

# FOOD & BEVERAGE

## Application & Dosage



Peroxsil Ag+ with its proven efficacy and non-toxic by products is the preferred choice in the food industry. Water systems need regular cleaning, otherwise they will provide a source for uninhibited growth of bacteria. One area that is overlooked are biofilms. An out of sight, out of mind mentality can be disastrous. Biofilms thrive inside tanks, pipes and surfaces and are the major source of water contamination in closed systems. Disinfection protocols, when implemented correctly, can be a cost-effective means of reducing pathogenic organisms and are an important step in any biological risk management program. Development and implementation of a step-by-step disinfection protocol for the control and prevention of infectious disease has become essential for food processing plants.

### STAINLESS STEEL STORAGE TANKS - Biofilm removal

Empty the tank. Turn off tank outflow valve. Manually clean the inside of the tank. Wash off any residue and flush out. Calculate the volume of the tank and fill with fresh chlorine free water and add 1 litre of Peroxsil Ag+ for every 100 L water. Ensure there is an opening for air release. Allow to stand for 4 hours. Empty the tank contents (separately from the pipes) and fill with fresh water. (you should now proceed to removing the biofilm in the water pipes. see below)



### WATER PIPES - Biofilm removal

Turn off tank outflow valve. Drain all system pipes. Fill a properly sanitized tank with fresh chlorine free water. Add 2 litres of **Peroxsil Ag+** for every 100 L water. Open tank outflow valve and allow pipes to fill. Allow to stand for 24 hours. Ensure there is an opening for air release. Open pipe-end stop valves and flush the entire system with fresh water. Biofilm build-up is dependant on water temperature and water quality entering the system. Comparative microbial tests should be taken from the tank and the furthest pipe outlet to determine when to sanitize again. Continuous water sterilization would reduce the need for biofilm removal.



### WATER SANITATION - Continuous use

Constant dosing by manual or machine application, should be implemented for safe continuous disinfected water, suitable for human use. Dose 1000 L of water with 25ml of Peroxsil Ag+. Using peroxide test strips, keep the peroxide at 10-15 ppm. Future biofilm build-up will be prevented and water will be constantly sanitized. Peroxide testing should be ongoing and microbial testing should be carried out periodically.





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### FRUIT & VEGETABLE WASH

Complete microbial sanitation is dependant on the water quality and the degree of soiled product. In addition various microbes are more resilient. A wash bath of 3% Peroxsil Ag+ will kill most bacteria and viruses withing 5 minutes however spores can take a few hours. Therefore the degree of Peroxsil concentration is dependant on the log reduction required. In general a 3% solution is usually adequate for most applications. As soiled fresh produce enters the system the peroxide concentration will diminish and therefore constant dosing will be required.



### EQUIPMENT & SURFACE DISINFECTION

Using soap and water, aggressively wash equipment, floors and walls. Thereafter rinse with clean water thoroughly. If available a high pressure steam clean should follow. Using a 3% solution, add 60ml of **Peroxsil Ag+** per litre of water, and spray the cleaned surfaces. Allow to stand for 45 min or until dry. Do not rinse.

Stainless steel surfaces are no guarantee against biofilm buildup. Although microscopic on surfaces they occur in every groove and scratch.



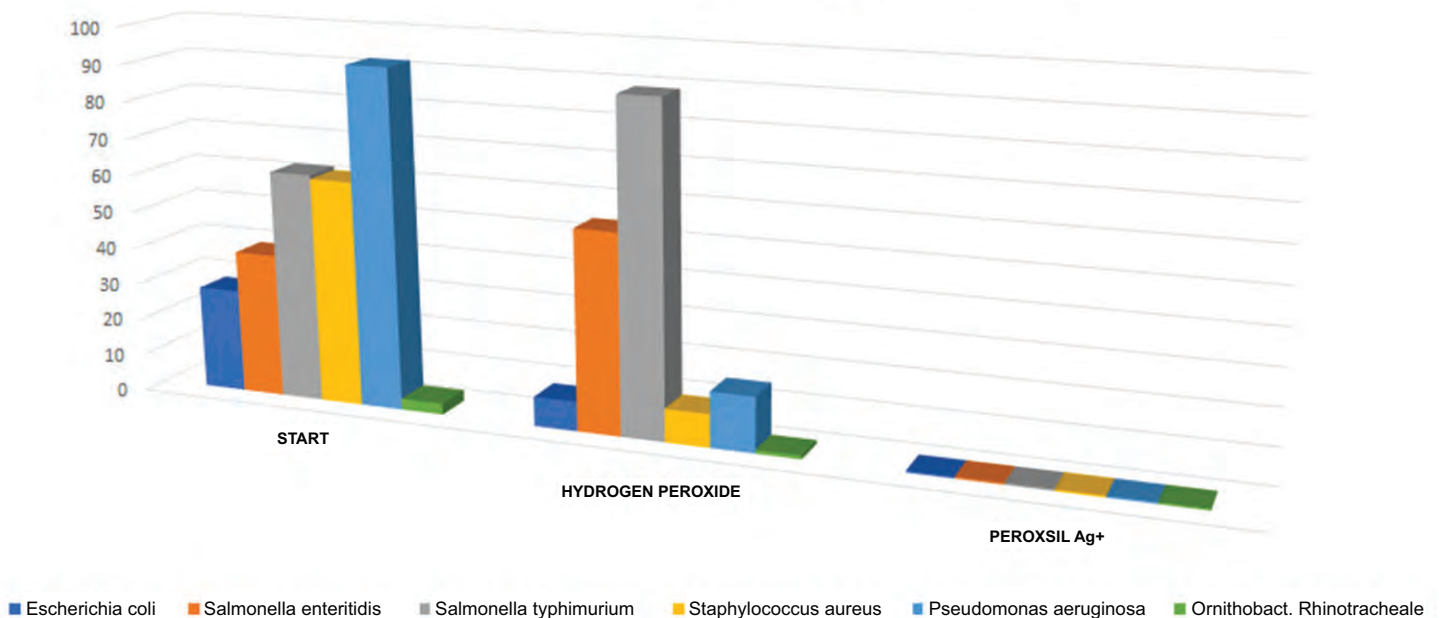


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### Peroxsil Ag+ bacterial removal after 48 hours



### CHLORINE vs PEROXSIL Ag+

CHLORINE	PEROXSiL Ag+
Biofil removal - NO	Biofil removal - YES
Carcinogenic - YES (Metabolons)	Carcinogenic - NO
Corrosive - YES	Far less corrosive - Does not form acids
Banned in parts of Europe and USA	Rapidly replacing chlorine in many of these areas
pH dependent and very ineffective above pH 7	Is not pH dependent
Is ineffective against complex organisms (e.g. Cysts & Protozoa)	A very broad spectrum kill
Neutralisation required before dumping	No neutralization required
Temperatures above 40° C releases chlorine gas	Effective at higher temperatures
Brief to medium effectiveness	Very long effectiveness
Restricted algicidal effect	Good algicidal effect
Restricted fungicidal effect	Good fungicidal effect
Odour formation - YES	Odour formation - NO
Change in taste - YES	Change in taste - NO
Overdose risk -YES	Overdose risk -Practically NIL

## Efficacy Data - Anti-Microbial testing

TEST ORGANISM	PEROXSIL %	PASS RATE	REQUIRED TIME	ACTUAL TIME	TEST
<i>Pseudomonas aeruginosa</i>	1%	> 5 log reduction	5 minutes	5 minutes	VC8054-1999 5.11
<i>Staphylococcus aeruginosa</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Escherichia coli</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Enterococcus hirae</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Salmonella typhimurium</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Lactobacillus brevis</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Enterobacter cloacae</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276
<i>Clostridium spp</i>	3%	> 5 log reduction	5 minutes	5 minutes	BS EN 1276

<i>Candida albicans</i>	3%	> 4 log reduction	15 minutes	5 minutes	BS EN 1650
<i>Aspergillus niger</i>	3%	> 4 log reduction	15 minutes	5 minutes	BS EN 1650
<i>Saccharomyces cerevisiae</i>	3%	> 4 log reduction	15 minutes	5 minutes	BS EN 1650
<i>Aspergillus brasiliensis</i>	2%	> 5 log reduction	15 minutes	15 minutes	VC8054-1999 5.11

<i>Legionella pneumophila</i>	0.2%	> 4 log reduction	60 minutes	60 minutes	BS EN 13623
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<i>Bacillus atrophaeus</i>	2%	> 5 log reduction	240 minutes	240 minutes	VC8054-1999 5.11
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<i>Staphylococcus aureus</i>	1.5%	Approved	-	15 minutes	
<i>Enterococcus faecium</i>	4.0%	Approved	-	15 minutes	
<i>Proteus mirabilis</i>	1.5%	Approved	-	15 minutes	
<i>Pseudomonas aeruginosa</i>	1.5%	Approved	-	15 minutes	
<i>Candida albicans</i>	3.0%	Approved	-	15 minutes	

Peroxsil Ag+ showed a broad-spectrum micro-biocidal action which was more pronounced with respect to gram negative organisms. The tests using 20% calf serum as protein load did not result in any appreciable loss of effectiveness, so that Peroxsil Ag+ appears to possess only a minimal protein error.

### Environmental and Process Technology / PRODEM

In this study Peroxsil Ag+ is evaluated with respect of its capacity to remove the biofilm on pipe systems of drinking water. Using a biofilm monitor, biofilm was grown from drinking water without chlorine as disinfectant.

**PRODEM report recommendation:** Recirculation of the treatment solution (Peroxsil Ag+) is even more effective and results in the entire physical removal of the biofilm.

Biofilm	4%	> 3 log reduction	-	16 hours	
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	CHLORINE COMPOUNDS	CHLORINE DIOXIDE	QUATS	ALDEHYDES	PEROXIDES	PEROXSIL Ag+
PRODUCT DESCRIPTION	Hypochlorites (e.g. bleach) or N-chlorocompounds	ClO <sub>2</sub>	Quaternary ammonium compounds (e.g. benzalkonium chlorides)	Formaldehyde Glutaraldehyde	H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O <sub>2</sub> + Ag
MECHANISMS OF ACTION	Oxidation of SH-groups of vital enzymes. Denaturation of proteins.	Oxidation and denaturation of proteins.	Denaturation of proteins and inactivation of enzymes	Alkylation SH-groups of proteins Denaturation of proteins	Oxidation of DNA/RNA of microbes (20 times less effective than Peroxsil Ag+)	Oxidation of DNA/RNA of microbes
GERMICIDAL EFFICIENCY	Wide germicidal range. Does not remove biofilm	Wide germicidal range, but not sporicidal. Not effective biofilm remover	Limited germicidal activity, only effective against Gram+ bacteria, enveloped viruses and fungi. Not effective biofilm remover	Wide germicidal range. Does not remove biofilm	Wide germicidal range ineffective biofilm remover	Wide germicidal range. Removes biofilm
INEFFECTIVE AGAINST	amoebae, protozoa	amoebae, protozoa	gram neg. bacteria, myco-bacteria, spores, unsheated viruses, amoebae, protozoa,	amoebae, protozoa,	ineffective biofilm remover	None
HEALTH & SAFETY PROFILE	Very toxic. THM production (carcinogenic)	Carcinogenic and genotoxic. Toxic by-products formed (e.g. chlorate, chlorite)	Low toxicity. No toxic by-products	Highly toxic (FA is carcinogenic) FA forms chloromathylether (carcinogenic)	Non-toxic	Non-toxic
ENVIRONMENTAL PROFILE	Very little biodegradability. Must be neutralised before drainage	Must be neutralised before putting to drain. Biodegradable.	Must be neutralised before putting to drain. Slowly biodegradable.	Readily biodegradable. Must be neutralised before putting to drain	Completely biodegradable	Completely biodegradable
MATERIAL COMPATIBILITY	Extremely corrosive to metals, rubbers and fabric	Corrosive	Only corrosive at high concentrations, but generally compatible with all types of materials	Not corrosive	Corrosive	Not corrosive
EFFECTIVE pH RANGE	5 - 9	5 - 9	5 - 9	4 - 9	2 - 8	2 - 8
REACTION TO WATER HARDNESS	good	good	poor	good	good	very good
STABILITY AFTER DILUTION	only short-term re-usable under certain conditions	only short-term not re-usable	only short-term not re-usable	only short-term not re-usable	good re-usable	very good re-usable
BIODEGRADABLE IN WATER PLANTS	very poor, neutralisation necessary	very poor, neutralisation necessary	90% after 5 days	good, but neutralisation necessary	100% after 1 - 2 hours	100% after 2 - 4 hours

## WHY CONSIDER CHANGING YOUR CURRENT DISINFECTANT?

Because farmers have one of the highest cancer rates of all professions

### How Water Sanitation Can Damage Your Health

If you use municipal or disinfect borehole water with chlorine (calcium hypochlorite) you are exposing yourself to poisons 100 times more toxic than chlorine itself.

Something you may have never even heard of. Disinfection-by-products (DBPs) are contaminants found in nearly every water supply that adds chlorine.

That clear, clean-looking liquid you use every day – to quench your thirst, to bathe in, to wash your dishes and laundry – is far from the fresh, pure resource you might assume.

It is important to understand that chlorine itself is relatively benign and breaks down to chloride in your body, which is not much different from the chloride ion in salt. The problem is that it reacts with organic material already dissolved in the water, forming these far more toxic DBPs.

**Protect you and your family with knowledge.**  
Read on [www.peroxsil.com/images/pdf/Chlorine-Report.pdf](http://www.peroxsil.com/images/pdf/Chlorine-Report.pdf)