

Reduction of Discharge Water by Heating the Nutrient Solution During the Winter Period

Why

Necrosis virus is becoming an increasing problem in lettuce cultivation, both in soil-grown and hydroponic systems. The virus is spread by the fungus *Opidium virulentus*, which can be present in irrigation and nutrient water. By preventively heating the nutrient solution to 18–20°C, this study investigates whether the development of the fungus and the symptoms of the necrosis virus can be reduced. The aim of this measure is to improve water quality and reduce reinfection in recirculating hydroponic systems.

What

This measure consists of the controlled heating of the nutrient solution within a hydroponic system. The water is continuously maintained at a temperature between 18 and 20°C using heating units and circulation pumps. *O. virulentus* is mainly observed during colder periods, which is why research is being carried out to determine whether heating the nutrient solution can influence the reproduction of this fungus and thereby reduce the spread of the virus.

How

Construction

The installation usually consists of:

- A heating element or heat exchanger connected to the water buffer
- Temperature sensors and automatic control systems
- A circulation pump to ensure a uniform water temperature
- Application in a recirculating nutrient water system

Maintenance

Daily monitoring of the water temperature is strongly recommended, together with regular monitoring of the oxygen level and microbiological load of the water. In addition, it is important to apply this measure preventively, before the first virus symptoms appear. However, further research is still needed to confirm the effect of water heating on suppressing the development of *O. virulentus*.

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Cost

Target price

The cost of this measure depends on the size of the hydroponic system and the type of heating installation used. Prices can start from approximately €10.000 and increase significantly for systems with larger flow rates. The main investments are related to energy consumption, installation of heating elements, and monitoring and regulation of the water temperature. Both installation costs and recurring operational costs can vary depending on the scale of the system and the level of automation.

Subsidy

For innovative investments in water treatment and water recirculation in greenhouse horticulture, growers may be eligible for VLIF support (Flemish Agricultural Investment Fund). Depending on the type of investment and its innovative value, the subsidy rate may cover approximately 40 to 50% of the eligible investment costs.

Benefits

Economic

This measure can provide several benefits. Economically, a more stable water quality can help reduce yield losses caused by necrosis symptoms, lower plant losses, and improve product quality.

In addition, this technique also offers benefits in terms of ecosystem services and sustainability. Better control of waterborne pathogens can reduce the need for chemical plant protection products. Furthermore, the measure promotes more sustainable water use in closed cultivation systems and supports integrated strategies for disease management and biodiversity.

Sources

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Examples

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