

SteraMist Efficacy against Aspergillus in Harvested and Dried Cannabis Flowers

Abstract:

The current research was carried out in two folds: 1) to investigate whether SteraMist Ionized Hydrogen Peroxide (iHP) technology would be a solution for remediation of Aspergillus and Powdery Mildew for infected cannabis flower that had been dried and cured and 2) to investigate whether SteraMist iHP technology could be a preventative solution against Aspergillus and Powdery Mildew in a commercial cannabis cultivation.

The research for remediation began by identifying a legal cannabis cultivation facility that was infected with powdery mildew and that also failed Aspergillus test(s). Dark Horse Genetics' facility was selected because it checked both of these prerequisites.

The dried and cured flowers that had failed both powdery mildew and Aspergillus from Dark Horse Genetics were immediately treated using SteraMist iHP technology. Samples of treated flower and samples of untreated flower from the same batch were sent in to a third party test lab to be retested. The untreated flower did not pass aspergillus and powdery mildew testing. The treated flower passed both both.

The research for prevention was a 4-month process that began with treatment in vegetative rooms, clone/mother rooms, flower rooms, hallways and common areas with SteraMist iHP solution. Plant stocks (mothers) were all misted next. New cuttings (clones) were taken from the mother stock a week later and treated with SteraMist again. Within four weeks, those same clones (now teens) were misted again with SteraMist. After another four weeks, the vegetative plants were treated once more with SteraMist before being moved into the flowering stage. In the Flowering stage, the plants were treated twice with SteraMist; once in the first month and once the week before harvest.

When the plants were harvested, dried and cured, it was sent in to a third party lab to be tested for aspergillus and powdery mildew. All samples that were treated passed both powdery mildew and aspergillus. Other cultivation rooms on site (controls) were not treated and those failed both aspergillus and powdery mildew lab tests.

The failed control group was then treated with SteraMist, retested and samples passed both tests.

In this twofold research, we concluded that SteraMist does in fact remediate aspergillus and powdery mildew in infected cannabis flower that had been dried and cured. We also concluded that SteraMist is in fact great as a preventative control step for aspergillus and powdery mildew infections in a cannabis cultivation facility.

Introduction:

Aspergillus is a saprophytic fungus that helps remove environmental carbon and nitrogen from the earth's atmosphere. *Aspergillus* is most commonly found in the soil, where it thrives on naturally occurring organic debris. While *Aspergillus* predominantly grows underground, its spores propagate rapidly in the air with each fungus capable of producing thousands of conidia. These spores are commonly spread through environmental disturbances and strong air currents, that allow them to be found both indoors and out.

These spores are everywhere, and there's a good chance that you breathe in hundreds of them every day. While there is usually no risk for healthy individuals, *Aspergillus* is especially dangerous to immunocompromised individuals, in whom the airborne spores can lead to a debilitating invasive infection, called aspergillosis, that oftentimes proves to be fatal.

The danger posed to medicinal cannabis patients exists solely through the practice of ingesting cannabis by smoking and inhaling the product directly into the lungs through combustion. This danger is due to the fact that the heat created through the combustion does not reach the approximately 200 degrees required to effectively eliminate *Aspergillus* spores. When these spores are present in the plant and smoked, they are inhaled directly into the lungs where they pose a serious risk of infection.

Aim:

The purpose of this experiment is to test the efficacy of SteraMist's Ionized Hydrogen Peroxide (iHP) technology as a solution to mitigate and/or eliminate *Aspergillus* from cannabis flower that has been dried and cured for human consumption.

This experiment aims to understand if SteraMist iHP technology could be a more natural and safer solution at eliminating aspergillus with preventative misting in a facility with live plants and also on infected plants that have been harvested and cured.

Hypothesis:

In previous experiments from SteraMist, it was shown that aspergillus was eliminated to non-detect, from contaminated facilities. We expect to observe that SteraMist iHP technology will eliminate aspergillus from dried/cured cannabis flower when thoroughly misted on all sides of flower. We also expect that preventative misting will greatly reduce if not mitigate the spread of aspergillus and powdery mildew.

Risk Assessment:

<i>Hazard and Associated Harm</i>	<i>Risk</i>	<i>Precautions</i>
Ionized Spray can cause skin/ eye/breathing irritations	High	EPA label states: goggles, gloves, mask(n95 or R-95), long sleeves and long pants
Damage to Living plants	Medium	Sample Mist on a few plants
Damage to finished product	Low	Sample misting
Terpene and taste profile reduction	Medium	Sample mist and evaluate by testing product (smell and smoking it)

Materials:

1. SteraMist SteraPak-Backpack Sprayer
2. SteraMist BIT Solution- 7.8% Hydrogen Peroxide
3. Safety Goggles
4. Tyvek Suit
5. Chemical Gloves
6. R-95 Mask
7. Dried Cannabis
8. Screen (to lay cannabis on)
9. Oscillating fan

Method 1: Spraying cured flower

Setup:

1. A clean room with proper ventilation was used to do the experiment.
2. Tyvek suit, goggles and gloves were worn.
3. A 4'x4' screen that was constructed prior to experiment (using wood and screen rolls from a hardware store) was laid on top of a table at either end of the screen.
4. An oscillating fan was set up 5' away from the screen.
5. The SteraMist SteraPak was filled with SteraMist 7.8% BIT Solution, prepped for use and put on top of one of the table for later use.
6. The dried cannabis was brought into the clean room in buckets.
7. R-95 face masks are worn at this point.
8. 1 oz of dried cannabis was spread out onto the screen evenly in a single layer.
9. The SteraMist SteraPak was worn by the experimenter.
10. The experimenter held the sprayer 18"-24" away from the cannabis and proceeded to spray onto the cannabis from left to right, then a second pass from right to left. The assistant sprayed the second lower half starting from left to right, then a second pass from right to left.
11. The assistant knelt down, held the sprayer 18"-24" away from the cannabis and proceeded to spray under the screen onto the cannabis starting from left to right, then a second pass from right to left. The assistant sprayed the second lower half starting from left to right, then a second pass from right to left.

Disposal and Clean Up:

1. The ventilation was turned on immediately after the final spraying.
2. The oscillating fan was turned on and pointed just above the cannabis.
3. The SteraMist SteraPak was brought out of the room to be cleaned.
4. Gloves are removed and disposed of properly.
5. Tyvek suit, goggles and R-95 masks were hung up in storage room.
6. After a 3hrs of drying, multiple samples were taken from different areas of the screen and sent to the labs to retest for aspergillus.

Method 2: Preventative Spray

1. A Flower room was identified to have been significantly infected with white mold, powdery mildew and aspergillus.
2. Live plants infected plants were present.
3. All lights were turned off to prevent any burns from spraying. All fans and ventilations were turned off to prevent sprays from being misdirected.
4. Tyvek suit, goggles, R-95 mask and gloves were worn.
5. Experimenter sprayed all walls, ceilings, plants and everything in the room that wasn't electronics with SteraMist.

Disposal and Clean Up:

1. The ventilation and fans were turned on immediately after the final spraying.
2. The SteraMist SteraPak backpack sprayer was brought out of the room to be cleaned.
3. Gloves are removed and disposed of properly.
4. Tyvek suit, goggles and R-95 masks are hung up in storage room.

5. After 15 minutes, all lights were turned back on.