Science & Technology, Inc.

Case Study

Retail Produce & Floral Coolers

AiroCide® PPT Photocatalytic Air Purifying Technology

AiroCide PPT photocatalytic air purifiers contain the same NASA-developed technology used in a variety of *AiroCide* air purifying product lines. In addition to serving the floral and perishable preservation and food safety industry, the 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 applications including the medical healthcare industry (*AiroCide* air purifiers are FDA Class II listed medical devices).

Abstract:

A clinical study of the *AiroCide PPT* photocatalytic air purifying technology was conducted in the produce cooler and floral cooler of a national retail grocery store. The data supports the hypothesis that airborne mold levels would be lowered after 24-hours of continuous operation of the *AiroCide PPT* air purifying system. The results show a range of 41% to 100% **decrease** in levels of specific airborne mold species in the produce cooler. In the floral cooler, mold level **decreases** ranged from 44% to 100%.

Conditions:

The test site is approximately ten (10) years old. The walk-in produce cooler is located in the back of the store and is 24' x 20' x 10' or 4800 ft^3. Temperature at the time of the tests was 40° F. On day # 1 of testing, the store received a double shipment, leaving many pallets and boxes stacked outside the already full cooler. The produce cooler door remains open over 50% of the time during the day and is equipped with plastic strips that provide access while maintaining some air blockage. Two (2) employees are scheduled to work in the produce department between 6 am and 7 pm. From 7 pm to 6 am the produce cooler door is closed.

The floral cooler is located in the front of the store, approximately 20 feet from the front doors. The floral cooler is approximately 10' x 10' x 10' or 1,000 ft^3. The temperature during the tests was 38° F. During the test period the store was running a sale on roses and the display areas and small storage room were full. One (1) person operates the floral department. Product mix inside the combination cooler/display case runs 50% cut stems, 25% pre-made arrangements in vases and 25% wrapped bouquets.

Protocol:

The study was conducted during two typical business days. On day # 1 of testing (September 17, 2003) four (4) air samples were taken in the produce storage area and four (4) samples were taken in the floral storage area before the *AiroCide PPT* air purifiers were turned on. These samples established the baseline.

On day # 2 of testing (September 18, 2003) the same eight (8) samples above were taken after one air purifier (ACS-100) was operating in each cooler for 24-hours.

Air samples were taken with an impingement air sampler (similar to the Anderson N6 sampler) on 15 x100 mm plastic petri dishes. This type of slit air sampler is considered the most accurate method of measuring viable (live) mold and is superior to air sampling that utilizes ambient or gravity spore capturing techniques.

All airborne mold and bacteria in this study were measured in colony forming units (CFU) per cubic meter of air. A CFU is any unit of a given organism that has the ability to multiply and form a colony, or reproduce.

Results

The tables below show examples of specific mold species that showed significant decreases in 24 hours. Decreases ranged from - 41% to - 100%. in the produce cooler. In the floral cooler, mold level decreases ranged from 44% to 100%.

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

Specific Mold Species Test Results
(Test # 2 shows % change from Test # 1, Baseline)

Produce Cooler

	Baseline	24 hrs	
Mold Species	**Test 1**	**Test 2**	
	CFU/m³	**CFU/m³**	**Change***
Cladosporium	59	35	- 41%
Mycelia sterillia	12	0	- 100%
Penicillium Species Var. 1	59	12	- 80%
Aspergillus niger	12	0	-100%
Paecilomyces	24	0	- 100%

Floral Cooler

	Baseline	24 hrs	
Mold Species	**Test 1**	**Test 2**	
	CFU/m³	**CFU/m³**	**Change***
Cladosporium	106	59	- 44%
Mycelia Sterillia	24	0	- 100%
Pennicillium Species Var. 1	71	12	- 83%
Fusarium	12	0	- 100%