



# Validation of Produceshield Plus and OxypHresh 15 on Diced Tomatoes

**Objective.** Validate the efficacy of OxypHresh 15 alone and in combination with Produceshield Plus (PS+) to reduce *Salmonella* in the wash water and on the surface of diced tomatoes. These studies were completed with and without an organic load added to the flume water.

**Summary of Results.** OxypHresh 15 and OxypHresh 15/PS+ were significantly ( $P \leq 0.05$ ) more effective than chlorine in reducing *Salmonella* on the surface of tomatoes and eliminated all *Salmonella* in the wash water. At short treatment times, OxypHresh 15/PS+, showed a significantly ( $P \leq 0.05$ ) rapid reduction versus chlorine. When organic load was added only the OxypHresh /PS+ blend was significantly ( $P \leq 0.05$ ) more effective than chlorine.

**Materials and Methods.** All testing was completed at Michigan State University under the direction of Dr. Elliot Ryser. Tomatoes were provided by Lipman Family Farms.

### Treatment Types :

Treatments were made in the hold tank and pumped over to the flume. To mimic high organic load ~140 L of extract collected during commercial processing was added to the hold tank to target turbidity Of 300 NTU.

	Concentration( ppm)	pH
OxypHresh 15	80	3-3.5
OxypHresh 15 / Produceshield Plus	80	1.8
Chlorine - 5	5	6.5
Chlorine -10	10	6.5



1000 L hold tank  
Turbidity = 300 NTU

### Pathogens:

- Roma Tomatoes
- Dip-inoculation
- *Salmonella* Typhimurium LT2 and MHM112
- Target 5 - 6 log CFU/tomato



130 L Flume

### Processing :

Tomatoes were diced into ¼" sections and then treated in the flume. Samples were collected at 20s, 40s, and 60 s.

**Salmonella Reduction (no organic load added to wash water).** OxypHresh 15 and OxypHresh 15/PS+ showed significantly ( $P \leq 0.05$ ) higher reductions vs chlorine (figure 1). *Salmonella* was eliminated in the wash water while populations increased in the water and chlorine treatments. (figure 2). OxypHresh 15 showed a significantly ( $P \leq 0.05$ ) higher reduction at short treatment times (figure 3). OxypHresh 15/PS+ blend also showed a significant ( $P \leq 0.05$ ) reduction in lactic acid bacteria (spoilage bacteria) vs all treatments.

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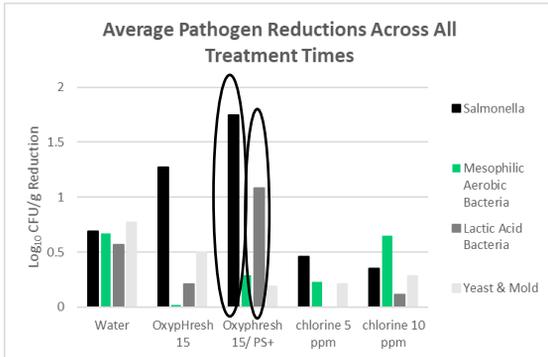


Figure 1. Pathogen Reduction on diced tomatoes. OxypHresh 15/PS+ showed significantly higher reductions in *Salmonella* and lactic acid bacteria.

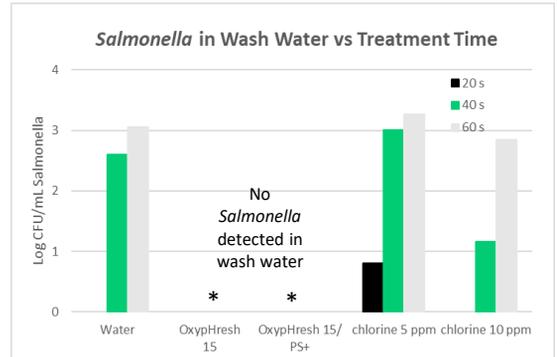


Figure 2. *Salmonella* detected in wash water over treatment time. No *Salmonella* was detected in OxypHresh 15 and OxypHresh 15/PS+.

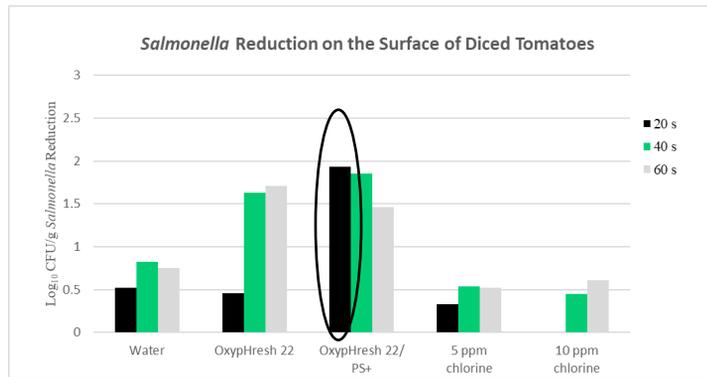


Figure 3. Reduction of *Salmonella* on the surface of diced tomatoes vs treatment time. OxypHresh 15/PS+ at 20s showed a significantly higher reduction vs all other treatments.

***Salmonella* Reduction (organic load added to wash water).** When an organic load was added to simulate commercial conditions, OxypHresh 15/ PS+ provided significantly ( $P \leq 0.05$ ) higher reductions of both *Salmonella* and lactic acid bacteria (figure 4). The OxypHresh 15/PS+ showed significantly higher reductions in *Salmonella* at 20 s treatment time (figure 5).

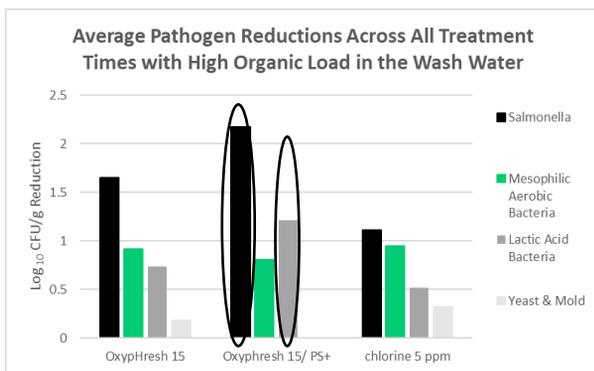


Figure 4. Pathogen Reduction on diced tomatoes. OxypHresh 15/PS+ showed significantly higher reductions in *Salmonella* and lactic acid bacteria under high organic load conditions.

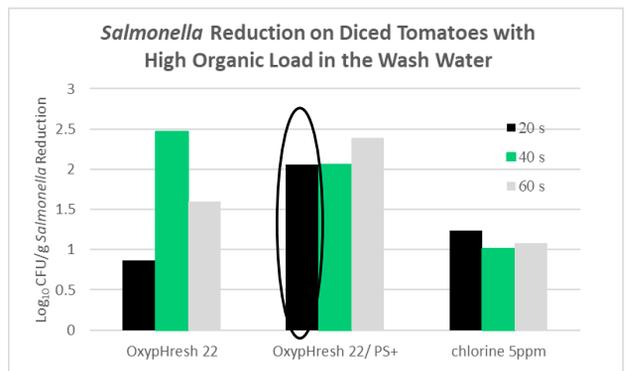


Figure 5. Reduction of *Salmonella* on the surface of diced tomatoes vs treatment time. OxypHresh 15/PS+ at 20s showed a significantly higher reduction vs all other treatments.