Eco-Responsible Solutions to Improving Performance

POULTRY INDUSTRY

Knowledge

Experience

Solutions

Connecting Entrepreneurs With Innovation
What is Danolyte®?

Danolyte® is Eur-Eca’s brand name for the anolyte we produce. It is a metastable aqueous disinfectant solution obtained through an electrolytic process. Unlike the traditional processes of electrolysis with saline solution, Danolyte® molecules retain high activation energy which facilitates and accelerates disinfection process.

The key active ingredient in Danolyte® is hypochlorous acid, which is a molecule produced by electrolysis of two natural ingredients, water and salt. In fact, hypochlorous acid is naturally produced by the human body to protect against viruses and bacteria. Danolyte® does not contain antibiotics, alcohol or steroids.

Danolyte® is a biodegradable solution and completely safe for the environment and non-toxic to humans. The resulting sodium hypochlorite generated by our system has much greater biocidal effect than chlorine commonly used due to its high redox potential (900 mV). Danolyte® is safe and non-toxic to humans, but instantly deadly on contact to every known fungus and bacteria it has been tested against. Danolyte® is produced with our proprietary equipment. What differentiates our product is the extended shelf life and the PPM that can be achieved with our technology. Our system provides the possibility to produce a disinfectant mixture with different ranges of pH depending on the applications for its use.

The proprietary software installed in our system further differentiates it from any available in the world. It ensures full traceability of injections of disinfectant solution, as well as regular alarm management and production. As such, our technology allows maintenance staff to connect via Internet to the machine and control and monitor it 24/7.
**Danolyte® Key Benefits**

*Danolyte® has an inherent capacity eliminate the biofilm inside the plumbing, and prevent re-growth of microorganisms and recontamination.*

- Eliminates Legionella contamination (even encysted in amoebae)
- Eliminates E. Coli, Salmonella, Staphylococcus aureus, Campylobacter jejuni, Listeria monocytogenes, and all known bacteria, fungi, viruses
- Highly effective as a sporicidal
- Eliminates biofilm in plumbing and prevents regrowth
- Minimal chlorine byproducts (chlorites, chlorates, trihalomethanes)
- Neutral pH - compatible with materials used in water networks
- Does not change the characteristics of drinking water
- Non-toxic disinfectant and sterilant biocide product
- Effective in killing and all known viri, bacteria and fungi
- Anolyte approved as “Hospital Grade Sterilant” – EPA/ FDA
- Safe and non-toxic to humans
- Biodegradable and safe for the environment
- Low operating cost
- Eliminates the need for use of harsh chemicals and additives

*Danolyte® competitive edge is higher, more consistent quality & longer shelf life*
Pathogens widely impacting the poultry industry

- **Salmonella**: Generally introduced by live poultry into the plant. Contamination spread during scalding & de-feathering processes.

- **Clostridium perfringens**: Generally introduced by the environment (soil/intestines/fecal matter) Present on processed meat in the form of spores.

- **Staphylococcus aureus**: Carried on skin surfaces & intestines of poultry contamination during de-feathering, chilling & evisceration.

- **Campylobacter jejuni**: Poultry are symptomless carriers – cooling water and air also important. Contamination higher in fresh than in frozen products.

- **Listeria monocytogenes**: Isolated from soil, vegetation & feces. Able to multiply in refrigeration. More heat resistant than Salmonella.
Food safety is a serious issue in the poultry industry worldwide. The highest food safety standards are by the countries which rely on imported goods. This makes food safety a global issue which cannot be solved through the implementation of an HACCP program alone. Protocols are required throughout the entire production chain. Unlike conventional chemical applications, Eur-Eca’s technology is able to provide a holistic solution to solve problems significantly impacting food safety and contamination in the poultry industry, beginning in pre-processing (hatcheries & broilers), extending to general processing (abattoirs), and continuing throughout the entire chain, including post-processing.

**Pre-Processing**

**Recommended Danolyte® Application Areas**

**BROILERS**
- Treatment of Feed
- Decontamination of Drinking water
- Treatment of Environment

**LAYERS/HATCHERIES**
- Disinfecting and decontamination of eggs
- Environment disinfection
- Replacement of formaldehyde

**Key Benefits of Using Danolyte®**

*Optimal results are achieved when water and environment are treated throughout entire growth process delivers incremental benefits*

- Increased hatchability and reduction of mortalities & culls
- Kills Pathogens pre-pylorically
- Increased growth higher flock weights (infection elimination – reduced lagging)
- Reduction of antibiotic water medication (helps control stress related mortalities)
- Growth enhancement (improved feed conversion and boosting of immune system)
- Reduces or eliminates Campylobacter jejuni contamination during processing
Danolyte® Poultry Solution

Processing

The rapid processing rate within poultry abattoirs makes it difficult to control bacterial contamination of carcasses. Contamination can result from the environment, production processes, equipment, humans as well as cross contamination from carcass to carcass. Here chemical disinfection products need to comply with a number of minimum performance standards within a poultry processing facility in order to produce high bactericidal activity without adversely affecting food quality. Danolyte® exhibits a unique mechanism of biocidal action which is distinct from that of conventional chemicals. Micro-organisms cannot build up a tolerance to this electrical charge based technology.
**Post-Processing**

Pathogens commonly found in Further Processing Plant (FPP)

- *Listeria monocytogenes*: Leading pathogen concern on ready-to-eat (RTE) meat
- *Escherichia coli O157:H7*: Main pathogen of concern in raw ground beef
- *Salmonella enteritidis*: Leading cause of illness associated with egg related salmonella foodborne illnesses

**Advantages of using Danolyte in Poultry Post-Processing**

- Eradication of spoilage micro-organisms
- Shelf life extension resulting from bacterial elimination
- Decontaminated offal and sausage casings which result in extended shelf life of value-added products
- General carcass decontamination
- Working surface disinfection
- General food safety, HACCP compliant
- Eliminates biofilm in plumbing
- Significantly reduces risk of infection to humans
Danolyte® provides a unique, integrated, and eco-friendly solution to challenges endemic to poultry abattoirs and processing plants

- Micro-organisms cannot build up a tolerance to Danolyte.
- Non-toxic & safe to handle – safe for the environment and the workers
- No change in color, taste, or smell
- Multiple application options – immersion, spraying, misting, infusion,
- Danolyte® returns back to benign state
- Improved food product quality and extended shelf life
- Broad microbial capacity – bacteria, mycobacteria, viruses, fungi, spores and protozoans.
- Elimination biofilm and prevention of recontamination
- Ease of installation and maintenance and minimal space requirement
- Retrofit to current watering systems
Danolyte®

Pre-Processing

There are many variables which impact our specific plan for a given location, because no two facilities are exactly alike. In general, we advise utilizing the appropriate PPM and ratio of Danolyte to water to treat the drinking water, the environment, the processing areas, the tools and equipment, and the workers. How all of that is done will depend on the particular circumstances of the individual location and the water supply. The following provides an example of elements inclusive in a typical installation for pre-processing and processing.

- Misting with Danolyte® to sanitize employees entering plant/production area
- Treatment of all feed with misting of Danolyte®
- Introduce Danolyte® to drinking water
- Utilize mister to apply Danolyte® to broilers
- Treat egg surfaces with Danolyte® during incubation period
- Utilize Danolyte® to rinse all tools, implements, and work surfaces after cleaning

Processing

- Utilize misters with Danolyte® to sanitize employees entering processing area
- Introduce Danolyte® into the primary water supply
- Regularly clean and rinse all processing equipment and work surfaces with Danolyte®
- Thoroughly rinse and clean all carcasses using water treated through the primary water supply
- Utilize Danolyte® to rinse all tools, implements, and work surfaces after cleaning
Numerous research projects and scientific studies conducted to determine the impact of utilizing anolyte production and processing of poultry. Although these results vary slightly in magnitude, they have all validated that a fully integrated and systematic introduction of anolyte into the process yields substantial incremental benefits. All known studies to date have provided these consistent conclusions:

- Reduced cull and mortality rate
- Improved overall animal health
- Improved feed conversion rate
- Reduced need for high grade feed
- Lower overall production and processing cost
- Replaces more expensive and toxic chemicals
- Increased average bird weight of up to 0.8 pounds
- Increased profitability resulting from reduced input costs and increased revenue due to increased bird weight

An integrated process for disease and contamination control employing Danolyte® as the core component will improve overall performance and profitability within the poultry industry.
What is the active antimicrobial agent in Danolyte®?

The active ingredient in Danolyte® is hypochlorous acid, a well-known and well noted biocidal agent, which is produced by the human body's natural immune system to fight infection. It is also known as "Super-oxidized Water" or "Electrolyzed Water". It is non-toxic to humans, animals, and the environment.

Is Danolyte® safe for humans, animals and the environment?

Yes, Danolyte® disinfectant is nontoxic to humans and animals. Independent research was done based on international standards to test acute oral toxicity, skin sensitization, eye irritation and bacterial mutagenicity. The research concluded that there is no known health risks associated with its intended use. In addition, the solution is biodegradable and does not harm the environment. After its use, Danolyte® turns into very weak brine. It does not introduce chemical or soap residue into the ecosystem.

Is Danolyte® fragrance free and why?

Fragrances used by many manufacturers are typically toxic substances. There are no fragrances added to Danolyte®. It is perfect for those with multiple chemical sensitivities (MCS). It neutralizes/eliminates the nasty odors caused by food or pets.
**How effective is the hypochlorous acid, in Danolyte®?**

Although Eur-Eca has not tested our Danolyte® against every known bacteria, fungi, or mold ourselves, many independent test labs and scientific journals have verified that hypochlorous acid (the same that is in Danolyte®) is highly effective against a wide variety of bacteria, viruses, fungi, mold and mildew including:

<table>
<thead>
<tr>
<th>Adenovirus</th>
<th>Glanders</th>
<th>Plague</th>
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<tbody>
<tr>
<td>Aspergillus niger avium-intracellulare Bacillus anthracis botrytis cinerea</td>
<td>H. pylori Haemophilus influenzae Hepatitis B</td>
<td>Poliovirus Proteus Proteus mirabilis</td>
</tr>
<tr>
<td>Bacillus anthracis bacteria</td>
<td>Hepatitis C HIV HIV-I</td>
<td>Pseudomonas aeruginosa Pseudomonas fluorescens</td>
</tr>
<tr>
<td>Botulinum toxin Brucellosis Campylobacter Candida albicans</td>
<td>Klebsiella Pneumonia</td>
<td>S. dublin</td>
</tr>
<tr>
<td>Candida albicans Candida albicans Coliphages Corynebacterium amycolatum Dermatophytoes</td>
<td>Listeria monocytogenes M. avium M. chelonei</td>
<td>S. haemolyticus S. hominis S. pullorum</td>
</tr>
<tr>
<td>Corynebacterium amcolatum Dermatophytoes E. coli Entamoeba histolytica Enterobacter aerogenes Enterobacter cloaceae Enterococcus</td>
<td>M. luteus M. smegmatis M. xenopi Mold</td>
<td>S. saprophyticus Salmonella enterica Serratia marcescens</td>
</tr>
<tr>
<td>Corynebacterium amcolatum Dermatophytoes E. coli Entamoeba histolytica Enterobacter aerogenes Enterobacter cloaceae Enterococcus Enterococcus faecalis Fungi</td>
<td>Monilina fructicola MRSA Mycobacterium Mycobacterium tuberculosis Noroviruses</td>
<td>Staphilococcus aureus Streptococcus faecalis Streptococcus pyogenes Sulfate Reducing bacteria Thermo-tolerant coliform</td>
</tr>
<tr>
<td>Corynebacterium amcolatum Dermatophytoes E. coli Entamoeba histolytica Enterobacter aerogenes Enterobacter cloaceae Enterococcus Enterococcus faecalis Fungi</td>
<td>General coliform bacteria</td>
<td>Tularemia Vancomycin Resistant spores of H. pylori Yeast</td>
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Does Danolyte® cause antibiotic resistance?
The overuse and misuse of antibiotics have led to the proliferation of "superbugs" such as MRSA. Danolyte® is effective against a wide range of germs, including MRSA. To date, it has not been found to contribute to development of antibiotic resistance.

What is the difference between Danolyte® and bleach?
The main disinfecting ingredient in bleach is hypochlorite, whereas the main disinfecting ingredient in Danolyte® is hypochlorous acid. It is well established to be substantially more effective biocidal than hypochlorite bleach, yet is completely safe, natural and non-toxic. Bleach, however, is known to be toxic, can cause severe tissue damage, and is a breathing irritant. Danolyte® kills most bacteria and viruses on contact, whereas bleach can take up to an hour to achieve similar results.

What is the difference between disinfectant and sanitizer?
There is a general misunderstanding by the consuming public as to the difference between a disinfectant and a sanitizer. Sanitizers only kill a percentage of viruses and bacteria (99.99% often advertised) while a disinfectant kills 100%. Sanitizers are therefore only effective at reducing the number of organisms present on a surface, leaving the remaining organisms to quickly reproduce after the sanitizer’s application. Furthermore, the organisms that remain after the application of a sanitizer may become resistant to future sanitizing treatments thereby reducing the effectiveness of a sanitizer after repeated applications. Danolyte® disinfectant not only kills 100% of bacteria, it also does not introduce bacterial resistance. When Danolyte® comes into contact with viruses or bacteria, there are no survivors.
Commonly Asked Questions

How does Danolyte® kill bacteria if they are non-toxic?
Danolyte® contains hypochlorous acid that reacts with a variety of microbial sub-cellular compounds, interferes with metabolic processes, and kills individual bacterium exposed within milliseconds. In the human body, white blood cells naturally produce hypochlorous acid to defend against disease/bacteria in the body.

How long can Danolyte® be stored?
For optimal results, use Danolyte® within 18 months of the production date.

What is the difference between Danolyte® and "mixed oxidant"?
A mixed oxidant is a blend of chlor-oxygenated species. Average concentrations are 30 - 40% mixed oxidants (MOS) and 60 - 70% sodium hypochlorite (i.e. Bleach). Danolyte® contains pure 100% hypochlorous acid, the most powerful active ingredient. The mixed oxidant only contains about 30% or less of the active ingredient of hypochlorous acid. As a result, it is much inferior in performance compared to Danolyte®.