

EcoClearProx[®]
An innovative H₂O₂ disinfection product



Bieau aims to bring a valuable alternative for classical disinfection, decontamination or pathogen controlling methods in drinking water production, health care, agriculture and horticulture.

EcoClearProx® is a patented biodegradable hydrogen peroxide (H_2O_2) solution and is registered for a broad spectrum of applications.

The key words of our mission are sustainability, efficacy, respect for men and the environment.

A reason more to consider a better future with of Bieau, is that the products which are entirely compatible with the care of today for sustainable development. Moreover, Bieau remains to develop its products further so that soon we can offer you a broader spectrum of products that brings protection to human, animal or plant health and contributes to a better environment.

H_2O_2 is one of the most powerful known oxidants. Stronger than chlorine, chlorine dioxide and potassium permanganate. Catalysation allows H_2O_2 to transform into hydroxyl radicals ($\text{OH}^\cdot$) whose oxidizing power is 2nd to fluorine, which is the strongest oxidant.

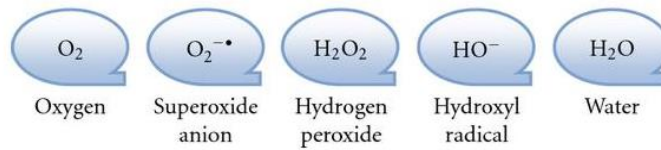
H_2O_2 decomposes in water and oxygen without forming any by-products which is very important.

Oxidant	Fluorine	Hydroxyl radical	Ozone	Hydrogen peroxide	Potassium permanganate	Chlorine dioxide	Chlorine
Oxidation potential, V	3.0	2.8	2.1	1.8	1.7	1.5	1.4

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Mode of action of hydrogen peroxide:



1. Release of atomic oxygen that disturbs microorganisms.
2. Production of superoxide and hydroxyl radicals which damage key components of the cell including fats, proteins and DNA, ultimately resulting in cell death

The impact on proteins is particularly important, e.g. damage to the proteins in spore walls and the breakdown of peptide compounds

Sulfhydryl groups of proteins and double bonds in fatty acids appear to be very sensitive

Ecological impact:

EcoClearProx[®] = H₂O₂ + polyalcohol ⇌ Other stabilisers for H₂O₂ with a negative impact on the environment

An extensive range of additives for stabilising hydrogen peroxide has been investigated. They include, e.g. silver nitrate, inorganic salts like phosphates, pyrophosphates or stannates, organic compounds, such as organic chelates or organic acids (e.g. acetic acid).



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Why to use EcoClearProx®

1. Stability:
EcoClearProx® has a pronounced shelf life. It tends to hold its stability much longer than other products which is very important for transport in extensive pipework systems. Especially in low concentrations, the life span of ECP, compared to normal hydrogen peroxide can exceed over a 1000 time.
2. EcoClearProx® is a stabilised hydrogen peroxide solution without addition of silver, because:
 - Silver is toxic to all living cells
 - Silver contributes to antibiotic resistance
 - Silver is deposited around nerves and in deeper skin layers and may cause permanent skin damage
 - Silver is intimately associated with environmental contamination of other toxic heavy metals such as mercury and lead
 - Silver sticks to fish gills, potentially choking them to death
 - Silver disturbs bacterial activity when cleaning sewage
 - Silver prevents the use of sludge as fertilizer, needed for nutrient recycling
 - **SILVER IS CUMULATED IN THE BODY OF ANIMALS DRINKING SILVER ENRICHED PEROXIDE**
3. Effectivity
EcoClearProx® has been tested effective against gram-positive as well as gram-negative bacteria, viruses, fungi, yeasts, algae and it prevents building up of slime and foam.
In agreement with this EcoClearProx® has been tested successfully against:
 - Bacteria: Pseudomonas aeruginosa, Escheria coli, Staphylococcus aureus, Enterococcus hirae, Legionella pneumophilla
 - Fungi: Aspergillus niger
 - Yeasts: Candida albicans
 - Viruses: H5N1, H1N1EcoClearProx® has a high efficiency for eradication of bacteria, viruses, yeasts, fungi and spores thereof as proven for various applications.
EcoClearProx® can be used successfully for the oxidation of organic matter, the removal of undesired organic compounds as for controlling microbial levels and biofilms.
The efficacy of EcoClearProx® can be increased when combined with UV. Multiple case studies have been executed, and they have proven to be very efficient in decontamination of brackish water, decontamination of fruit sorting water and decontamination of MBR water using AOP (EcoClearProx+ UV). These studies have proven a high efficiency.



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4. Decontamination and disinfection

- The main purpose of ECP is decontamination: preventing and reducing the present microbial load in applications as drinking water production- and storage rooms, equipment and machinery.



Applications

Fish industry

When fish and seafood are caught or harvested, decomposition starts after a few minutes, caused by micro-organisms.

This process calls for specific hygienic care to ensure that the fish and shellfish retain their quality and are safe to eat, especially when fish and shellfish are eaten raw (sushi, oysters, etc.).

Good cleaning and disinfection procedures are very important steps, to guarantee products of high quality. Tight hygiene measures covering the complete distribution chain - from the catch to the retail stores and restaurants.



Room disinfection

It's very important to first clean thoroughly, by hand or mechanically, removing all the dirt because organic residue may inhibit the bactericide effect of the disinfectant.

Chipped ice

Chipped ice is generally used in the fishing industry to refrigerate and conserve the fish or seafood.

The water used for ice making is microbiological highly contaminated. micro-organisms will not reproduce if the water is frozen, but, as soon as it starts thawing, the seafood is literally bathed in bacteria and will not be safe to consume. Using ECP enriched water offers an easy solution for this problem.



The applications of EcoClearProx PLUS in organic agriculture

ECP PLUS has been tested in viticulture successfully against Botrytis bunch rot and powdery mildew of grapevines by spraying 1% dilutions of ECP PLUS on a once or two weekly bases using 1000 liter of spray water per ha. Also, downy mildew can be controlled using ECP PLUS, however the work with this pathogen revealed that an alternation of 1% dilutions of ECP PLUS once a month with another substance with fungicidal activity (e.g. monopotassium phosphate, or eventually a classical synthetic fungicide or copper sulfate)

Finally, ECP PLUS showed to control some pests to some extend (e.g. spidermites).

- ECP PLUS was tested in preliminary trials using 1 to 2.5% dilutions. From the results was concluded that 1% dilutions of ECP PLUS is in general sufficient to control the threat.
- Field tests using 500 to 1000 liters of spraying water per hectare revealed that ECP PLUS can longer protect the grape vines against these diseases when using 1000 liters of spraying water per ha.

Powdery mildew



The suppression of powdery mildew of grapevines (caused by *U. necator*) is successful in Italian field experiments (2 years of experience) when spraying 1% dilutions of ECP PLUS once to 2-weekly basis. The amount of water sprayed should be 1000 liter per hectare, as this has a positive impact on the prolongation of the protective/curative effect of ECP PLUS.

Botrytis cinerea



The suppression of Botrytis cinerea in grapevines is successful in Italian field experiments (2 years of experience) when spraying 1% dilutions of ECP PLUS on a weekly basis. The amount of water sprayed should be 1000 liter per hectare.

Downy mildew



Only a few active substances with fungicide activity can be used in organic farming, besides copper and sulphur. The copper is the only substance that can be used against downy mildew; however, since it causes problems of environmental impact, is incompatible with the organic farming's objective of environmentally friendly farming,



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the Commission of the European Communities has fixed a ceiling on use expressed in terms of kilograms of copper per hectare per year (EC, 2002).

The suppression of downy mildew caused by *P. viticola* in grapevines has been tested with ECP PLUS on various locations situated in 3 different regions of Italy representing 3 different ecological niches: **ECP PLUS is THE organic alternative for this application.**

Water re-use in agriculture

The results of Barhorst and Kubiak (2009) indicate that hypochlorite has a high potential to form Absorbable Organic Halides (AOX) in effluents of agriculture. The predominant by-products are chloroform, dichloroacetic acid and trichloroacetaldehyde. If possible, disinfection should be accomplished using no chlorine containing agents. By this means, negative influences of hypochlorite on the quality of wine can also be avoided.

ECP is **THE** alternative organic disinfection agent.

Drinking water for farm animals

Mix 70ml of ECP peroxide to each 1000 liters of water for 30ppm of hydrogen peroxide in water. If you do not have an injector system, use 1.8ml of 50% grade to each 30 liters of water. This same ratio is used for all farm animals

Many more applications can be found, consider ECP as your solution to fight bacteria, fungi, spores, virus and any other pathogen.



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Based upon the use of EcoClearProx Plus

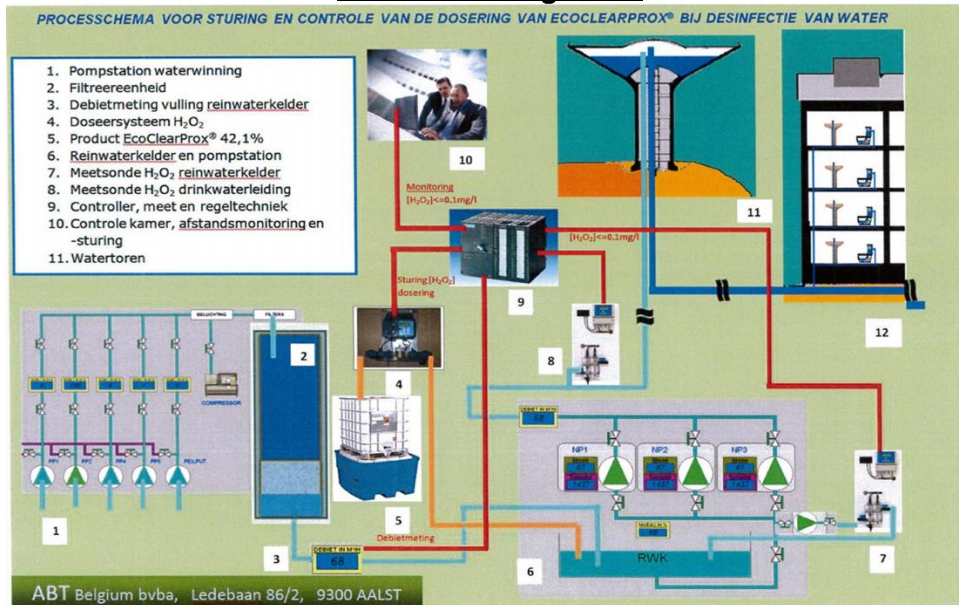
Crops	Disease	Dilution Rate	Application Rate	Directions
	Anthracnose Downy Mildew Powdery Mildew Rust	1:100 – 1:300 1:100– 1:300	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100 at 5-day intervals. Reduce rate to 1:300 after the completion of the third treatment and maintain a 5-day interval spray cycle until harvest.
Broccoli Cauliflower Cabbage	Alternaria Leaf Spot Downy Mildew Powdery Mildew	1:100– 1:300	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventative: Begin when plants are small. Apply first three treatments at 1:100, at 5 days intervals. Reduce rate to 1:300 after the completion of the third treatment and maintain a 5-day interval spray cycle until harvest.
Citrus	Rust Scab Powdery Mildew Brown Rot Phytophthora	1:100 – 1:300	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare.	Pre-Bloom: Begin applications at 0.75- 1.0 cm green tip and continue a five to seven day schedule through bloom. Curative: Spray diseased trees using a 1:100 rate and continue treatments at five-day interval.
Tomatoes	Anthracnose Cladosporium Mold Early Blight Late Blight Powdery Mildew	1:100 – 1:300	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, at 5 day intervals. Reduce rate to 1:300 after the completion of third treatment and maintain 5-days interval spray cycle until harvest.
Apples	Rusts Scab Powdery Mildew	1:100 – 1:300	1l ECP PLUS/100l of water; apply 300-500l/hectare.	Curative: Spray diseased trees using a 1:100 solution. Pre-Bloom: Begin applications at 0.75-1.25cms green tip and continue on a five to seven day schedule through bloom.
Filberts	Eastern Filbert Blight Bacterial Blight	1:100	1L ECP PLUS per 100l of water, apply 300-500l of spray solution per hectare.	Curative: Spray diseased trees using a 1:100 solution. Pre-Bloom: Begin applications at 0.5 – 1 cm (¼ - ½inch) green tip and continue a five to seven day schedule through bloom.
Bananas	Sigatoka	1:50	1L ECP PLUS per 50l of water; apply 300-500l of spray solution per hectare.	Curative: Spray diseased plants using a 1:50 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, for 5-days intervals. Reduce rate to 1:200 after the completion of third treatment and maintain 5-day



Grapes	Botrytis	1:100	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, at 5-days intervals. Reduce rate to 1:300 after the completion of the third treatment and maintain 5-days interval spray cycle until harvest.
	Downy Mildew	1:100		
	Powdery Mildew	1:100 –		
		1:300		
Cucurbits	Alternaria	1:100	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare. 2L-5 L ECP PLUS per 500l of water; apply 300-500l of spray solution per hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventative: Begin when plants are small. Apply the first three treatments at 1:100, at 5-day intervals. Reduce rate to 1:300 after the completion of third treatment and maintain at 5-day interval spray cycle until harvest.
	Anthraco	1:100		
	Downy Mildew	1:100		
	Powdery Mildew	1:100 –		
	Pythium Rot	1:300		
		1:100		
Onions	Botrytis	1:100	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare. 2L-5 L ECP PLUS per 500l of water; apply 300-500l of spray solution per hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, at 5-day intervals. Reduce rate to 1:300 after the completion of third treatment and maintain at 5-day interval spray cycle until harvest.
	Downy Mildew	1:100		
	Powdery Mildew	1:100 –		
		1:300		
Peppers	Anthraco	1:100	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare. 2L-5 L ECP PLUS per 500l of water; apply 300-500l of spray solution per hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, at 5-day intervals. Reduce rate to 1:300 after the completion of third treatment and maintain at 5 days interval spray cycle until harvest.
	Phytophthora	1:100		
	Blight	1:100		
	Powdery Mildew	1:100 –		
		1:300		
Potatoes	Early Blight	1:100	1 to 2l ECP PLUS/100l of water; apply 300-500l/hectare. 2L-5 L ECP PLUS per 500l of water; apply 300-500l of spray solution per hectare.	Curative: Spray diseased plants using a 1:100 solution. Preventive: Begin when plants are small. Apply first three treatments at 1:100, at 5-day intervals. Reduce rate to 1:300 after the completion of third treatment and maintain at 5 days interval spray cycle until harvest.
	Late Blight	1:100 –		
		1:300		
Seed Potatoes	Fusarium	1:50	1l ECP PLUS per 50l of water	Curative: Dip whole or cut tubers into tank of working solution. Let soak for a period of five minutes before removing seed pieces.



ECP in drinking water



For the for authorization of EcoClearProx for PTO5 (drinking water) on 13/04/2009 /) of the Federal Public Health Service, Food Chain Safety and Environment, Risk Management Service regarding the H_2O_2 dosing system, being: "The intention is to check whether the monitoring system is workable in practice During this test application, measurements in the treated water should be carried out to check whether the prescribed standard of 0.1 mg/l is not exceeded."

The conclusion of this extensive report was that the set criteria are met. Namely, over a period of more than 2 months, the dosage was continuously monitored and recorded. It was opted to gradually increase the concentration to just below the permitted standard, avoiding any risks of overdose. During the last 14 days of the test, the EcoClearProx® dose was controlled in such a way that the permitted H_2O_2 concentration of 0.1 mg. contact us to get the full report.

EcoClearProx	Chlorine 33%
83,6l	1000l
8,36%	100%
Odorless	smelly
No biofilm	Biofilm risk
No negative by products	trihalomethanes, haloacetic acids, mono-, di- and trichloramines, etc.
No influence by pH	Strong pH influence



Contact us for more detail, product assortment and questions.

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