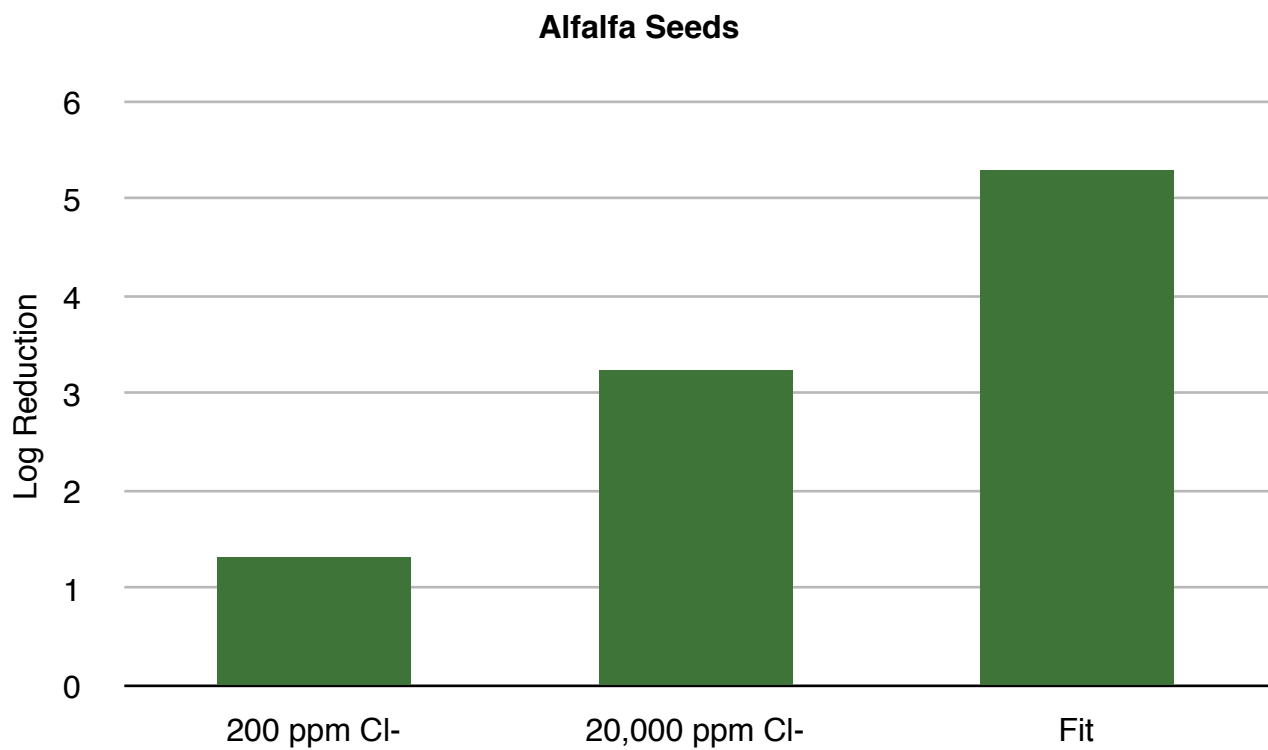
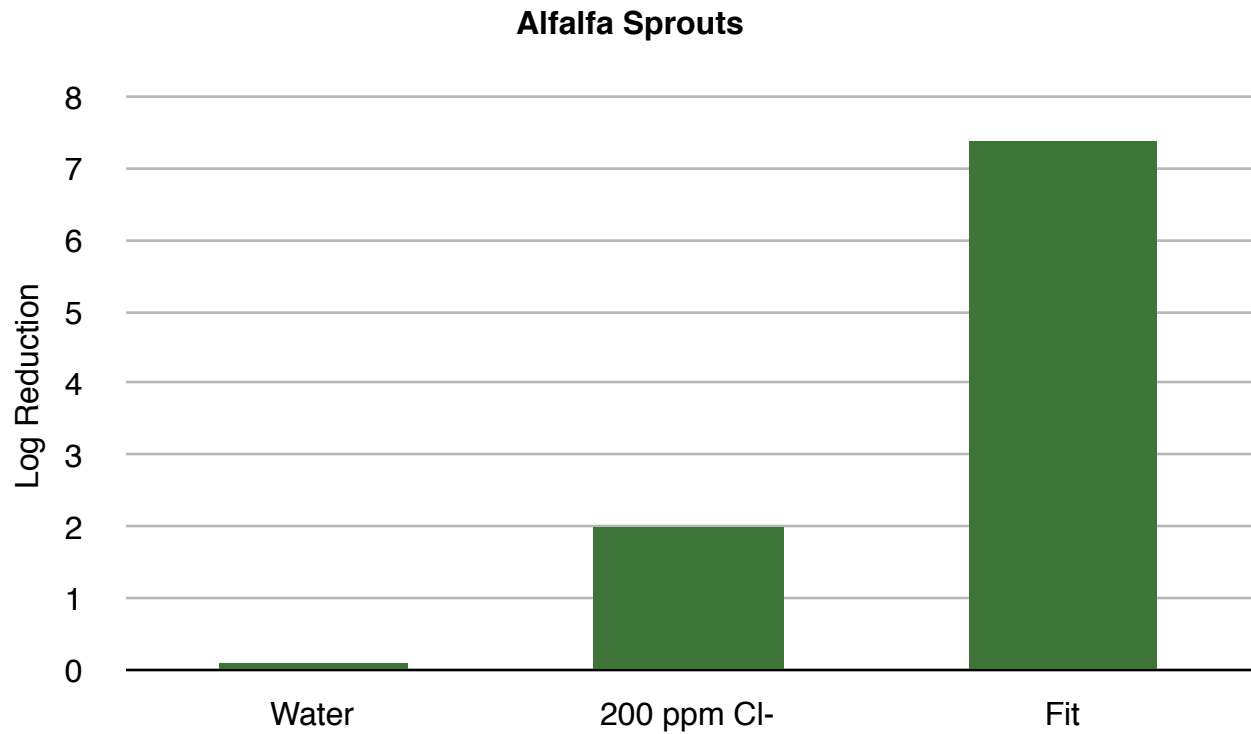


Efficacy vs. Pathogens - Fit Compared to HOCL



Method: Vitro Carrier Testing - AOAC Use Dilution Test

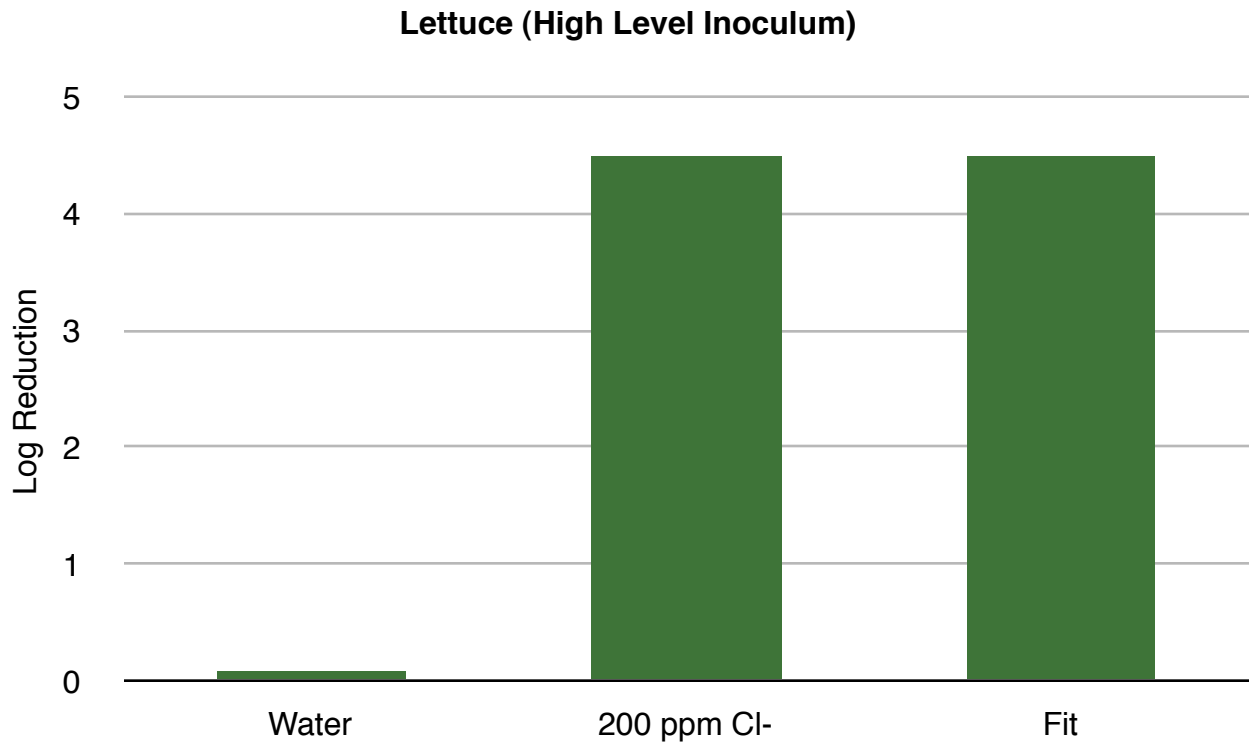
Efficacy vs. E. coli O157:H7 - Fit Compared To Cl-



Source: Published in Journal of Food Protection - 2001. Comparison of chlorine and a produce wash for effectiveness in killing E. coli O157:H7 on alfalfa seeds. Center for Food Safety and Quality Enhancement, University of Georgia - Larry Beuchat

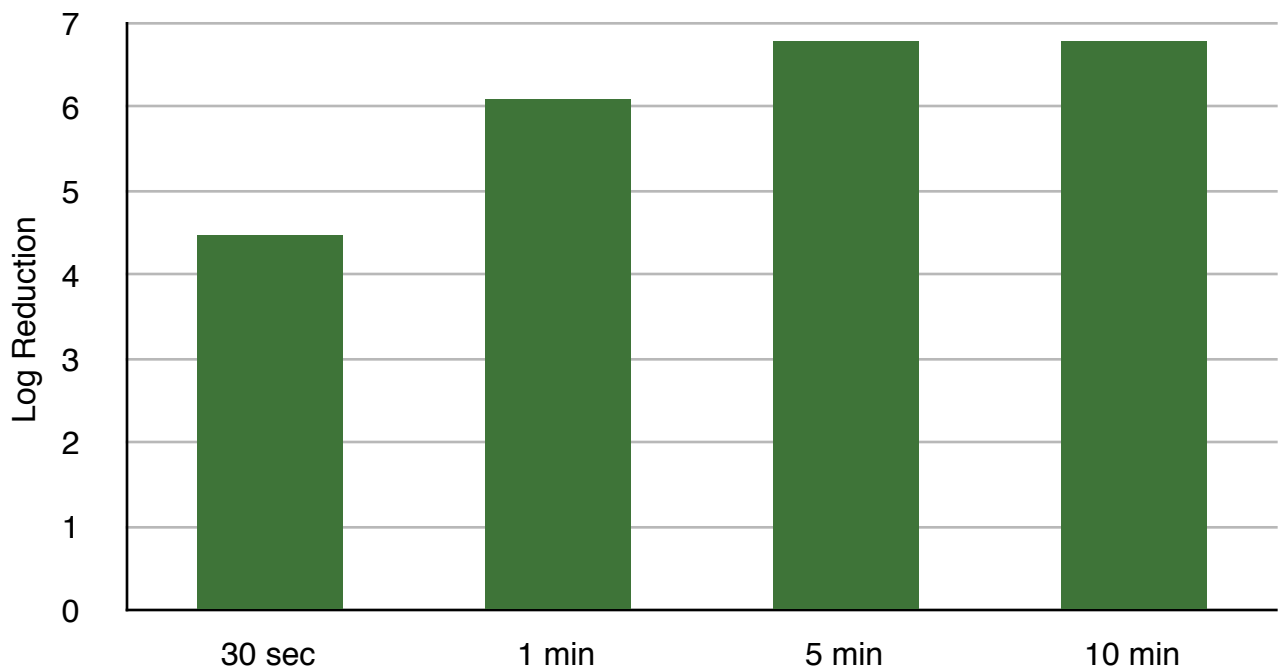
Plating Technique - SMAN; Sorbitol MacConkey Agar plus 50 ppm nalidixic acid

Efficacy vs. E. coli O157:H7 - Fit Compared To Cl-



Source: Published in Journal of Food Protection - 2001. Comparison of chlorine and a produce wash for effectiveness in killing E. coli O157:H7 on alfalfa seeds. Center for Food Safety and Quality Enhancement, University of Georgia - Larry Beuchat

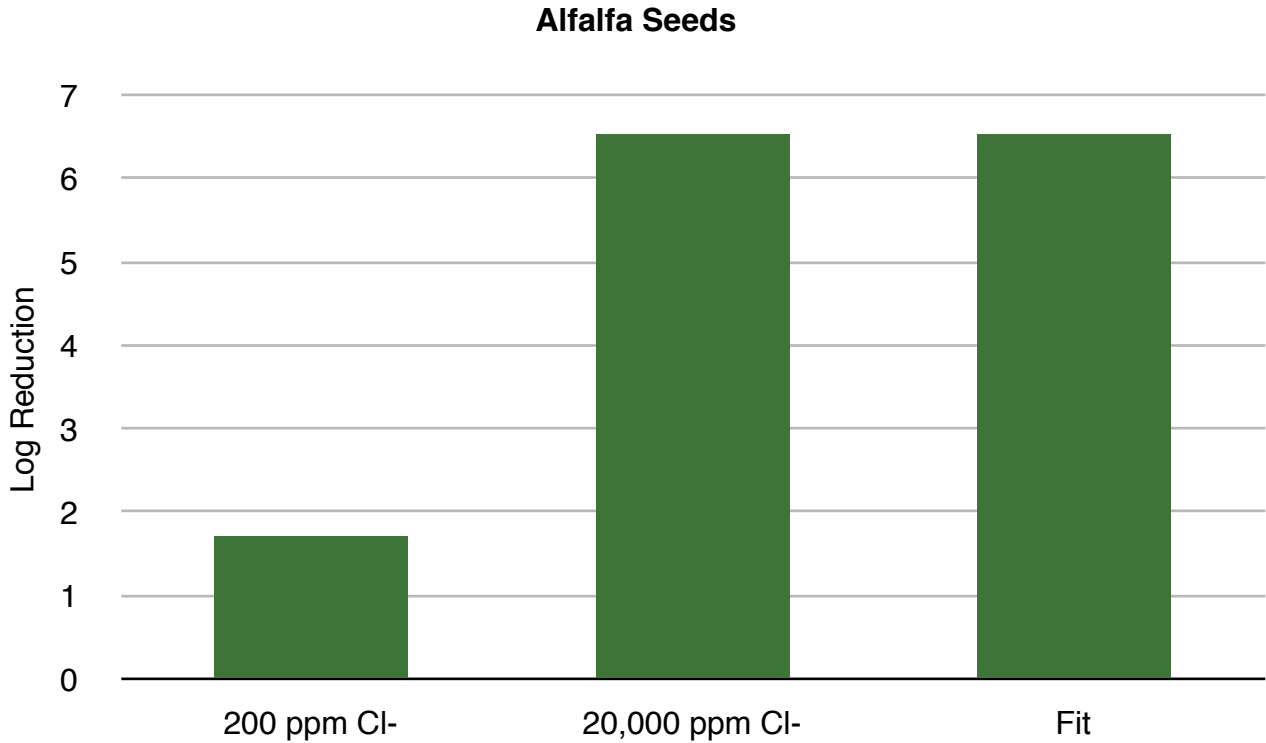
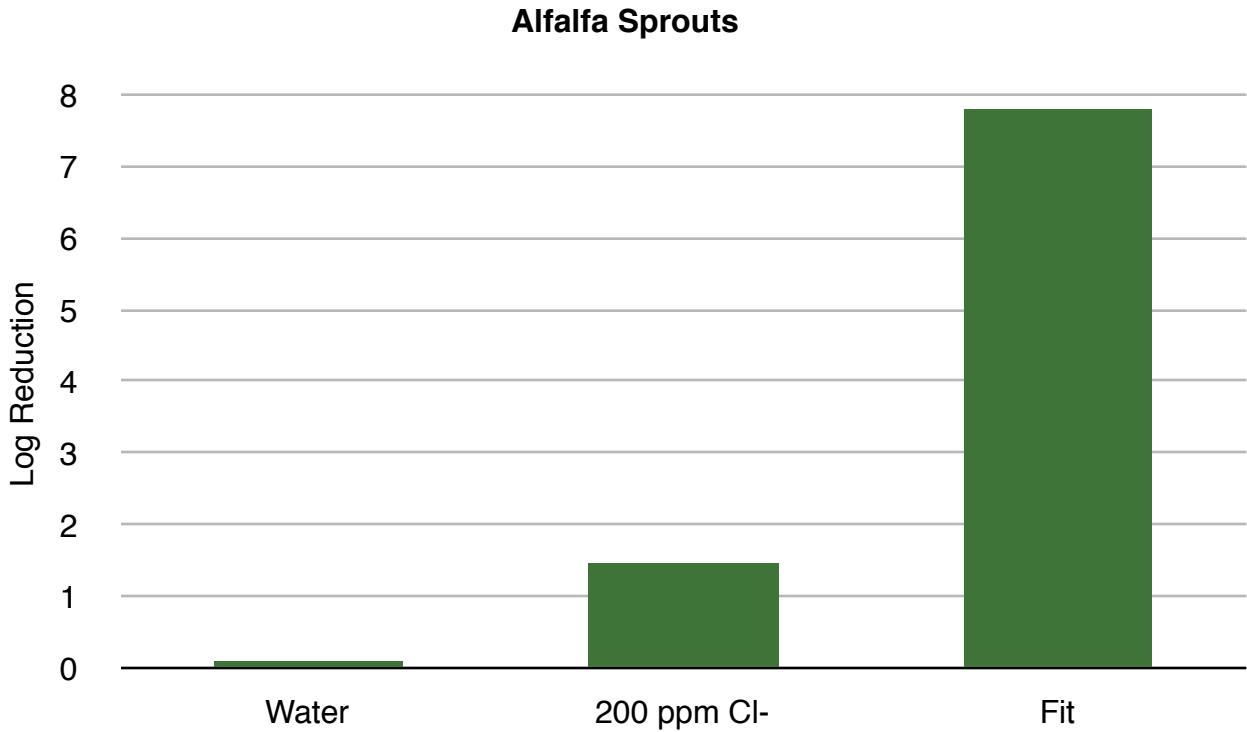
Efficacy of Fit vs E. coli O157:H7



Method: In Vitro Suspension Testing - AOAC 960.09

AOAC suspension testing for Germicidal and Detergent Sanitizing Action of Disinfectants - using recommended Fit concentration

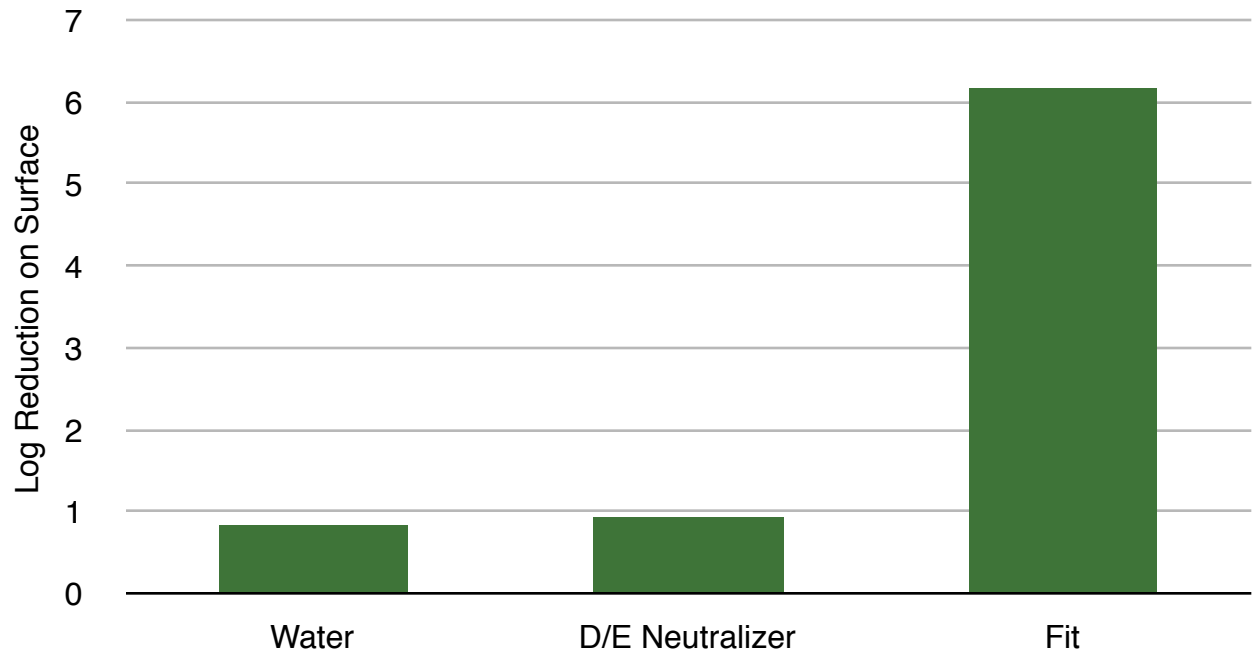
Efficacy vs. Salmonella - Fit Compared To Cl-



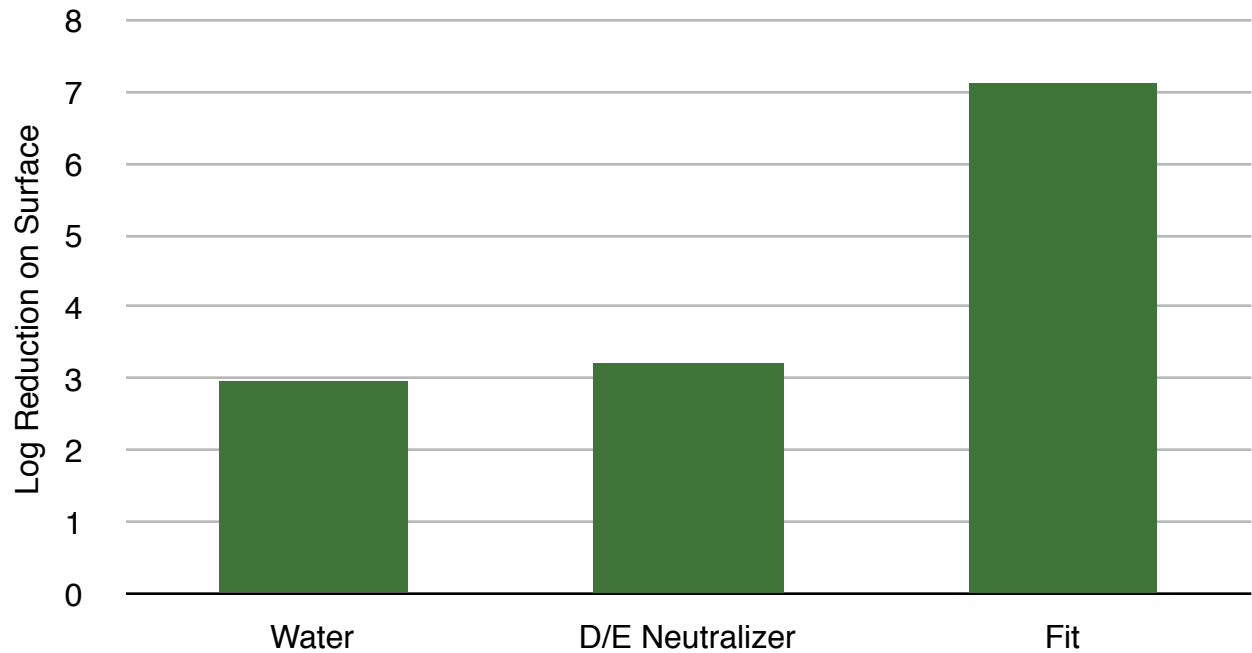
Source: Published in Journal of Food Protection - 2001. Comparison of chlorine and a produce wash for effectiveness in killing E. coli O157:H7 on alfalfa seeds. Center for Food Safety and Quality Enhancement, University of Georgia - Larry Beuchat
Plating Technique - BSAN; Bismuth Sulfite Agar plus 50 ppm nalidixic acid

Fit Efficacy vs. Salmonella

On Tomato Surface



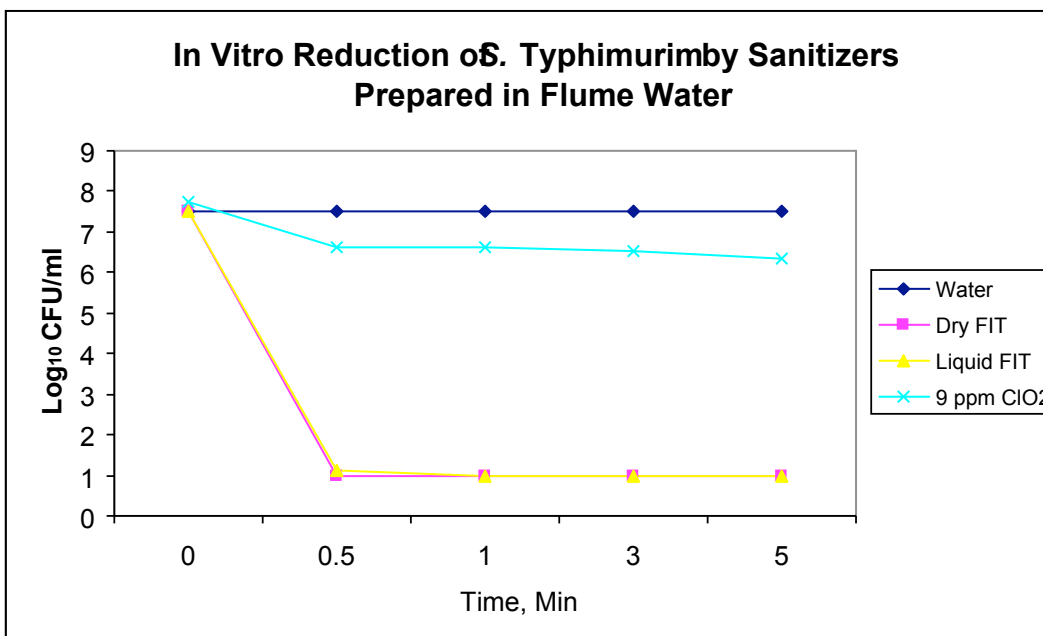
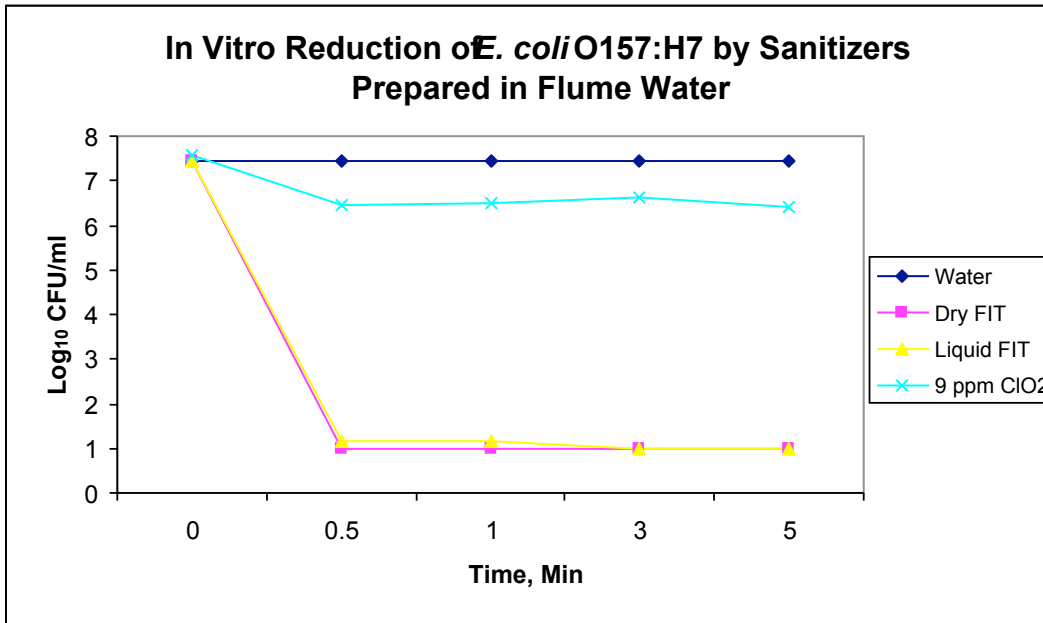
Method: 1997 EPA Scientific Advisory Panel - Modified Rinse Step test procedure



Method: 1997 EPA Scientific Advisory Panel - Modified Residual Wash test procedure

Source: Published in Journal of Food Protection - 2001. Efficacy and Reproducibility of a Produce Wash in Killing Salmonella on the Surface of Tomatoes Assessed with a Proposed Standard Method for Produce Sanitizers. Department of Food Science and Technology, University of California et al.

Efficacy of Fit vs. ClO₂ for Evaluating Pathogen Control in Produce Processing - Full Scale Production



Source: Published in Journal of Food Science - 2008
Department of Food Science & Toxicology - Univ. of Idaho
Department of Food Science & Human Nutrition - Washington State Univ.

Commodity: Testing conducted using dirty flume water in a fresh pack **potato** operation



How Fit Works

Fit is powered by a patented chemistry combining all natural surfactants and organic acids. It is available in both powder and liquid form, and is easily diluted in municipal or tap water. The powder is diluted at a rate of 5 grams per liter, and the liquid is diluted at a rate of 7.8 ml per liter. The natural surfactants in Fit enable it to thrive in dirty water conditions, which remain active and hence FIT is more effective than oxidizers which deactivate in the presence of high soil or organic loads.

Simple pH monitoring equipment is all that is required to ensure the Fit solution stays in the proper pH activity range. At the proper dilution in clean water, the pH of the system will be approximately 3.2. The upper limit of the pH activity range is 3.5, and the monitoring process should be set up to add more Fit when the pH of the solution reaches this limit.

Fit will remain active much longer than traditional oxidizers. This offers processors the opportunity to significantly reduce costs with respect to the amount of water used, and also the amount of energy required to cool the water (where applicable). The surfactant chemistry in Fit helps suspend the soil load in the wash water, and results in cleaner wash water for a greater length of time. The following picture is taken from a full scale production trial at a lettuce processing facility. From left to right, the water samples represent:

WBF3 - Control - water used to wash lettuce with traditional oxidizing sanitizer (sample after 8 hr run)

WAF3 - Control Water from above (8 hr run) after FIT has been added

WEF1 - Same water used in WAF3, but then washed another full 8 hr shift of lettuce washing



FIT Antimicrobial Efficacy Model

- ▶ Low pH helps disrupt bacterial cell wall and membrane (organic acids)
- ▶ Surfactants assist cell membrane disruption and enable pH to be more effective; can also penetrate cell membrane to affect cellular metabolism (fatty acids)
- ▶ pH buffering is necessary for maximum effect (citrate, etc.)
- ▶ Ionic strength effects from salts can enhance efficacy (NaCl, etc.)

Understanding Antibacterial Efficacy

