

An Acidic Silver Ion Pretreatment Can Greatly Reduce the Risk of an Illness Outbreak for Fresh Cut Leafy Greens

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Purpose

Report the increased microbial lethality of a patent pending acidic silver ion pretreatment (SmartWash Boost™) of cut leafy greens presently being commercialized.

Introduction

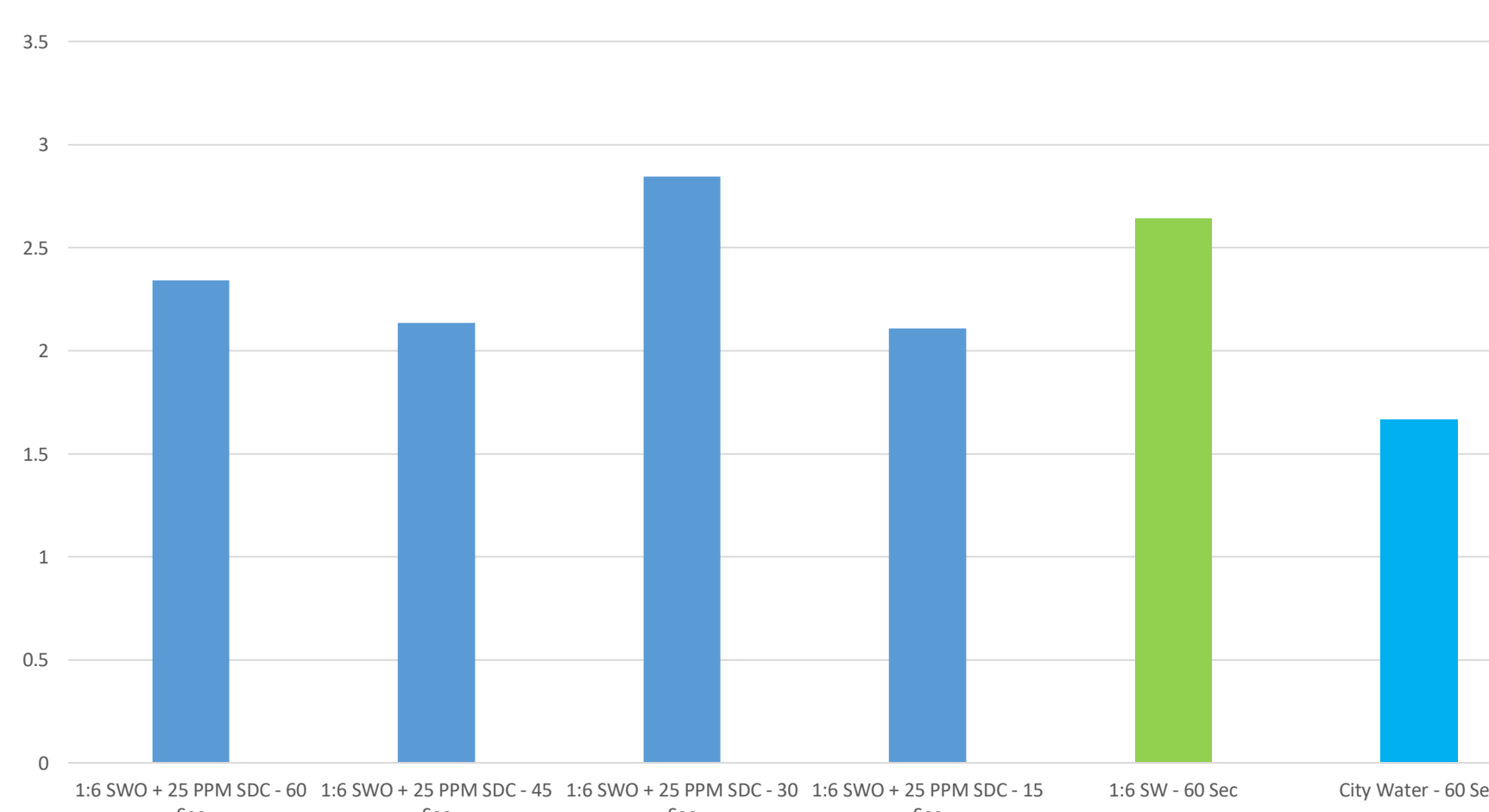
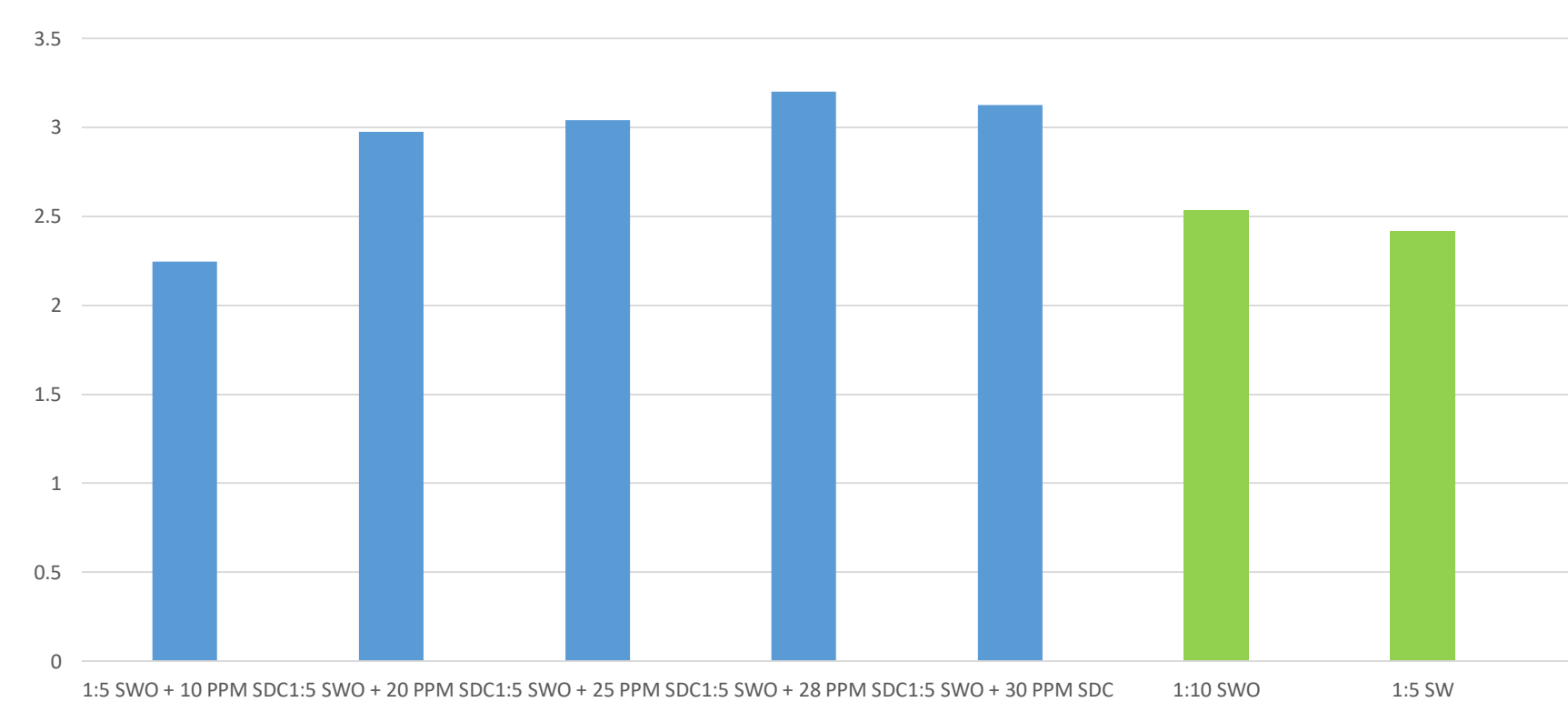
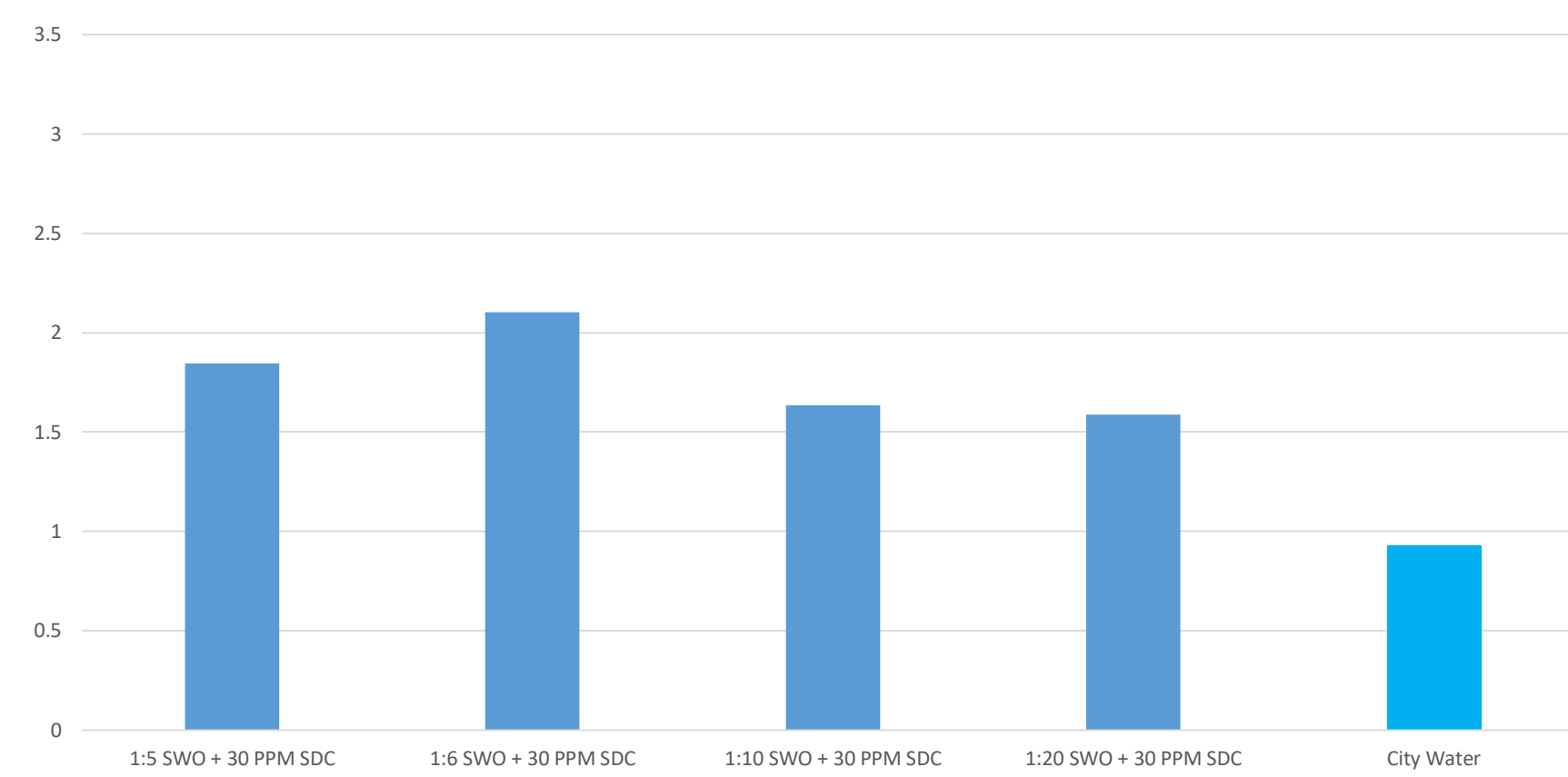
A pasteurization or kill step for fresh-cut processing would be desirable. Increases in lethality without quality loss move the fresh cut industry in this direction and therefore mitigate outbreak risk.

Methods

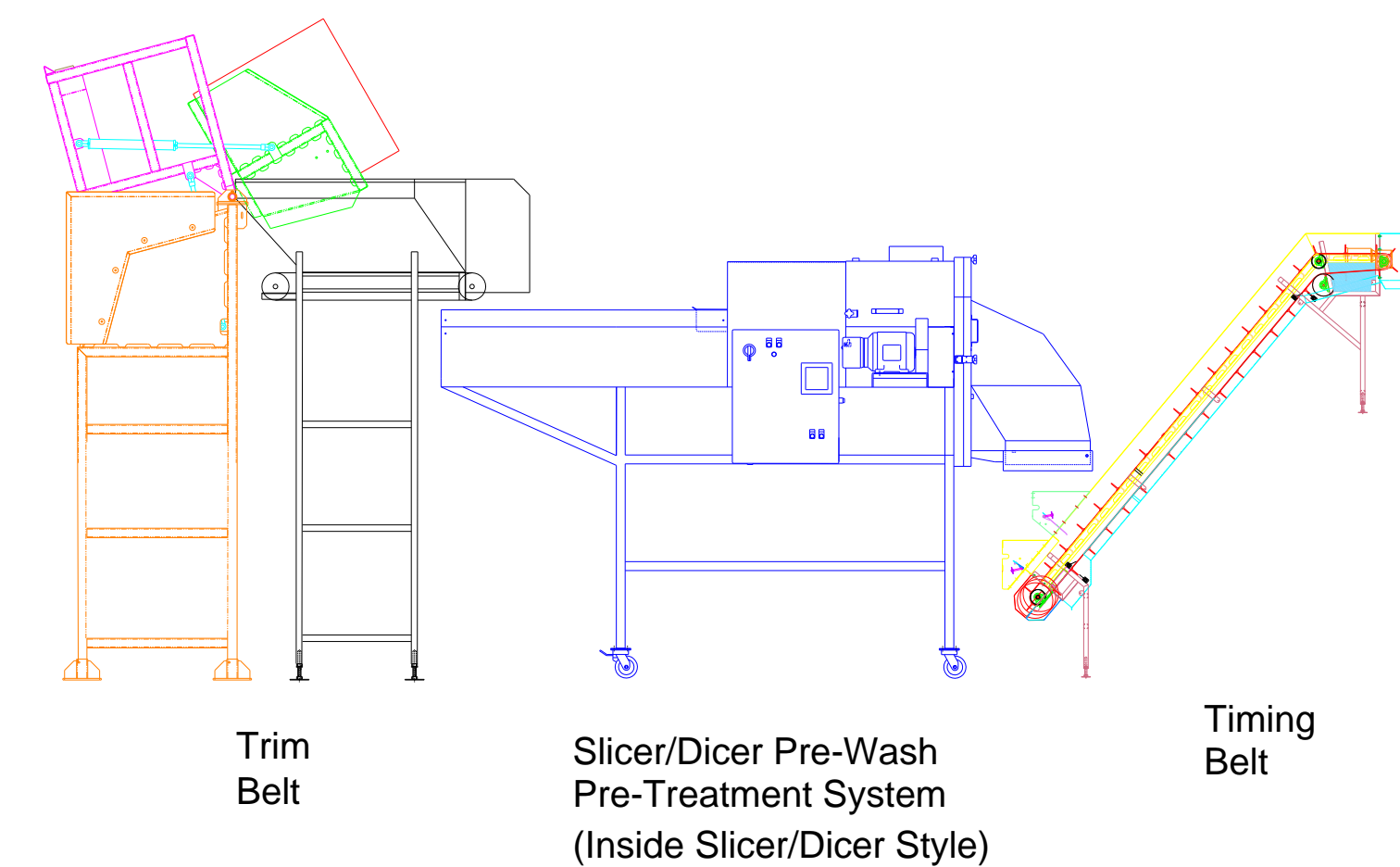
Pilot plant studies with and without the pretreatment are used to measure the increased lethality of the proposed pretreatment against inoculation with generic *E. coli*. The magnitude of this increased lethality was optimized by adjusting the various control parameters including acid content, silver ion concentration and dwell time. Based on models built from case study data and product testing, the impact of increased lethality on outbreak risk can be estimated.

Process Parameter Optimization

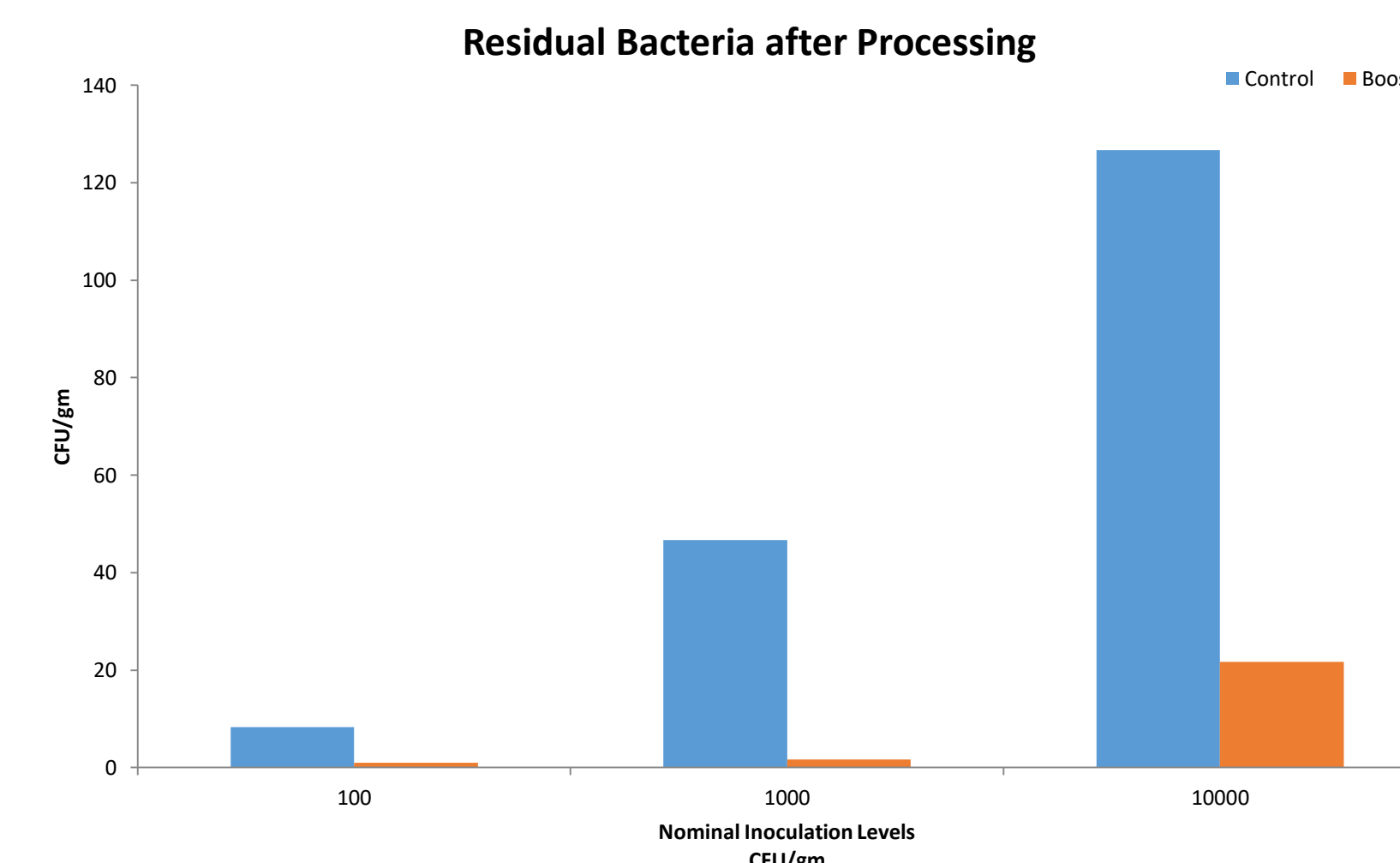
- 25 ppm silver ion as Silver Dihydrogen Citrate (PURE Control®)
- 1:7 SmartWash Solutions SW^{OTM}
- 30 secs contact time
- Feed rate ~0.6 gpm but is dependent on cutter geometry



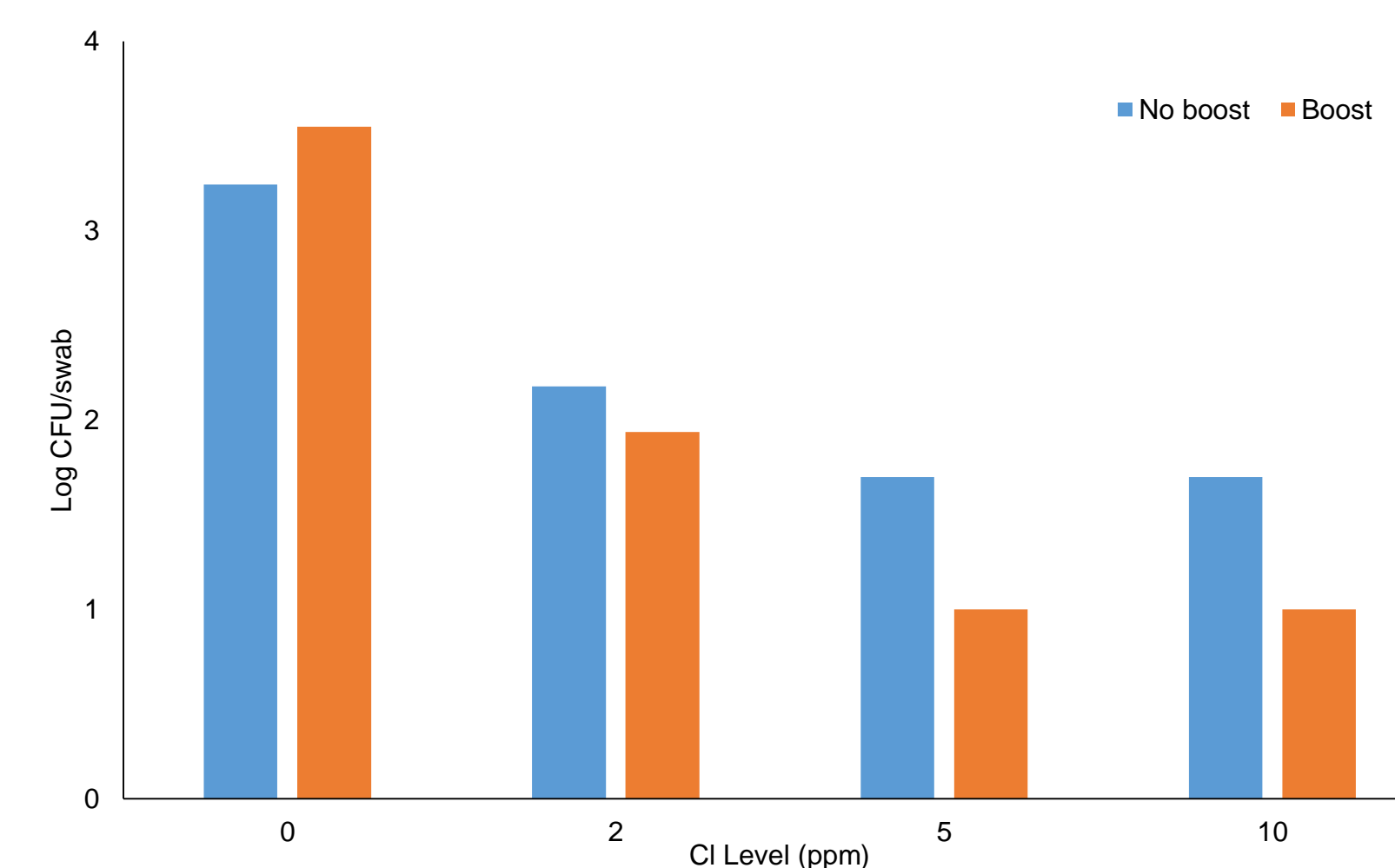
An Application Approach



Effective at Low Inoculation Levels



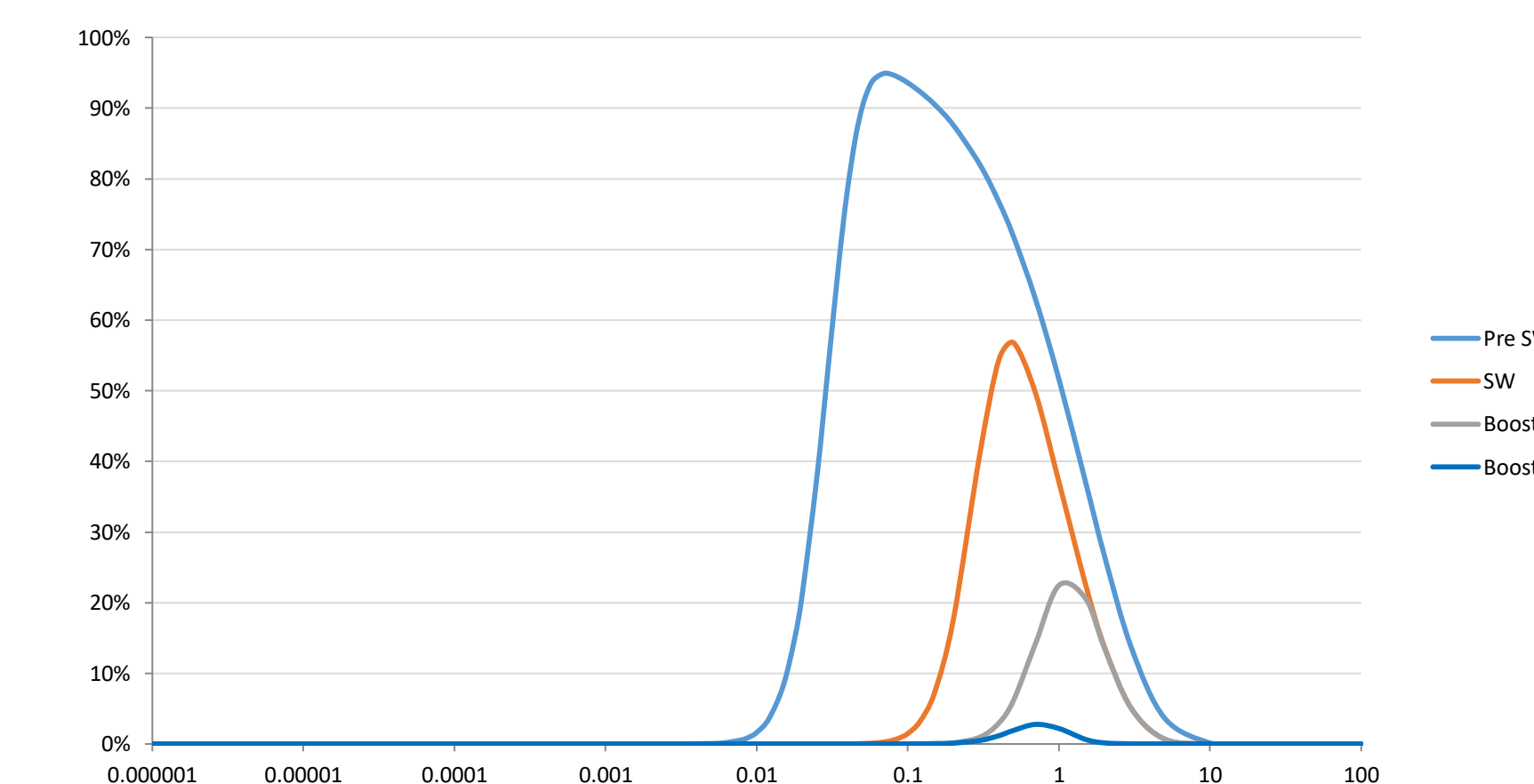
Potential Increase in Cross Contamination Control



Average Boost Effect

Product	Number of tests	Lethality with SW & Chlorine	Lethality with Boost and SW & Chlorine	Difference in Lethality
Iceberg	33	0.97	1.79	0.82
Romaine	20	1.13	1.67	0.55
Combined	53	1.03	1.74	0.72

Modeling across the total spectrum of potential contamination levels shows reductions in the potential risk profile



Conclusions

- The pretreatment increases lethality and potentially increases cross contamination control
- An overall increase in lethality of 0.72 ($p < 10^{-6}$) was observed over a well-managed chlorine process.
- Modeling indicates that these improvements reduce the potential outbreak risk.

Significance

Processors need to be aware of innovations that are raising the standards for the best practical process. The marketplace has little tolerance for processors who fall behind and therefore put consumers at greater risk. This pretreatment sets a performance benchmark that processors can use as a reference in evaluating their own processes.

For Further Information

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