

Case Study – Airoclean420 vs Powdery Mildew

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Purpose: This study was designed to determine whether Airoclean420 air sanitation technology is effective in reducing the occurrence and spread of powdery mildew.

Client: Vertically integrated multi-state national branded cannabis company with controlling interest in: cultivation, manufacturing, extraction, packaging, and dispensaries.

Scope: Work was performed in an operating cultivation facility from four different cultivars previously observed to be highly susceptible to powdery mildew infection.

Test Materials / Equipment / Methods:

Equipment > Airoclean420 (5 units) deployed in active Cultivation Room

Materials > Vegetative Plant Cultivars:

- Pineapple Express (27 plants)
- Katsu Bubba Kush (18 plants)
- Kosher Tangie (27 plants)
- Chunky Diesel (14 plants)

Test Methods > Testing will be limited to visual observation to assess the severity of powdery mildew levels on vegetative plants. Facility employees will complete 2-3 observation periods:

- 1) Powdery Mildew Quantification **Pre**-Airoclean420
- 2) Powdery Mildew Quantification **Post**-Airoclean420

Background: There have been high levels of powdery mildew incidence on vegetative plants in this facility. Powdery mildew is easily detected by the white coating on the leaves and shoot tips. If left untreated, the infection will spread throughout the plant, causing leaf atrophy and death. Persistent infection can damage cannabis plants by severely slowing down photosynthetic processes, ultimately affecting harvest yields. Reducing the occurrence of powdery mildew is essential in maintaining a healthy crop at all stages of the cannabis life cycle. In an attempt to reduce the occurrence of powdery mildew on vegetative plants, a trial will be run using Airoclean420 technology. Five units will be installed in the cultivation room measuring 47,900 ft³ with systems mounted 12-24 inches above the vertical racks.

Airoclean420 is a NASA developed air sanitation technology that has previously been utilized as a significant preventative control in the Food and Beverage Industries to protect perishable products from harmful contaminations. This technology has been modified to combat contamination on cannabis plants such as powdery mildew, grey mold/botrytis, downy mildew, and blight using photocatalytic oxidation (PCO). Airoclean420 is energy efficient and does not produce emissions, ozone, or any other harmful chemicals. This study is designed to test the efficacy of Airoclean420 technology in reducing the occurrence of powdery mildew in the vegetative stage of the cannabis life cycle.

Procedure Preparation: Apply Phosguard treatment as scheduled for vegetative plants. Resume normal treatment of vegetative plants. One week after Phosguard application, select the plants from the following strains for powdery mildew observation: Pineapple Express (27 plants), Katsu Bubba Kush (18 plants), Kosher Tangie (27 plants), Chunky Diesel (14 plants). Prepare the data sheet titled, "Pre-Airoclean420".

Pre-Airoclean420 Observations: Select the plants that will be used for powdery mildew observation. For each plant, fill out the columns in the Pre-Airoclean420 data sheet. Record the date data are collected. The plant ID column should contain the unique Biotrack ID. - List the strain of each plant in the strain column. Record whether or not powdery mildew is present on the leaves of the plant. Count the number of affected leaves. Record whether or not powdery mildew is present on the stems of the plant. There should be 86 observations total. Once all plant data is collected, apply another Phosguard application and turn on the Airoclean420.

Post-Airoclean420: Select the same plants used in the Pre-Airoclean420 data collection for Post-Airoclean420 data collection. For each plant, fill out the columns in the Pre-Airoclean420 data sheet. Record the date data are collected. The plant ID column should contain the unique Biotrack ID. List the strain of each plant in the strain column. Record whether or not powdery mildew is present on the leaves of the plant. Count the number of affected leaves. Record whether or not powdery mildew is present on the stems of the plant. There should be 86 observations total. Once all plant data is collected, continue weekly Phosguard application and allow the Airoclean420 to continue running. This would result in one Pre-Airoclean420 data set, as well as two Post-Airoclean420 data sets over the span of three weeks.

Observations Collected: If Pre-Airoclean420 and two Post-Airoclean420 data sheets are filled out, this will result in 258 total observations (this is the ideal goal, and would provide more confidence in our results).

Data Analyses – Binomial regression models were used to analyze the presence of powdery mildew on individual plant stems and leaves due to the binary nature of the data. Linear mixed effects models were used in conjunction with TukeyHSD post-hoc analyses to analyze the number

of leaves affected by powdery mildew per plant over the duration of the study.