

# A Grower's Guide to Sustainable and Safe Water Reuse

## How Peroxide UltraPure™ Protects the Crop and Minimizes Risks in Irrigation Water Recirculation



## Introduction

Growers everywhere are facing the challenge of balancing water use with crop production. Freshwater resources are becoming increasingly scarce, and responsible water management is no longer an option, it's a necessity. At the same time, consumers are demanding more sustainable and safe food production practices.

This whitepaper introduces GOgen® systems, a proven technology that empowers growers to achieve both water conservation and healthy, thriving crops. By leveraging Peroxide UltraPure™, GOgen® systems enable safe and sustainable water reuse in agricultural operations.

## The Challenge of Water Reuse in Agriculture

Water reuse offers a clear path to reducing freshwater consumption in agriculture. This is a critical benefit as global water scarcity worsens. However, there are inherent risks associated with this practice. Pathogens and harmful organisms can accumulate in recirculated water, increasing the potential for disease transmission among crops. A single infected plant can quickly become the source of a widespread outbreak, leading to devastating losses throughout the entire operation.

While traditional water treatment methods help mitigate these biological risks, they can introduce challenges of their own. These methods often leave behind byproducts that can accumulate in the soil over time. This buildup can negatively impact soil health and long-term agricultural productivity.

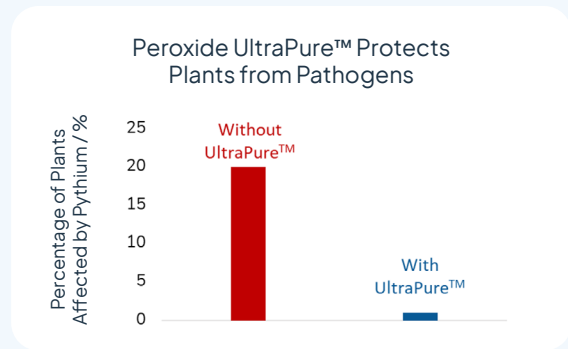
### From Problem to Profit: Peace Tree Farm Solves Disease with GOgen®

Peace Tree Farm, a herbs and ornamentals nursery in Pennsylvania, USA, faced challenges with plant disease. A recurring issue was Pythium, a fungus that attacks plant stems and causes rot. Their existing water recirculation system, while good for resource conservation, also increased the risk of disease spreading.

To address this, Peace Tree Farm implemented a GOgen® system. This innovative technology injects a safe concentration of Peroxide UltraPure™ into their irrigation system. This solution decreased Pythium incidence in the plants from 20% down to 1% and provides a vital boost to root zone health through increased oxygen.



- [Download the Case Study](#) →
- [Watch the Video](#) →



### How GOgen® Systems Work

Safeguarding plant health is paramount for successful agriculture, and GOgen® systems offer a proven approach to achieving this goal within recirculating water systems. By generating Peroxide UltraPure™, an ultrapure form of hydrogen peroxide, GOgen® effectively keeps waterborne pathogens that can devastate crops under control. This targeted approach ensures a clean and healthy irrigation environment, minimizing the risk of disease outbreaks that can significantly impact yield and quality.



However, the benefits of GOgen® extend beyond simple treatment of irrigation water. Unlike other products that leave behind harmful residues, Peroxide UltraPure™ breaks down into oxygen and water. This not only eliminates the risk of chemical build-up in the recirculated water but also offers additional advantages for plant health. The oxygen generated during the breakdown process increases dissolved oxygen levels in the water, further promoting healthy root development and nutrient uptake. Furthermore, the reduction of organic materials in the water prevents biofilm formation on pipes and equipment, ensuring efficient water flow and delivery of vital resources to your crops. In essence, GOgen® systems create a holistic approach to water treatment in recirculating systems, promoting optimal plant health and maximizing agricultural productivity.

### Preventing ToBRFV outbreaks with GOgen®

Tomates Lis is a tomato greenhouse in Spain which recirculates its irrigation water, a practice that has been prompted by the water shortages in the region. A key part of the disease control program is the GOgen® and Peroxide UltraPure™. Of special concern is Tomato brown rugose fruit virus (ToBRFV), a pathogen that is devastating tomato crops in the region.

With Peroxide UltraPure™, Tomates Lis has the peace of mind that the plants are healthy and that disease pressure is under control. Analyses have consistently shown that neither ToBRFV nor other pathogens such as Pythium are present in the irrigation water.



[Download our ToBRFV Protection Whitepaper](#)



## Benefits of GOgen®



### Enhanced Plant Health and Biosecurity

GOgen® systems provide a dual advantage by using Peroxide UltraPure™ to keep plants healthy in recirculating water systems. This ensures healthier crops by maintaining cleaner water, which directly contributes to the prevention of algae, biofilm formation, and the accumulation of organic matter in irrigation systems. At the same time, water oxygenation levels are boosted which contributes to a more vigorous root zone and a plant that is more resistant to disease. Importantly, no salts or other impurities like heavy metals are added in the recirculated water, which contributes to an optimal growing environment for the plants.



### Operational Efficiency and Reduced Maintenance Costs

The implementation of GOgen® Systems results in lower organic load in the water, reducing the amount of biofilm and as a result the need for frequent maintenance of irrigation infrastructure. This leads to less clogging in filters, pipes, and driplines, saving both time and resources for growers.



### Sustainable Practices Leading to Better Crop Outcomes

By improving water quality and reducing disease pressure, GOgen® Systems contribute to a healthier root zone and overall plant condition. This results in improved crop performance, evidenced by increased yields and enhanced crop quality, aligning with sustainable water management by promoting the reuse of water.

The capability of GOgen® to produce hydrogen peroxide onsite effectively oxidizes and degrades a wide range of contaminants present in irrigation water, including organic pollutants and pathogens. The hydrogen peroxide eventually breaks down into water and oxygen, but only after reacting with biofilm and other contaminants. In contrast with methods like UV and ozone, which are fleeting treatments with no lasting effect, peroxide stays in the water longer and travels further in the irrigation system.

Peroxide generated onsite by GOgen® leaves no harmful byproducts in irrigation water. Unlike ozone, chlorine, and bulk peroxide, which produce potentially harmful residues or disinfection byproducts, hydrogen peroxide generated onsite via GOgen® breaks down into water and oxygen, without any other byproducts. This ensures that the treated water remains free from unwanted residues, making it safe for irrigation and minimizing environmental impact. Additionally, since GOgen® produces hydrogen peroxide on demand, there's no need for transportation or storage of hazardous chemicals, further reducing the risk of accidental spills or contamination.

GOgen® also offers increased oxygenation in irrigation water through its onsite generation of hydrogen peroxide, which releases oxygen during its decomposition. Unlike UV and chlorine treatments, which do not contribute to oxygenation, the presence of hydrogen peroxide generated by GOgen® enhances dissolved oxygen levels in water, promoting aerobic conditions beneficial for crops. This increased oxygenation can enhance soil fertility, root development, and nutrient uptake in plants, leading to improved crop yields in irrigated areas.

	UV	Ozone	Chlorine	Industrial Peroxide	GOgen®
Downstream effect	⊗	⊗	⊙	⊙	⊙
No byproducts after use	⊙	⊗	⊗	⊗	⊙
Increased oxygenation	⊗	⊙	⊗	⊙	⊙

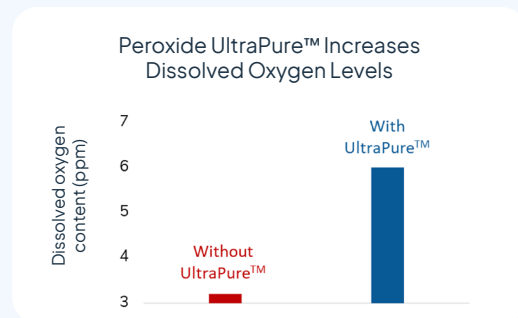
GOgen® systems are designed for user-friendliness from the get-go. GOgen® operates autonomously. This means minimal intervention is needed on users' part – once installed, the system takes care of itself. Installation itself is straightforward, and the system seamlessly integrates with irrigation systems through a standard dosing pump. This eliminates the need for complex adjustments or a complete overhaul of your irrigation setup.

Furthermore, GOgen® boasts chemical-free operation. The only inputs it requires are water and power. This eliminates the hassles and potential hazards associated with storing and handling. No more worrying about spills or exposure to harmful substances, creating a safer work environment for you and your team. With its focus on simplicity and safety, GOgen® offers a user-friendly and worry-free solution for revolutionizing your irrigation water treatment.

### Vertical Farm Sees Higher Water Oxygenation

A vertical farm that fully recirculates its irrigation water wanted to protect their plants against the spread of disease, especially Pythium. At the same time, the vertical farm was struggling to reach its target dissolved oxygen levels. Peroxide UltraPure™ from the GOgen® system was instrumental to achieve better plant protection, as well as increase dissolved oxygen levels.

GOgen®'s onsite peroxide generation eliminates the risks associated with storing and handling concentrated chemicals. Furthermore, GOgen® bypasses the need for chemical deliveries, which is particularly helpful for vertical farms looking to minimize chances for external contamination coming into the facility and have limited storage space available.




[Download the Case Study](#) →


## Taking the Next Step with GOgen® Systems

GOgen® systems offer a powerful tool to help growers achieve safe water recirculation. By enabling safe and efficient water reuse, GOgen® systems contribute to a future where agriculture can thrive while minimizing its environmental footprint. If you're a grower looking to reduce water use, ensure responsible water discharge, and improve the overall sustainability of your operation, GOgen® systems are worth exploring. Contact HPNow to discuss how this innovative technology can benefit your specific needs and contribute to a more sustainable future for agriculture.

## About HPNow

HPNow is a technology and market leader in onsite green oxidation through its range of safe, sustainable, onsite hydrogen peroxide generation solutions. HPNow's solutions address growing global challenges in clean water and sanitation through autonomous, safe and sustainable green-oxidation solutions. Headquartered in Copenhagen, and with representation across Europe, the Americas and Asia, HPNow addresses their clients' water treatment needs in market segments ranging from agriculture and aquaculture, to industrial and drinking water treatment.

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