

Government regulatory agencies in most countries have strict guidelines about levels of allowable fungi contamination. Achieving the required purity can be challenging when fungus infestations are significant, which they often are.

High-Tech Methods for Fungus Resistance

Fungal invasions have damaged sensitive cannabis plants in locations across the globe. In response to ongoing problems with crop loss traceable to fungal activity, [Israel's Agricultural Research Organization sponsored a project](#) to investigate some potential high-tech cures for these voracious microorganisms.

The three disinfecting technologies used in these experiments were:

- [Gamma Irradiation](#)
- E-Beam (Beta) Irradiation
- [Cold Plasma Treatments](#)

The radiation-based experiments were carried out at the Soreq Nuclear Research Center in Israel. At the same time, cold plasma treatments were administered on-site with equipment developed by a company called Nova Green, which has developed its cold plasma disinfecting technology specifically for cannabis plants. These treatments were applied to naturally infected cannabis buds (inflorescences) from plants cultivated for medicinal purposes.

The capacity of each method to reduce fungal forming units (CFUs) was found to be significant. Gamma irradiation reduced CFU levels by 4.5–6 log fold, while e-beam irradiation and cold plasma treatments each reduced them by fivefold. In each instance, infection levels were reduced below minimum standards established by Israel's Ministry of Health.

Traditional methods of neutralizing fungi have included the application of ultraviolet (UV) light beams and high-pressure steam (autoclaving). While these techniques are effective, they can be destructive to sensitive cannabis plants or extracts. They cause valuable medicinal cannabinoids and terpenes to degrade, leaving behind a less efficient product. Medicinal cannabis preparations must contain precise quantities of essential compounds to produce good results, and even the slightest alteration in those formulas can inhibit therapeutic performance.

Fungicides may kill these unwanted invaders as well. But the use of chemicals in cannabis farming is a controversial issue since most consumers would prefer to purchase products that are raised without any exposure to toxins. Another problem is that chemicals with toxic properties cannot be used when cannabis plants reach an advanced flowering stage.

Such problems are avoided when sterilization procedures are carried out using gamma radiation, e-beam (beta) irradiation, and cold plasma inundation. These disinfecting agents target bacteria, yeast, mold, mildew, and other fungi exclusively, without creating any changes in the molecular structure or physical characteristics of cannabis plant compounds. They don't compromise the essential qualities of cannabis plants grown organically or cannabis products marketed under the organic label, which is vital given the public's preference for the natural and the chemical-free.

While all worked about equally as well, gamma irradiation is far more expensive to implement than the other two methodologies. This makes its usefulness somewhat questionable in comparison to e-beam irradiation and cold plasma treatments (the latter is delivered in the form of a gas). From a practical standpoint, cold plasma might be the easiest of the technologies to use at this time, since applications have already been customized to meet the needs of the cannabis industry.

More research is needed to definitively prove the utility of each of these sterilization techniques. But early findings on their efficiency fit with expected results, based on their known effects on fungi and other microorganisms.

Fungus is Everywhere

Yeast and mold are the most well-known types of fungi. Both can inhabit the flowers, buds, stems, or roots of a cannabis plant.

But they are far from the only threat. Careful analysis has revealed the presence of an astonishing variety of fungi infections in cannabis. The [list of fungi](#) known to colonize cannabis plants includes:

- Botrytis
- Bold
- Alternaria
- Mildew
- Oidio
- Roya
- Aspergillus
- Pythium
- Root rot
- Fusarium
- Verticilosis
- Esclerotinia

Cannabis crops grown indoors, outdoors, and in greenhouses can all be negatively impacted by these sly invaders, who arrive through the air in the form of invisible spores.

Fungi aren't universally dangerous to humans. But cannabis plants are vulnerable to the predations of some that are, meaning that cannabis products contaminated with these fungi could be detrimental to the health of those who consume them.

This is a serious issue in any instance. It is especially problematic in people with compromised immune systems since fungal infections can quickly overwhelm the body's ability to combat them when immune responses are not reliable.

The concern over contaminated medicinal cannabis has been magnified by the Covid-19 pandemic. People with underlying conditions that function as risk factors for Covid-19 need safe,

high-quality medications that are effective against the symptoms of these disorders. If they consume cannabis that contains unwanted fungal invaders, their health could suffer at a time when having a robust immune system is essential.

An Ounce of Prevention

E-beam and cold plasma solutions to fungal issues are attractive because of their safety and efficiency. But prevention remains the most effective solution of all.

To keep fungi at bay, rooms used for indoor growing should be regularly disinfected with bleach. This should take place before new crops are planted and immediately after harvest. Tools and utensils should be kept clean at all times, and workers should regularly wash hands and take other steps to make sure they aren't a source of contamination.

Environmental conditions can encourage fungal outbreaks. Fungi like dark, humid areas and are more likely to spread in stale air. That is why growing areas should be well-ventilated and kept well-lit. Dehumidifiers can be used to prevent indoor humidity levels from rising above 50 percent. Dead leaves on plants should always be removed since they can precipitate the spread of the condition that caused them to expire.

Naturally, it is more difficult to reduce the risk of fungal outbreaks in outdoor growing environments. Nevertheless, the odds of severe fungal infection can be reduced if hygiene and cleanliness are prioritized. All tools and equipment should be kept clean and disinfected, and workers should observe all the standard rules of good hygiene.

Going forward, there is likely to be great emphasis placed on hygiene in the cannabis industry because of fears related to the coronavirus. Most of the measures taken as a result should help counteract fungal outbreaks as well.

Fungi are so ubiquitous and can colonize vulnerable areas so easily that prevention strategies won't keep them away entirely. But growers who prioritize the prevention of fungal infection will have less need for high-tech solutions, which will keep expenses down and lower the risk of serious, widespread fungal invasions. E-beam and cold plasma sterilization hold great promise, but in an ideal world, they would be used as backups and not as a primary means of defense against destructive microorganisms.

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