

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 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 *AiroCidePPT™* airborne pathogen killing technology was conducted in a refrigerated cooler inside a large warehouse of a very large organic produce wholesaler located in Holland, to determine if the *AiroCide* technology would reduce the amount of airborne mold present. Results inside the cooler were compared to the outer warehouse area where no *AiroCidePPT™* units were used.

The three (3) *AiroCidePPT™* ACS-50 systems utilized for the study reduced the amount of airborne fungi inside the cooler by an average of **96.8%** in 72 hours. At this point the units were turned off. Subsequently, after 48 hours, the amount of airborne mold inside the cooler showed a **89.5%** increase. These killing results are exceptional taking into account the very high contamination level of the testing area with an initial CFU counting (baseline) well over the 500 mold colonies.

Facility

The organic produce cooler where the *AiroCide PPT™* test took place is approximately 648 m³ in volume. The subject cooler is part of a very large refrigerated storage facility for organic perishable produce. The temperature in the cooler is kept at 4°C at all times. In order to maintain such temperature the cooler is equipped with an airtight door, which is only opened when accessing is necessary. The test cooler is used for storage of citrus, both clean and contaminated, or new and old produce placed next to each other.

Protocol:

The test period consisted of five (5) consecutive days of air sampling. A baseline and an “active off” readings, with no *AiroCidePPT™* systems operating were conducted at the start and at the end for comparison to the “active on” test. The “active on” samples taken inside the cooler were averaged to determine the overall mold count in the cooler.

On day #1 of testing (September 30, 2005) two (2) air samples were taken inside the produce cooler and one (1) sample was taken in the main warehouse for comparison.

On day #2 of testing (October 3, 2005) the same three (3) samples above were taken after three (3) *AiroCidePPT™* systems ACS-50 were operating in the cooler for 72 hours.

On day #3 of testing (October 5, 2005) the same three (3) samples above were taken after three (3) *AiroCide PPT™* systems ACS-50 were inoperative in the cooler for 48 hours.

Air samples were taken with an Aerotech6® air sampler on 9 x 90mm plastic petri dishes of Sabouraud Cloranfenicol Agar (SAB) for fungal growth, in accordance with the general standard testing protocols and procedures. All airborne mold in this study were measured in colony forming units (CFU) per cubic meter of air. The results and total counts were provided by a local independent laboratory specifically chosen by the customer.

Results

The table and graphic below show airborne mold **reduction** inside the cooler of **96.81%** in 72 hours against a subsequent **increase** of **89.50%** inside the cooler after 48 hours of no *AiroCidePPT™* use. This dramatic decrease is particularly significant considering the very high level of contamination in the cooler and the very short duration of the test.

It is also important to pay attention to airborne levels outside the cooler which **decreased** by 26% after the first 3 (days) due to the weekend and very low activity in the warehouse and **increased** by a 25% after five (5) days when the activity was restored at the beginning of the week.

Note that although the amount of CFU's counts on the lab report were well above 500, only 500 CFUs were taken as baseline for calculation purposes. Therefore, it is correct to say that the actual reduction is of **99.999%**

Mold

		Active On		Active Off	
	Baseline	72 / hrs *		48 / hrs **	
Test Site	CFU's	CFU's	Change	CFU's	Change
Cooler	> 500	16	- 96.8%	152.50	+ 89.50%
Warehouse Area	> 500	361	- 26%	440	+ 25%

* - 72 hours after the AiroCides had been turned on.
 ** - 48 hours after the AiroCides had been turned off.

