

Iodine water disinfection for hydroponics and nurseries





the world's leading disinfection system for hydroponic and nursery producers

Improve the quality of your product

The multi-award winning Isan® system is superior to any other water disinfection and disease control system for hydroponic and nursery producers.

Automated and self regulating, it requires no chemical mixing and offers certified delivery as well.

The Isan system is rapidly revolutionising disinfection and sanitation across the agricultural marketplace, due to its unique ability to effectively kill a wide range of human and plant spoilage organisms.

The resulting improved product quality is one of the main benefits.

Disease prevention via the Isan system

Many major hydroponic and nursery micro-organisms are spread via water.

This becomes an increasingly bigger problem when recycled water is used as the pathogens are effectively recirculated over and over again and consequently build up in the water.

Therefore, disease prevention makes far better economic sense than disease curative programs.

The Isan system uses a patented form of pure iodine, BioMaxA, which has proven to be highly effective in bacterial and fungal control.

Additionally, BioMaxA iodine does not effect nutrients in water.

Achieve a competitive advantage

The Isan system can deliver a competitive advantage to your nursery or hydroponic operation.

A key benefit of the system is that iodine possesses a particular ability to provide high kill rates at low concentrations in high organic loads.

Complete automation and accurate measuring via ion selective electrodes, guarantees that the correct amount of active iodine is always in the water stream.

The Isan system is safe for the environment, easy to handle and cost effective. With a safe, effective water disinfection recycling system, producers can collect run off water and achieve significant cost reductions on water usage,

plant losses (improved disease management) and nutrient re-use.

Direct injection systems, which inject iodine directly into the irrigation line at dose levels, are also available.



Direct injection system



Summary of features and benefits of the Isan system for hydroponic and nursery producers

Costs effective	✓	Significantly less reactive to high organic loads	✓
Iodine does not react with nutrients	✓	Less corrosive than other types of disinfection and sanitation systems	✓
NFT compatible	✓	Improved water management – efficient usage of clean, recycled water	✓
Kills pathogens more effectively	✓	No chloramines or carcinogenic by-products dispersed into the environment	✓
Iodine in solution offers a measurable residual	✓	No OH&S issues, as handling and mixing of chemicals are eliminated	✓
Does not require pH monitoring	✓	Fully automated computerised control	✓
Active within a pH range of 3.0-8.5	✓	Includes PC control integration, data logging and inbuilt modems for remote servicing	✓
Will not react with ammonia found in organic matter	✓		
Superior efficacy than competitive products	✓		

Testimonial

**Steve Randall,
Floranda Flowers
and Randbiz,
Toowoomba,
Queensland**

"The Isan system was installed in September 2005 and this has given us the confidence that possible water-related disease problems have been eliminated. We recycle our dam water and we have rid *phytophthora* and *pythium* without using any fungicides. We have increased productivity and the plants are healthier and without stress despite very hot summer days. The roots have increased in area and size, and are white, disease free, allowing more water and nutrient uptake."

features and benefits for hydroponic and nursery operators



The best protection for hydroponic and nursery operators is to control water borne pathogens in the irrigation water. This will lead to healthier plants, fewer crop losses, faster growth cycles and cleaner root systems.



Higher kill rates on bacteria and fungi

Extensive testing has proven that the BioMaxA iodine used in the Isan system consistently achieves high bacteria and fungal kill rates.

Other types of water disinfection systems simply cannot ensure that micro-organisms will be controlled.

No pH adjustment required

The patented iodine used in the Isan system operates in a very wide pH range (pH 3.0-8.5) and does not alter the pH of solutions. It has little or no adverse effect on pH, eliminating all of the pH monitoring problems encountered with other disinfection and sanitation systems such as chlorine.

Improved product quality

Nursery and hydroponic producers who are using the Isan system are achieving improved product quality. For example, Brian Ellis from Clean Green Hydro in Queensland says he has achieved “a total elimination of *Pythium*” in his hydroponic lettuce root system since using the Isan system. Brian has also “achieved at least a 50% increase in the storage life” of his processed lettuce crops, by washing the lettuce in BioMaxA iodine as part of his post harvest sanitation.

Does not effect nutrients

The Isan system will not effect your existing nutrients. This means you can recycle your water and save money on replacing nutrients. The system is fully NFT compatible as well.

Improve product quality
No pH adjustment required
No chemical mixing



NFT compatibility

Higher kill rates on bacteria and fungi

Does not affect nutrients

Low capital equipment and running costs

When comparing the overall features and benefits of different disinfection systems, the Isan system offers tremendous value for money in terms of capital equipment costs. No other system can deliver such a complete solution at such a reasonable price. In addition, other systems cannot match the Isan system in terms of running costs, as the BioMaxA iodine offers superior kill rates at low concentrations.

Environmentally friendly

The Isan system is one of the world's most environmentally responsible disinfection systems.

The system can capture all by-products, providing an environmentally clean, closed loop process.

No chemical mixing

Use of other biocides involves diluting and mixing highly toxic chemicals. By comparison, the Isan system uses a patented form of pure iodine, which is supplied in a sealed canister. Handling or mixing of chemicals is eliminated – totally.

Automatic adjustment to organic load

The Isan system constantly monitors the active iodine biocide available and quickly self adjusts dosage levels to meet any increase in the organic load. This

fully automated process happens in 'real time' and is a unique feature of the Isan system.

Measurable residual

BioMaxA iodine offers a residual which can be measured. Other systems do not offer this feature, resulting in operators being unsure of whether the disinfection process has been effective or not. The Isan system is also not dependent on water quality or water flows being able to cope with large volumes of water (depending upon size of system).

Complete data logging

Disinfection levels in the water can be recorded in any preset time cycle and stored permanently. These logs provide your customers and HACCP auditors with certified proof of constant and effective disinfection levels. No more hand-written reports.

Fully automated

Every Isan system is equipped with a fully automated, computerised control system, which can be easily integrated with your existing PCs.

This system electronically monitors the biocide level and automatically doses the water to maintain preset levels. Electronic monitoring of the remaining iodine helps to ensure timely replacement of canisters.

Safe and user-friendly

The Isan system is the safest and most user friendly system available. Controls warn the operator of any breach of preset levels and also, in certain circumstances, can shut down the system. These warnings can be audible, visual and/or sent electronically to a computer.

Effective chlorine replacement

Comprehensively replaces disinfection by existing chlorine systems, eliminating all of chlorine's negative aspects and handling problems, including growing environmental issues. Being iodine based, the Isan system eliminates the significant risk posed by the introduction of chlorine based carcinogenic by-products into the environment.

Reduced corrosion

The BioMaxA iodine used in the Isan system is far less corrosive. For example, iodine itself is around eight times less corrosive than chlorine, while the concentration of iodine used is usually five to six times less than chlorine dosages. The Isan system, once installed, will result in significantly longer equipment life, leading to substantial capital equipment cost savings.

Testimonials

"We have found the Isan system to be extremely effective as a sterilising agent in our salad wash plant, to the point where we are achieving at least a 50% increase in storage life of our processed products. As well as achieving superior results, we are also finding it to be cost effective when compared to other sterilisation products".

Brian Ellis, Clean Green Hydro, Childers, QLD, Australia

"I am thrilled with the Isan system's ability to fight *Pythium*. *Pythium* was particularly an issue in relation to my spinach crop. Previously I had relied on a fungicide to control *Pythium*. While it did a decent job, it was nowhere near as effective as the Isan system".

John Richardson, Owner, Benara Rd Horticulture, SA, Australia

the power of iodine



Technology and operating methods

For over 150 years, iodine has been recognised as the most effective medical antiseptic available. NASA has long recognised iodine's unique qualities and uses it as the only water disinfection process for all manned space flights. The Isan system enhances the power of iodine to produce the world's most effective disinfection system.

Iodine is a dark, dense, crystalline solid (4.96 g/ml) at room temperature, which slowly dissolves in water to form a concentrated solution (in equilibrium with its crystallised form) of approximately 250 ppm (0.25g/litre). The Isan system uses specially manufactured iodine, BioMaxA[®], which dissolves on average up to four times faster than regular iodine. The system allows for very low dosages of iodine to achieve superior kill rates on fungi, bacteria and viruses.

Why iodine kills micro-organisms

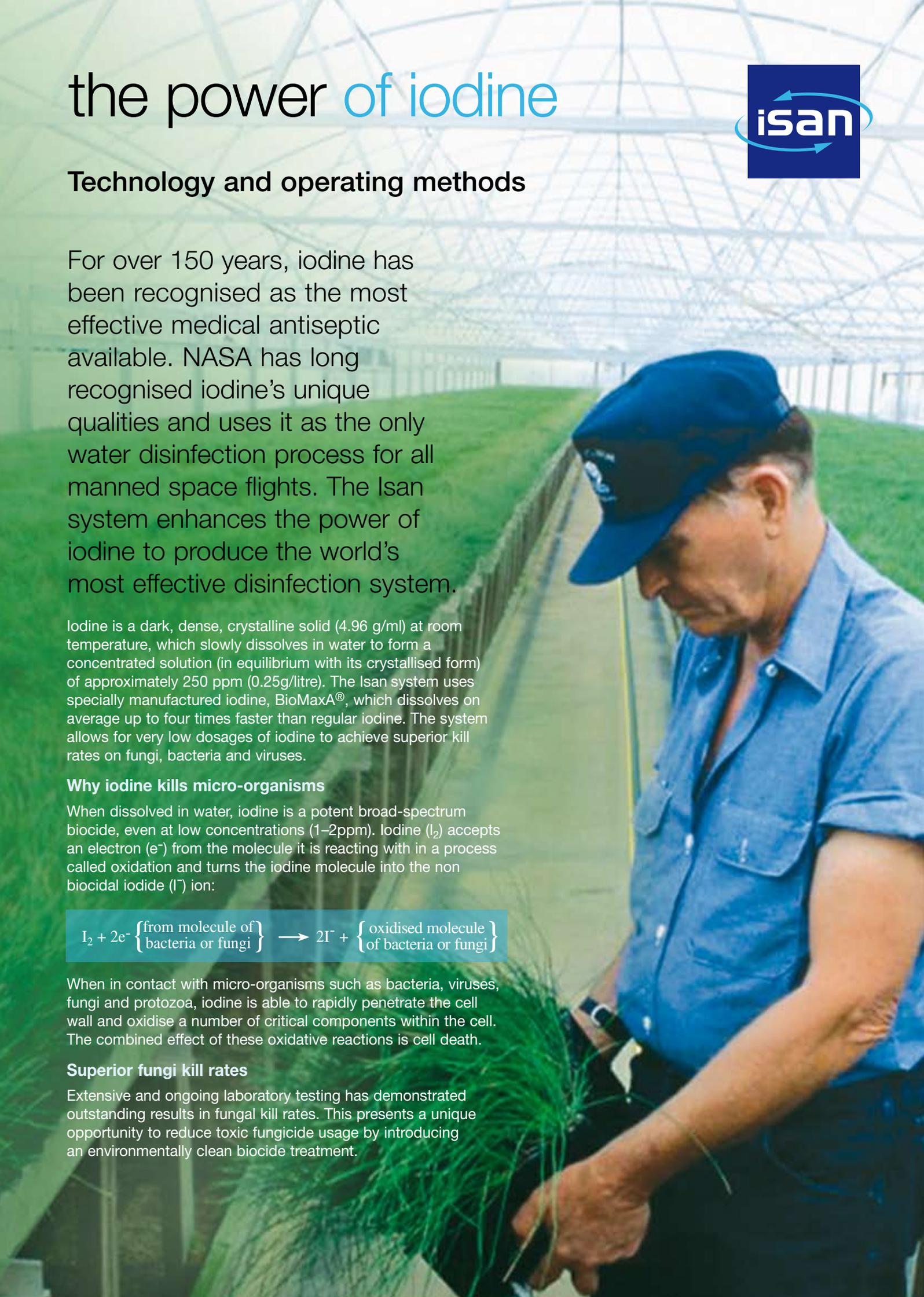
When dissolved in water, iodine is a potent broad-spectrum biocide, even at low concentrations (1–2ppm). Iodine (I₂) accepts an electron (e⁻) from the molecule it is reacting with in a process called oxidation and turns the iodine molecule into the non biocidal iodide (I⁻) ion:



When in contact with micro-organisms such as bacteria, viruses, fungi and protozoa, iodine is able to rapidly penetrate the cell wall and oxidise a number of critical components within the cell. The combined effect of these oxidative reactions is cell death.

Superior fungi kill rates

Extensive and ongoing laboratory testing has demonstrated outstanding results in fungal kill rates. This presents a unique opportunity to reduce toxic fungicide usage by introducing an environmentally clean biocide treatment.



Why Isan delivers the most powerful biocide

Principally, iodine breaks down into four compounds: Iodine (I_2), Hypoiodous Acid (HIO), Tri-iodide (I_3^-) and Iodate (IO_3^-). Both I_2 and HIO are strong biocidal agents. I_3^- and IO_3^- are only present in very low concentrations and only significant at a very high pH greater than 8.5.

This offers a significant edge to the nursery industry.

Chlorine in solution converts to only two compounds: Hypochlorous Acid (HOCl) and Hypochlorite (OCl^-). Only HOCl is biocidal and will remain in solution at a pH level above 6.5. Below this pH level, HOCl breaks down and will gas off quickly out of solution.

Iodine operates within a broad pH range

The active compounds of iodine in solution, I_2 and HIO remain effective at higher concentrations over a wide pH range (pH 3.0 to pH 8.5). In contrast, chlorine systems must operate within a narrow pH range of 6.5 to 7.5. Additionally, the natural chemical consequence of adding chlorine to water is to alter the pH level, dramatically affecting biocidal action.

Chlorine also reacts three times faster with proteins than iodine. The effect of this reactivity is to substantially and quickly reduce the effective biocidal action of chlorine in solutions with a high organic load.

Measuring iodine

Isan's purpose-built, iodine-specific electrodes convert the millivolt (mV)

reading received from the iodine in solution directly to a ppm reading. Due to the unique properties of iodine, the Isan system can monitor, record, control and adjust the active iodine in solution in real time.

The Isan system and its unique anion exchange resin

Some applications of the Isan system can continuously remove disinfection by-products in an environmentally clean process by running

the wash water through its proprietary anion exchange resin.

By using the system in this way, the strains of iodine that dominate are diatomic iodine and hypoiodous acid – the most powerful biocidal species of the iodine family.

Trihalomethanes

Globally, governments and environmental agencies regulate the maximum level of trihalomethanes (THMs), undesirable chlorine by-products,

allowed in wastewater. They are now restricting the release of chlorinated wash water into the environment to prevent further contamination from occurring. Treatment of chlorinated water to remove THMs is an expensive exercise.

By comparison, iodine as used in the Isan system does not produce THMs on the produce or in the wash water.



We have an Isan system for every size operation and application

System specifications*	Batch system range	Dosing system range	Direct injection system range
Power	240V single phase	240V single phase	240V single phase
Capacity (subject to water conditions)	Up to 16,000 litres per hour	Up to 120,000 litres per hour	Up to 240,000 litres per hour

*Comprehensive additional models available for post harvest fruit and vegetable sanitation, manufacturing and industrial waste water.



The multi-award winning Isan SDS 2400 dosing system.

Contact Ioteq to request a complimentary onsite consultation and quote

One of our specialists will visit you, assess your current application and highlight how the Isan system can substantially benefit your operation.

The Isan system – developed and manufactured in Australia



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