

Impact of Vital Vio's Antimicrobial Light Technology on a Horticulture Processing Room

Partner/Study Location: Horticulture facility in Colorado

Study Objective: This study was designed to test the effectivity of Vital Vio's Antimicrobial Light Technology at reducing surface bioburden in a horticulture processing room.

Test Parameters: Vital Vio's Antimicrobial overhead lights were installed in the Processing Room where plants are sent for processing after harvesting. Swabbing occurred at five (5) sites throughout the room daily for 2 weeks prior to installation to establish baseline numbers. After the lights were installed, those same sites were sampled daily at post-installation weeks 2, 4, 8, 16, 36, and 37. Total fungi counts along with 16 individual genus or species identifications were looked at, and totals were taken across time.

Study conducted by: Chief Scientist at the facility and his team

Study Conclusions: This study demonstrated the ability of Vital Vio's Antimicrobial Light Technology to reduce surface bioburden in heavily used environments with extremely high bioburden and high amounts of plant debris. By week 8 post-installation, total fungi, *Penicillium*, and Yeast counts were reduced by over 1-log compared to baseline levels. At week 37 post-installation, there was as much a 3.5-log reduction in *Penicillium* and Yeast counts.

Vital Vio's Antimicrobial Lighting fixtures (fixtures that multi-task to provide overhead illumination and reduction of surface bioburden consisting of bacteria, molds, and fungi) were installed in the Processing Room of a horticulture facility. Sampling was taken before and after these lights were installed as a pilot study to show the efficacy and utility of this technology at reducing surface bioburden in a highly active space with large amounts of exposure to plants, plant detritus, and people. The Processing Room was chosen because of its high traffic and high bioburden as a challenge to the technology, in order to fully demonstrate its efficacy.

Methods:

Sampling Method and Timing

Swabs were taken using a 3M Sponge-Stick with 10mL Neutralizing Buffer at five (5) sites across the 1860.5 ft² Processing Room, including walls and workstations. These swabs were taken once per day for five (5) consecutive days at each sampling time point. Time points included two (2) weeks of pre-install baseline testing and testing at weeks 2, 4, 8, 16, 36, and 37 after installation of the disinfecting technology. After sampling, swabs were sent out to an external lab for processing. Swabs were processed to obtain total fungi colony forming units per square foot (CFU/ft²). Additionally, total CFU/ft² was determined for a total of 16 individual fungi species of relevance.

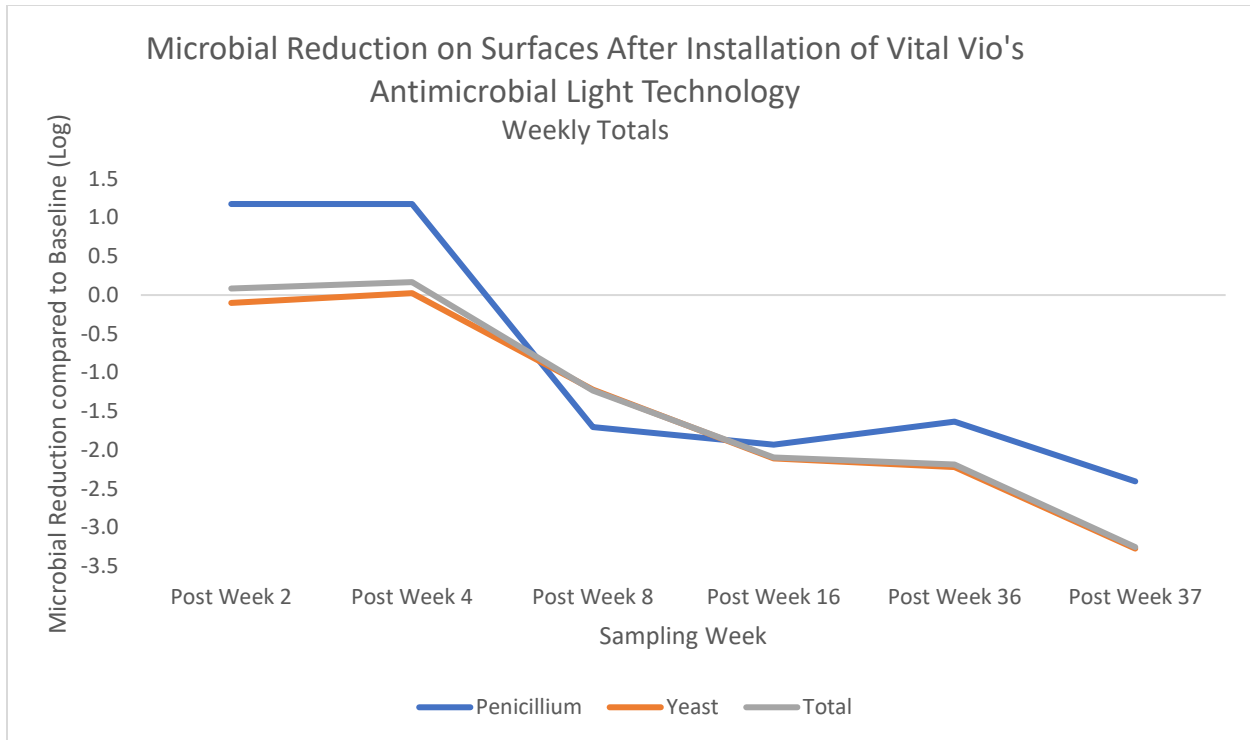
Antimicrobial Lighting Technology

A total of 124 light fixtures (Vital Vio Inc, Troy NY) were installed in the Processing Room. This provided Vital Vio's Antimicrobial Light technology with the opportunity to help continuously protect the space and help reduce surface bioburden on top of existing cleaning methods. This produced lighting levels of over 500 lux throughout the space, and these lights were kept on 24/7 to provide continuous and uninterrupted antimicrobial action.

Results:

Antimicrobial Light Technology was utilized continuously in the Processing Room to demonstrate the efficacy of this technology at reducing surface contamination over time. The lights were left on at all times. In this space, fungi, yeasts, and molds are of the most concern, so counts and identification focused on these species. Vital Vio technology is designed to reduce the presence of microbes on surfaces and works as an added layer of protection, with the idea that reducing surface bioburden during post-harvest processing (and in other ancillary areas) will help in the overall production of finished goods.

Penicillium and Yeast are the individual microbes of most relevance and highest concentration in the Processing Room, so the analysis focused on these specific microbes along with total overall fungi counts. The other 12 species individually identified and quantified were rolled into the total fungi counts, as these species were seen much less frequently and more sporadically throughout the study.



The average of the total fungi count was combined for the two weeks of baseline testing. The log reductions of the post-installation sampling points were then calculated compared to this combined baseline count. Total fungi count stayed relatively consistent between installation of the antimicrobial lighting technology and Post-installation week 4 sampling. However, by Post-installation week 8 sampling, the total fungi count had started decreasing; this trend continued in the final post-installation time point at post-install week 37. There was an almost 3.5-log reduction in total fungi count values at this time point compared to the pre-installation baseline levels. A 3-log reduction equates to a 99.9% reduction in total fungi counts across the surfaces sampled. Similar levels of reduction were seen in specific Yeast counts. *Penicillium* counts showed a slightly larger than 1-log increase in numbers through post-install week 4, but decreased after this and showed an almost 2.5-log reduction by the final time point.

Conclusions

The Processing Room is an extremely challenging environment, with high amounts of surface bioburden and constant introduction or redeposition of plant debris and microbes as staff and plants interact within the space. *Penicillium* and Yeast are the most common sources of failed batches and are the microbes most commonly found in typical environmental and air sampling. Since fungi are of the most concern in this space, the decision was made to not look at bacterial levels in this study. Despite these challenges, Vital Vio's Antimicrobial Light Technology was able to show an almost 3.5-log reduction in total fungi, *Penicillium*, and Yeast surface counts compared to baseline values by 37 weeks after installation, with initial reductions being measured as early as 8 weeks after installation of the fixtures.