

# Me-I-Gro Indoor Climate Concept to eliminate odors and avoid harmful organisms

Me-I-Gro: for grow rooms highly effective as well as cost-efficient and environmentally friendly room climate concept for odor elimination and avoidance of harmful organisms. This paper is a continuation of the solutions presented and discussed in [1] and [2].

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## Measures for eliminate odor

Everyone knows the characteristic and telltale smell of hemp plants. The person who grows this plant takes a risk that should not be underestimated and should learn about odor neutralization or take appropriate measures.

In the following, we present some solutions and devices that can be of help in reducing and eliminating the smell of cannabis odor.

HEPA (High-Efficiency Particulate Air) filters are particulate air filters. They trap particles with an aerodynamic diameter smaller than 1  $\mu\text{m}$ . HEPA filters can remove bacteria and viruses, pollen, mites, aerosols and smoke particles from the air. They are one way to reduce odors but they do not completely eliminate odors.

Another way to reduce odors is to use odor neutralizers. These do not eliminate the cannabis odor, but only mask it with another intense odor.

Today, most growers use activated carbon filters that require an exhaust system. The air to be filtered must be actively sucked or pressed through the filter.

In practice, the activated carbon filter is usually installed at the end of the exhaust system to prevent odors from escaping to the outside. In this process, the capillary in the activated

carbon of the filters absorbs the odor molecules from the air. Activated carbon filters take up a lot of space in the grow room, making them difficult or impossible to use in limited spaces. High quality filters are also expensive and energy consuming. Inferior activated carbon filters, from experience, have a much shorter lifespan, are usually noisy and cannot completely eliminate the smell of cannabis odor.

The biggest problem with using this filter is that it is impossible to predict when the capillaries in the activated carbon will no longer be able to absorb odors, i.e. when the filter or activated carbon unit will need to be replaced.

Replacement depends very much on factors such as air flow velocity, air humidity ect. Filters whose capillaries can no longer absorb odorous substances release the odors unfiltered into the environment.

Another option for odor elimination is the use of ozone generators, which produce ozone at a certain concentration. It can inhibit mold growth, eliminate pathogens, sterilize the grow room and help eliminate cannabis odor effectively. More recently, home growers are trying to use low-power ozone generators that are placed directly in the grow room.

## Odor neutralization and cleaning with ozone

Ozone (O<sub>3</sub>) is a gas that consists of 3 oxygen atoms. It is also called active oxygen or tri-oxygen. It is the most powerful natural disinfectant known and is odorless in low concentrations.

Ozone is scientifically well studied and is also used in the food industry. It has also been used for over a century to sterilize instruments in hospitals and has long been used to purify drinking water. In nature, purification processes are constantly taking place with ozone in the atmosphere, which is produced by solar radiation.

The advantage of ozone treatment is that no chemical residues are left behind, as ozone decomposes to oxygen after a certain time. Since ozone is a gas, it can penetrate into the smallest holes and crevices and thus clean the whole object.

Under standard conditions (20°C at 1 bar air pressure), the half-life of ozone is about 20 minutes. However, high temperatures as well as pressure and other factors reduce the half-life of ozone considerably.

Ozone reacts directly with molecules in the air or microorganisms. Odor molecules (terpenes) in the hemp plant are no longer only filtered or odors covered but destroyed by oxidation. Ozone is used to:

- Eliminates the cannabis odor by placing an ozone generator behind the activated charcoal filter to further purify the exhaust air and thus residual odors.
- Keeps the grow room clean and free of germs. Ozone treatment is much more effective at killing fungi and pathogens than many other methods. Grow rooms can thus be sterilized with just the push of a button, without having to manually clean each component.
- To clean the hydro system.

Using an ozone generator is an effective way to eliminate odors. Nevertheless, ozone generators are not very common. This is due to the following disadvantages, among others:

- The selection of the right ozone generator for a given grow room size is very limited. Cf. [1].
- Where ozone generators are used, there should be no people, animals or plants, as high ozone concentrations can damage the respiratory tract or negatively affect plant growth. However, the same applies here: The quantity makes the poison.
- The grow room must be left immediately after switching on the ozone generator.
- After an ozone treatment, the room must always be ventilated intensively. The ventilation period usually lasts much longer than the actual treatment with ozone.
- Rubber products or iron are attacked by ozone. Corrosion or even material decomposition occurs. Before ozone treatment, it is therefore always necessary to check which material has been installed or at which concentration the ozone treatment is to take place.
- In addition, ozone exposure for too short a time causes reaction chains to be incomplete. New odors develop.

In addition, cleaning with ozone requires experience and expert knowledge and depends on the following points, among others:

- Degree and type of contamination (type of odor, type of mold, fungi, etc.)
- Temperature
- Humidity

However, when used correctly, the use of ozone as an odor eliminator has some advantages. This will be discussed in more detail below.

## **Me-I-Gro room climate concept**

The new Me-I-Gro (Me)asured (I)onic (Gro)wing room climate concept is able to eliminate odors via homolytic bond cleavage, thus creating an odor-neutral environment. Odors as well as harmful substances are efficiently eliminated by a controlled release of ozone through a special controlled ozone generator.

Air purification processes are monitored by means of permanent indoor air climate evaluations with the aid of an air quality sensor. Internationally prescribed limit values for ozone in the air are adhered to.

The process used is particularly gentle on plants. A kind of "terpene" protective screen is formed as a bell around the plant, which is largely free of ozone. The ozone gas only acts outside this bell, guaranteeing tasteless cultivation. Figure 1 illustrates this pictorially.

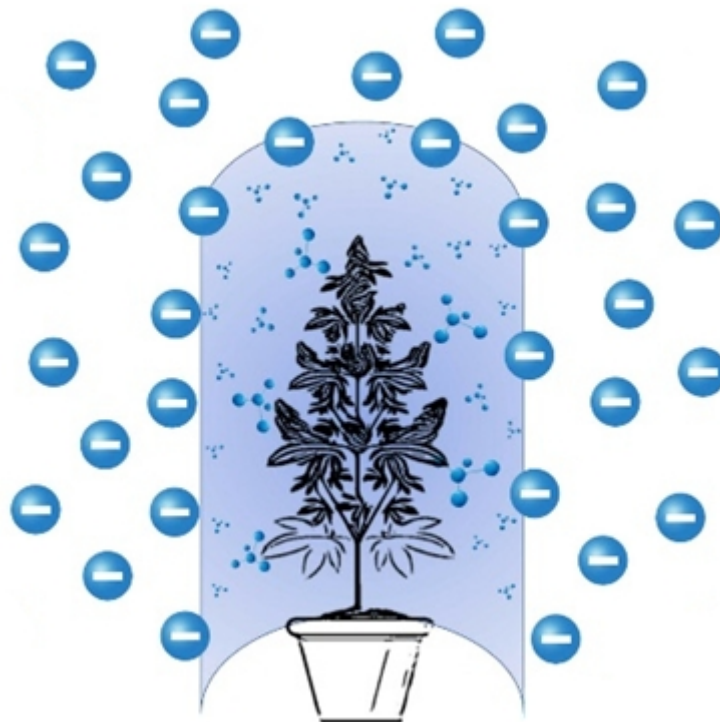


Figure 1: Odor (terpene) screen as a bell (marked in light blue) around the plant. The ozone gas produced, marked as a blue circle with a -, does not reach the flowers of the plant.

The room climate concept can not only clean the atmosphere of the growth room in a natural way, but also as a protective barrier against the introduction and spread of harmful organisms such as bacteria, mold spores, fungi, etc. to serve. Microbiological contaminants and harmful organisms are not killed but kept away from the grow room with the help of the ozone gas.

Ozone gas, in the right concentration, can further be used as a natural pesticide and disinfectant. Unlike conventional pesticides, it decomposes into oxygen after a certain time and leaves no toxic or carcinogenic residues.

A major advantage of the environmentally friendly process is that ozone gas acts not only on but also under the leaves of the plants, and nutrient media are not polluted by pesticides.

## Filter system for grow rooms

The Me-I-Gro room climate concept requires a room climate generator and an air quality sensor (Figure 2) as well as a special ozone generator.

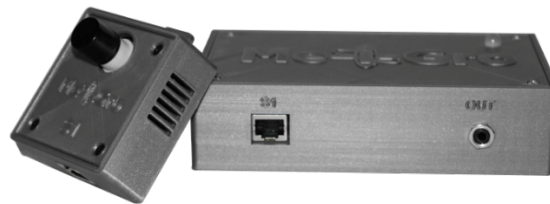


Figure 2: Air quality sensor module (left) with the room climate generator (right).

Figure 3 shows how the individual components can be placed in the grow room. The air quality sensor can be placed in the center of the grow room, the ozone generator next to the lighting unit.

Repositioning of the components is possible without any problems. The air fan, which is usually placed in the grow room, should be retained. Among other things, it ensures that the room air is well mixed with the ozone gas.

Since no activated carbon filter system is required, the free space can be used for the Me-I-Gro room air conditioning units and the plants. Figure 4 illustrates the wiring of the system components.

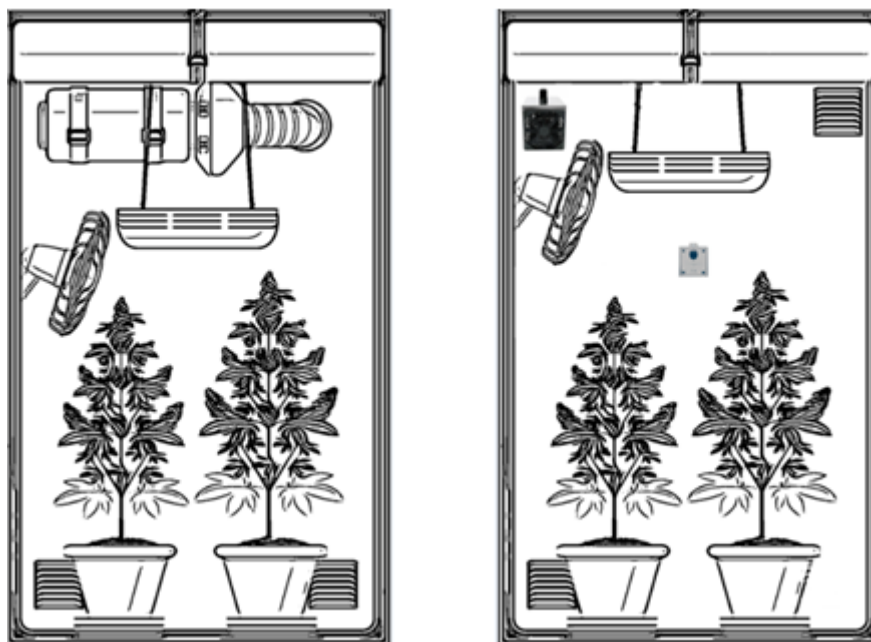


Figure 3: left: Grow room with conventional activated carbon filter system;  
right: grow room with air quality sensor and ozone generator.  
The room air-conditioning generator is not shown in the illustration for  
is not shown in the figure.

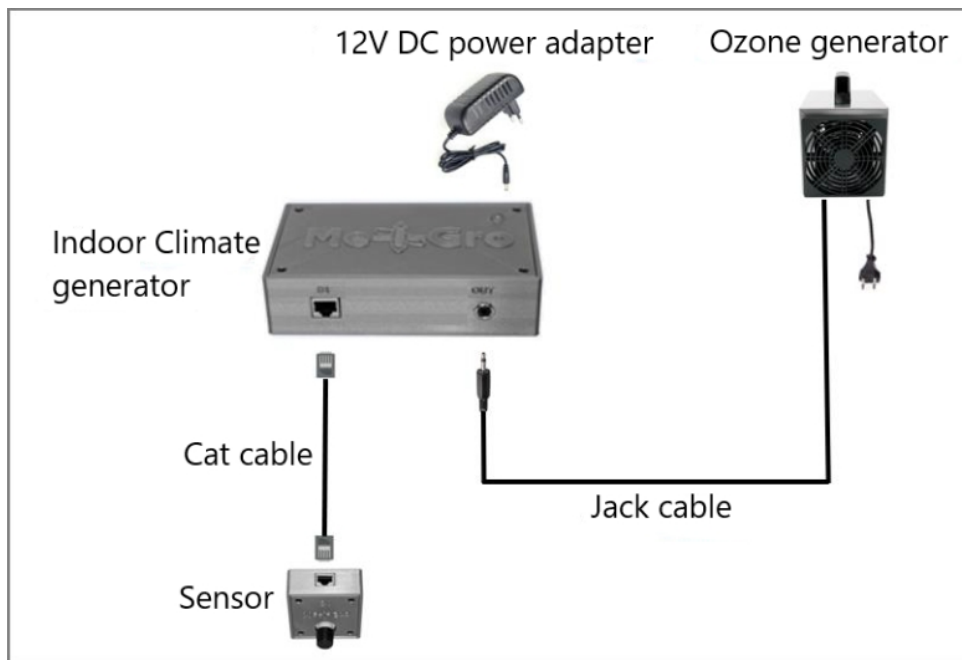


Figure 4: Wiring of the individual Me-I-Gro system components.

The ozone gas is generated directly from the room air. The concentration of ozone in the room air is precisely controlled via the air quality sensor. The room air conditioner is suitable for tents or rooms up to approx. 2m<sup>3</sup>. For larger grow rooms, there is a Me-I-Gro variant with 4 sensors that can cover grow rooms from 2m<sup>3</sup>.

The Me-I-Gro room climate concept allows any number of ozone generators to be cascaded to cover much larger room sizes. The system is consumable-free and maintenance-free. There are no ongoing costs due to consumables as with activated carbon filters. Filter changes are also eliminated.

The effort required for installation is negligible compared to conventional activated carbon filter systems. Aluflex pipes or hoses and heavy and bulky filter systems and components do not have to be installed. The space thus gained benefits the plants.

## Safety and health aspects

Ozone occurs in nature. By means of special measuring devices, the ozone concentration can be easily measured. It is usually expressed in ppm or ppb (parts per million, billion or µg, ng/L).

To get an overview of the exposure of the cannabis plant to ozone in the grow room, we will go into ozone limits that are found in the wild in summertime.

The EU has set various thresholds in relation to O<sub>3</sub>, measured as a one-hour average. A value of 90 ppb (parts per billion) or 180 µg/m<sup>3</sup> was determined as the information threshold. If this value is exceeded, information must be provided. Furthermore, an alarm threshold of 120 ppb (240 µg/m<sup>3</sup>) was decided. Below a daily exposure (average over 8 hours) of 120 µg/m<sup>3</sup> (60 ppb), adverse health effects are not to be expected.

The U.S. Food and Drug Administration (FDA) declares 100 µg/m<sup>3</sup> (50 ppb) to be a safe level in the air for inhalation over 24 hours.

To get an overall picture, Figure 5 shows the ozone levels to be expected in the city and on mountains during a summer period (24.7.1990 - 06.08.1990).

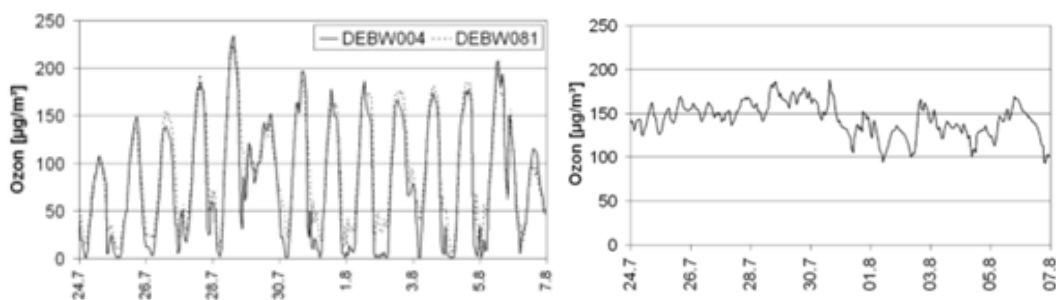


Figure 5: on left: City; max. 230 µg/m<sup>3</sup> (ca.165 ppb) ozone pollution, stations Eggenstein, Karlsruhe Nordwest (measuring stations: DEBW004/DEBW081). on right: Mountain; max. 190 µg/m<sup>3</sup> (ca. 95 ppb) ozone pollution, Garmisch-Partenkirchen-Wankgipfel (1780m) from: "Analyse der zeitlichen Entwicklung von Luftverunreinigungen mit dem Schwerpunkt Ozon", F. Schneider/FU-Berlin, Chapter 3.

In contrast to natural ozone pollution, the Me-I-Gro indoor climate concept reliably complies with ozone concentrations and immission protection laws through permanent ozone control measurements.

It is guaranteed that ozone concentrations of 120 µg/m<sup>3</sup> (60 ppb) are not exceeded in the grow room, i.e. there is a lower exposure compared to an ozone exposure in the city or on a mountain (cf. Figure 5).

It can therefore be guaranteed that at any time the grow room can be entered without concern. The plants will not be harmed by the generated ozone concentrations. The full aroma of the plant is guaranteed. Negative effects on plant growth are excluded by the air quality sensor.

## Summary

The use of special ozone generators and permanent measurement and control of the ozone concentration in the air are a way to eliminate odors in grow room efficiently and safely. The Me-I-Gro room climate concept is therefore an alternative to classical activated carbon filters. The advantages to common odor elimination methods are:

- Removes odors of any kind, no odor overtoning, no filter system and filter change necessary.
- Me-I-Gro cleans the grow room in parallel with odor neutralization.
- The system works silently and adapts to different room sizes.
- Easy integration into different grow rooms.
- The system is consumable and maintenance free; no ongoing costs.
- Very environmentally friendly and low energy consumption.
- Ventilation after ozone treatment against residual odors is completely eliminated. There is no danger from ozone.
- No need to use pesticides in the grow room as ozone keeps harmful organisms away.

Feedback and comments can be left in the section below.

[1] <https://2fast4buds.com/de/news/ozongeneratoren-fuer-indoor-grows>

[2] <https://www.royalqueenseeds.de/blog-ozongeneratoren-und-cannabis-alles-was-du-wissen-musst-n1158>