

## AiroCide PPT™ Perishables Preservation Technology

*AiroCide PPT™* contains the same NASA-developed technology that is used in a variety of *AiroCide* product lines. In addition to serving the floral and perishable preservation and food safety industry, the *AiroCide* technology is has been developed to kill/remove/eliminate airborne pathogenic and non-pathogenic microorganisms in vegetative and spore states (bacteria, mold & fungi, viruses and dust mites), allergens, odors and harmful volatile organic compounds (VOC's) in air in a variety of commercial, government, and residential market applications including the medical healthcare industry (*AiroCide* is listed as an FDA Class II Medical Device).

### Summary:

A clinical study of the *AiroCide PPT* airborne pathogen killing technology was conducted in the Pre-cooler at Esmeralda Farms' facility in Miami, FL. The data supports the hypothesis that airborne mold and bacteria levels would be lowered after continuous operation of the *AiroCide PPT* system. The results show a significant reduction in airborne pathogens just 24 hours. There was an average airborne mold reduction of 95.45% after a 72-hour period and an average airborne bacteria reduction of 73.18% in the same time frame.

### Protocol:

The Pre-cooler where the *AiroCide PPT* test took place, is approximately 148,500 ft<sup>3</sup> in volume. The test period consisted of four (4) days of air sampling in November 2004. A baseline air sample was taken in two locations in the Pre-cooler on Tuesday, 11/9/04 without the *AiroCide* units operating. On Wednesday, 11/10/04 all three *AiroCide PPT* units were turned on in the Pre-cooler and allowed to run for 24 hours. Active On samples were taken in both locations after 24, 48 and 72 hours of *AiroCide* use, on Thursday, 11/11/04; Friday, 11/12/04 and Saturday, 11/13/04. Air samples were taken for comparison in the Main Cooler and Shipping Area.

Air samples were taken with a slit air sampler (similar to the Anderson N6 sampler) on 15 x 100 mm plastic petri dishes. All samples were cultured by Aerotech Laboratories in Phoenix, AZ, and the results were measured in colony forming units (CFU) per cubic meter of air. All agar plates were exposed to 28.3 l/m of air for 3 minutes.

### Results:

Table 1 below shows airborne mold **reduction** at two sites inside the Pre-cooler of 90.83% and 99.35% , or an average of 95.45% in 72 hours. A significant reduction was realized in just 24 hours.

Table 1

	11/9/04	11/11/04	11/12/04	11/13/04	
Mold Spores	Baseline CFU/m <sup>3</sup>	24-hr CFU/m <sup>3</sup>	48-hr CFU/m <sup>3</sup>	72-hr CFU/m <sup>3</sup>	72-hr Change
Pre-Cooler Site A	131	<12	119	12	- 90.83%
Pre-Cooler Site B	155	119	83	<1	- 99.35%

Average Reduction - 95.45%

Table 2 shows airborne bacteria **reduction** inside the coolers of 60% and 79.83% , or an average of 73.18% in 72 hours. A significant reduction was realized in just 24 hours.

Table 2

	11/9/04	11/11/04	11/12/04	11/13/04	
Bacteria Spores	Baseline CFU/m <sup>3</sup>	24-hr CFU/m <sup>3</sup>	48-hr CFU/m <sup>3</sup>	72-hr CFU/m <sup>3</sup>	72-hr Change
Pre-Cooler Site A	60	24	95	24	- 60%
Pre-Cooler Site B	119	71	345	24	- 79.83%

Average Reduction - 73.18%

One (1) *AiroCide PPT* model ACS-100 is designed to clean the air in enclosed areas up to 50,000 ft<sup>3</sup> in volume (1,415 m<sup>3</sup>) under standard operating conditions. \*

One (1) *AiroCide PPT* model ACS-50 is designed to clean the air in enclosed areas up to 25,000 ft<sup>3</sup> in volume (707 m<sup>3</sup>) under standard operating conditions. \*

\**AiroCide PPT* specification requirements may vary according to the temperature and design of enclosure as well as the sensitivity of its contents to airborne mold, bacteria and ethylene gas. In order to obtain a target airborne pathogen reduction of 90% or greater within 48 hours, KES recommends adhering to the defined specifications.

Copies of tests mentioned in this paper can be obtained by writing KesAir, Research & Development, 3625 Kennesaw N. Ind. Pkwy, Kennesaw, GA 30144.

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