



AquaSoar™

THE KEY TO OPTIMAL ON-FARM
WATER HYGIENE

A Product Overview



Acepsis - AquaSoar™

THE WATER HYGIENE SYSTEM STORY

Improving Animal Wellness Through Optimized Water Hygiene

Water is considered the most essential nutrient for livestock development and production and is needed for numerous processes, such as the regulation of body temperature, growth, digestion, reproduction, metabolism, lubrication of joints, excretion, eyesight, etc. Water is also an excellent solvent for amino acids, minerals, glucose, vitamins, and metabolic waste.



Ensuring the farm water supply is safe to drink.



WATER QUANTITY AND QUALITY The total water needs of livestock are met through a combination of the water contained in feed and consumed through drinking water. Livestock require water in **sufficient quantities** and **sufficient quality** for optimal health and growth. To this point, while the basic elements of water, H₂O, remain the same, the rest of what is contained in water is not created equal.



WATER QUALITY | ANIMAL HEALTH Water quality plays a critical role in the health and production of livestock operations. Water quality may be altered by contaminants, such as mineral salts, toxins, heavy metals, microbial loads, debris, and agricultural practices. Most contaminants will reduce water intake, which results in a reduction in feed intake and a loss of production.



BACTERIA AND BIOFILM Other contaminants include bacteria, which can be toxic to livestock. High bacteria concentrations can cause infertility, foot rot, low production, and other reproductive problems. Stagnant water that is contaminated with manure and other contaminants can develop blue-green algae, which may be toxic to livestock. It is estimated that more than 90% of the bacterial and disease-causing organisms are protected within a slimy, greasy habitat known as **biofilm**, and that the majority of water feeding systems contain, and are contaminated with this rich mixture of bacterial species, as well as fungi, algae, yeasts, protozoa.

It is critical that to maintain a clean, fresh water supply, to maintain health and performance of livestock, both the bacterial and biofilm presence must be eliminated from a water system through water hygiene processes.

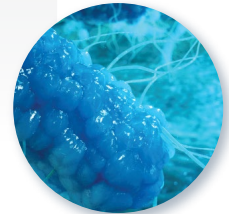
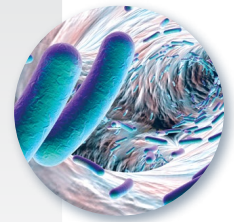
BIOFILM AND WATER HYGIENE



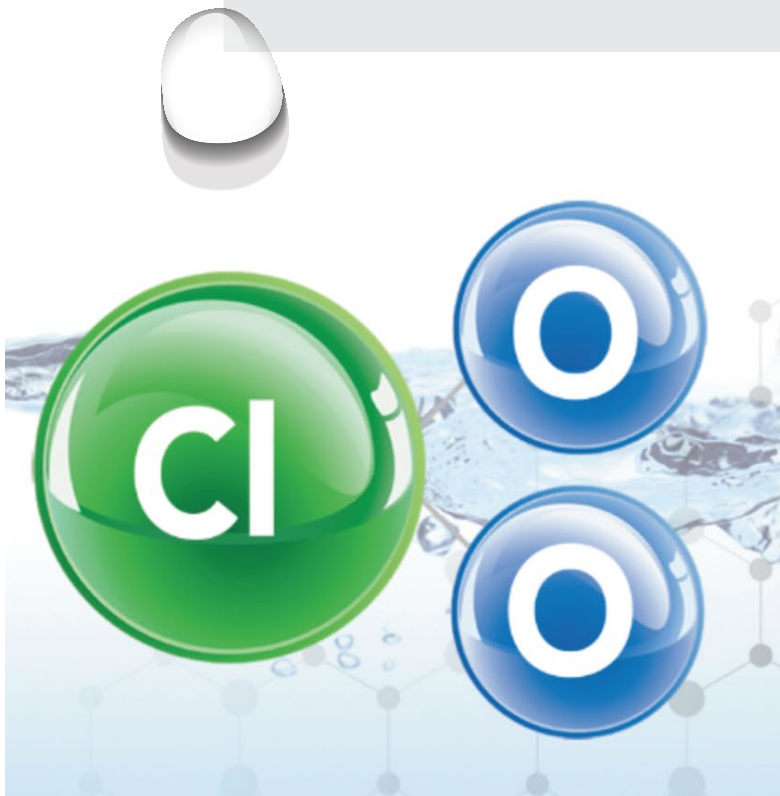
BIOFILM Livestock producers are intimately aware of biofilm within their water systems, at least by its feel. Biofilms are slimy, glue-like substances that coat the walls and surfaces of water systems, protecting large communities of disease-causing organisms.

Animals introduce bacteria and organic matter into the water each time they drink, providing a prime environment for biofilm formation when temperatures are warm and water flow is low. Biofilm formation within a watering system becomes a primary disease transmission vector. Bacterial isolates from biofilm structures have been linked to many chronic diseases within livestock. Biofilm also harbors disease-causing organisms.

Removal of biofilm becomes a primary hygiene activity within livestock operations. While formed by bacteria, biofilms also provide protection to a host of other disease-causing organisms.



Dr. Donald Sockett, DVM, from the Wisconsin Veterinary Diagnostic Laboratory (WVDL) cites, "Chlorine dioxide (ClO_2) is the most effective disinfectant for *Cryptosporidium*, providing the quickest action at the lowest concentration among available disinfectants. The product has good biocidal activity against *Mycoplasma*, Gram-positive and Gram-negative bacteria, algae, yeast, enveloped viruses, chlamydia, non-enveloped viruses, fungal spores, parvovirus, acid-fast bacteria, bacterial spores and protozoan cysts. Among scour pathogens, ClO_2 provides a quick kill and concentration and time values on coccidian, crypto and giardia oocysts."



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THE OPTIMAL WATER HYGIENE TECHNOLOGY

CHLORINE DIOXIDE has been proven to remove biofilm and disease-causing pathogens from water systems and prevent them from re-forming when dosed at a continuous low level. Sodium hypochlorite (bleach), and hydrogen peroxide, on the other hand, have been proven to have little effect on biofilms.

Measurement of Oxidizing Agent ORP Values In Pathogen Disinfection**

OXIDIZING AGENT | OXIDIZING AGENT ORP VALUE RANGE (mV)

CHLORINE DIOXIDE (ClO ₂)		600 → 1000 MV
OZONE* (O ₃)		700 → 1000 MV
IODOPHORS (I ₂)		400 → 600 MV
HYDROGEN PEROXIDE		300 → 500 MV
SODIUM HYPOCHLORITE		250 → 500 MV



ORP Values In Pathogen Disinfection**

PATHOGEN SURVIVAL IN SECONDS (S) OR HOURS (H) AT ORP LEVELS (MV)

Pathogens	<500 ORP (mV)	500 - 600	600 - 700	700+
E. COLI (0157:H7)	> 300 S	< 60 S	< 10 S	< 1 S
SALMONELLA SPP.	> 300 S	> 300 S	< 20 S	< 1 S
LISTERIA MONOCYTOGENES	> 300 S	> 300 S	< 30 S	< 1 S
THERMO-TOLERANT COLIFORM	> 48 H	> 48 H	< 30 S	< 1 S

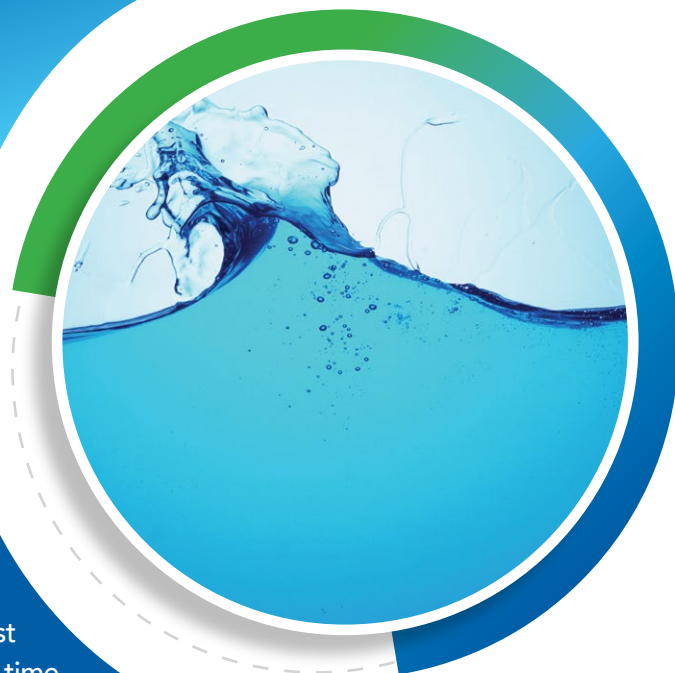
*Ozone is greatly influenced by the water quality and ozonation system.

**Oxidation Reduction Potential (ORP) for Disinfection Monitoring, Control and Documentation; University of California, Trevor Suslow, Department of Vegetable Crops, University of California - Davis

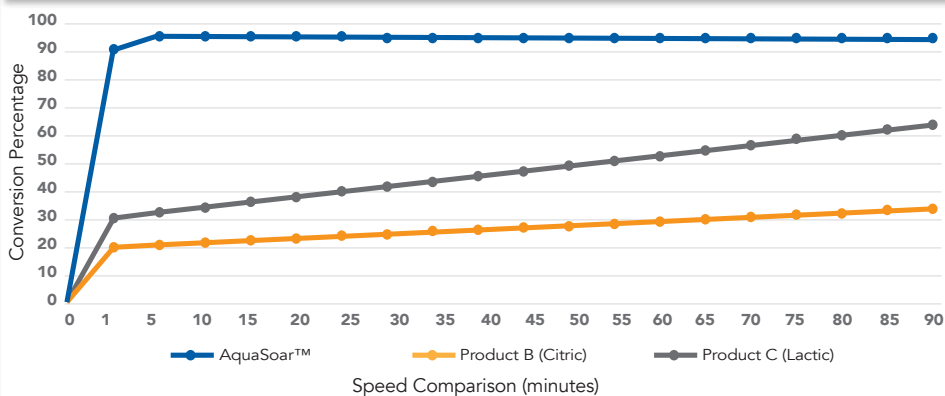
AquaSoar™

THE ULTIMATE WATER HYGIENE TECHNOLOGY

AquaSoar™ is a concentrated, two component, activator / base technology that produces chlorine dioxide on site, using the farm water source for dilution. The specially formulated AquaSoar™ Activator / Base precursors produce chlorine dioxide at the highest yield, in the shortest amount of time.

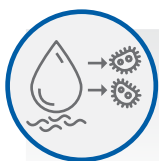


AquaSoar™ Speed Comparison (minutes) | Conversion %



This graph shows that AquaSoar™ produces the highest level of chlorine dioxide in comparison with other activation formulations. Concentrated precursors, producing more, faster, at the highest yield saves a great deal of cost within the system.

The AquaSoar™ Activator and Base precursors are specifically formulated for purity and efficiency of reaction. AquaSoar™ produces the highest level of chlorine dioxide within the shortest period of time, making it a perfect fit for on-farm production and dosing.



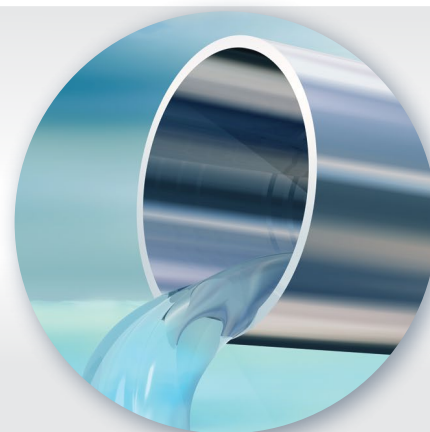
BIOFILM REMOVAL AquaSoar™ enhances primary water hygiene effectiveness by penetrating and breaking down the structural components of biofilm, removing deposits

that facilitate the growth and protection of dangerous pathogens.

In other words, AquaSoar™ breaks up the “organic glue” that holds biofilm together, binding them to the surfaces within water systems.

Adding AquaSoar™ to the water system provides the ultimate

“one-two punch”: **AquaSoar™ destroys the biofilm structure and eliminates the bacterial presence within the water system.**



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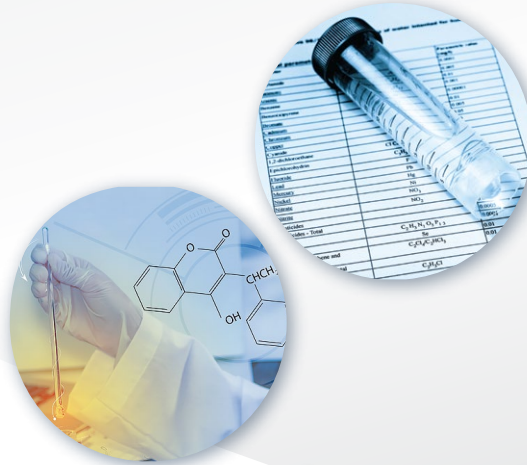
NEXT STEPS TO AN OPTIMAL HYGIENE PROGRAM

1 COLLECT WATER SAMPLES at the water source and throughout the livestock housing facilities, identifying a full water analysis of the operation

2 OUTLINE A SUGGESTED WATER HYGIENE program specific to a facility

3 INSTALLATION hygiene system components:

- Mixing system
- Dosing system
- Monitoring system
- Monitoring and calibration of the system
- Service and support



The concentrated AquaSoar™ Activator + Base are diluted on farm to create AquaSoar™ CONCENTRATE, providing maximum Hygiene output. The concentrated precursors ensure the lowest cost per use and greatest water hygiene value.



For more information, call Acepsis® or your local representative.

ACEPSIS®, LLC is an animal health based company that is focused on the development of state-of-the-art animal hygiene technologies. Our Company's mission is to apply innovative animal hygiene technologies into the agricultural and veterinary market sectors.