SANITATION
Cleaning and Disinfectants in the Poultry industry

Diseases and infections have always been a major concern to the poultry industry-- especially in the hatchery. Fortunately, microbial contamination can be prevented and controlled using proper management practices and modern health products.

Microorganisms are everywhere! Some are relatively harmless while others are highly pathogenic. Some pose a lethal threat to one species of animal while remaining harmless to another species. Some organisms are easily destroyed while others are very difficult to eliminate. The moral is: *Treat all microorganisms as if they are a severe threat to the chick's livelihood.*

Understanding the terms used to describe microbial control is important when selecting the appropriate action for eliminating disease causing organisms. Three terms commonly used but often misunderstood are sterilization, disinfection, and sanitation.

***Sterilization* - The destruction of all infective and reproductive forms of all microorganisms (bacteria, fungi, virus, etc.).**
***Disinfection* - The destruction of all vegetative forms of microorganisms. Spores are not destroyed.**
***Sanitation* - The reduction of pathogenic organism numbers to a level at which they do not pose a disease threat to their host.**

Most hatchery personnel have the impression that they are approaching a sterile condition because they use disinfectants when "disinfecting" the facilities. In fact, they may only achieve a sanitized condition at the very best. The most important consideration to remember when striving for a sanitized hatchery is that cleanliness is essential.

Proper cleaning of facilities removes the vast majority of all organisms and must be used before application of disinfectants. This applies to all areas within the hatchery including floors, walls, setters, hatchers, trays, chick processing equipment, air and personnel. The success of a hatchery sanitation program is limited only by its weakest link.

It is extremely important to remove as much organic matter as practicable from surfaces to be disinfected. All debris including down, egg shells, droppings, tissue residues, etc. must be removed from the hatchery. This is followed by thorough cleaning

using warm water and appropriate cleaning aides. Care is focused on selecting the proper detergent and thus producing the cleanest hatchery environment possible. Special attention is placed on compensating for variations in hardness, salinity and pH of the cleaning water. A thorough rinsing with abundant quantities of clean sanitized water completes the cleaning process and removes most lingering residues of detergents, organic matter or microbial organisms that can interfere with the effectiveness of a disinfectant.

Only after the facilities have been thoroughly cleaned are the surfaces treated with an appropriate disinfectant solution. Not all disinfectants are suited for every situation. When selecting the right disinfectant, carefully consider:

The type of surface being treated.
The cleanliness of the surface.
The type of organisms being treated.
The durability of the equipment/surface material.
Time limitations on treatment duration.
Residual activity requirements.

If the surface is free of organic matter and residual activity is not required, quaternary ammonium compounds and possibly halogen compounds can be used effectively. However, if surfaces are difficult to clean, residual activity is required or the contaminating organisms are difficult to destroy, then multiple phenolics or coal tar distillates may be needed.

Careful attention must assure that the disinfectant, if used as directed, meets requirements of the user. Be reasonable and don't expect the product to produce unattainable performance. Instead, select an optimal product or modify disease control practices.

In general, disinfectants can be divided into seven major categories. The various classes of disinfectants are:

Alcohols
Halogens
Quaternary Ammonium Compounds
Phenolics
Coal Tar Distillates
Aldehydes
Oxidizing Agents

Although many disinfectants are available, those mostly widely use in today's hatcheries include quaternary ammonium compounds, phenolics and aldehydes. However, each disinfectant is used only in appropriate locations for meeting the purposes for which it is designed.

Several considerations must be remembered when using any disinfectant to maximize its effectiveness. Some of these general considerations are:

Few disinfectants are effective instantaneously. Each requires a certain amount of time to bond with the microbe and exert a destructive influence. Allow adequate contact time (usually 30 minutes is sufficient) or select a different disinfectant.

When selecting disinfectants, consider their effectiveness on organisms that are of greatest concern. If a hatchery is experiencing problems with a certain viral disease, the disinfectant selected must be effective for destroying the specific organism causing the problem. Not all disinfectants are effective on all types or species of organisms.

In most situations it is advisable to clean and disinfect in two different operations that are separated with thorough water rinsing. Many cleaning/disinfecting producers promote their product based on ease and economy of use because they clean and disinfect in one operation. If these products are used, make sure that they satisfy all efficacy requirements demanded of other disinfectants.

The efficacy of disinfectant solutions is usually enhanced when applied in warm solutions rather that cold solutions. "Hot" solutions, however, may reduce disinfectant efficacy or promote a "cooked-on" condition for unremoved protein-rich residues.

When possible, allow all surfaces to dry thoroughly prior to reuse. Dryness helps prevent the reproduction, spread and transport of disease organisms. Although a surface is clean, it is more easily recontaminated with organisms if water remains on the surface.

It is important when selecting the best disinfectant to consider its effect upon the developing embryo and the hatchery environment. Embryos are in a very sensitive stage of development when the eggs enter the hatchery. They can be severely affected if subjected to chemical vapors, even if a sterile environment is provided.

It must be remembered that an egg is not produced in a sterile environment. Before it is laid, the egg is subjected to a series of microbial attacks that can reduce the embryo's potential to develop into a healthy, robust chick. The vent of the hen is probably the most contaminated area that an egg passes through. Poorly maintained nests can also distribute organisms to noninfected eggs. Fortunately, nature has provided several protective barriers for the embryo. Hatchery personnel must not conduct any procedure that interferes with the egg's natural defense. Producers must make every effort to collect and store eggs so that natural protections are not compromised.

Keeping egg shell surfaces dry is very important to prevent excessive microbial contamination and shell penetration. Without benefit of aqueous water the potentially dangerous microorganisms have little opportunity to invade the egg shell and infect the embryo. Sweating of eggs as they are moved from warm to cool environments must be prevented if sanitation programs are to be successful.

Embryos have the same requirements prior to pipping that the chicks have following hatching. They have the need for heat, moisture, and a high-quality source of air. They can be severely affected by harmful fumes originating from many chemicals often found in or near the hatchery. Although hatchability may not be affected, the quality of the chicks can be reduced. Whenever unusual odors from detrimental chemicals are detected in the hatchery, the product must be removed. This applies to all chemicals within the hatchery, including disinfectants. As an example, *vapors produced by*

improper use of phenolic disinfectants can cause changes in egg proteins and impair hatchability and chick quality.

Improper selection or use of some disinfectants can damage or hinder the function of hatchery equipment. Many disinfectants are corrosive and damaging to equipment parts. Some disinfectants can clog and gum-up spray nozzles if added to the water used in humidifiers. It is possible that electronic control devices can also be severely damaged or destroyed after prolonged exposure to some disinfectants.

Select disinfectants wisely and always follow label directions for their safe use. Not only does management have the responsibility to maximize hatchability and chick quality, but also to provide a safe working environment for the hatchery personnel. Safety of the people working in the hatchery must never be sacrificed for cost or productive efficiency.

Assuming that a proper state of sanitation is achieved, it must be remembered that the status of disease-free surfaces can be compromised if facilities are not maintained properly. Hatchery personnel must be made aware that they can be a major source of reinfection by transporting of microorganisms on clothes, hands and attire. Since people are direct carriers of microbes, provisions must be made available at appropriate locations in the hatchery for the washing of hands and footwear. Laboratory coats and caps can significantly reduce the spread of microbial organisms. Restricting movement of hatchery personnel by assigning duties within specific areas can reduce the distribution of organisms throughout the hatchery.

The risk posed by disease causing organisms is a constant challenge to hatchery personnel. Always use control measures that have been proved effective rather than trusting visual cleanliness as an indicator of sanitation. A clean surface does not always indicate a disease-free state. Assuming so may be fatal to the chicks and the management program.

Enirolyte Industry International Ltd. shares all the above concerns and indeed have expressed most of them to the Poultry and Eggs producers.
Envirolyte Industries International Ltd is in the business of developing, manufacturing and marketing equipment that uses water electrolysis to create fluids. These fluids have various commercial applications and may be used in multitude of different applications wherever and whenever there is a need to clean, disinfect, remediate, hydrate and moisturize. The processes for which these fluids may be used are referred to as the "Electrolyzed water -EW -Technology." For example, we believe that our food and agricultural treatment products potentially may be used to systemically treat all facets and phases of the food chain, from soil to animal feed to meat processing, by eliminating dangerous and unhealthy pathogens from the food chain with organically based and highly effective solutions. We make the claim that our products are "non-toxic". We can do this because at the levels we employ our technology, our studies both internal as well as through third parties show no toxicity. At the levels employed, the fluids and products are environmentally safe and non-toxic and do not contain or leave harmful residues associated with chemical-based supplements or disinfecting and cleaning agents. The electrolysed fluids created by the EW Technology refereed as the "EW Fluids" or anolyte and catholyte generated by our specialized equipment can be used in

place of many of the traditional products used in commercial, industrial and residential disinfecting and cleaning.
We have identified the following industries for early stage sales and marketing focus: 1) dairy production and processing, 2) meat and poultry processing, 3) clean in place ("CIP") for food and beverage processing and 4) agricultural grow-out and processing 5) livestock industries and livestock breeding 6) drinking water disinfection and waste water treatment 7) ballast water treatment 8) aquaculture 9) medical and health care ("Primary Markets"). As of today, we have focused on these markets because we believe that for each of these markets we have a competitive advantage, a leading strategic industry partner, or we can provide an attractive value-added proposition.

We presently market our existing products in our identified market channels (livestock, dairy production and processing, meat and poultry processing, food processing clean in place ("CIP"), environmental remediation and agricultural grow-out, drinking and waster disinfection). Future plans include enhancing our current products, and introducing new products and features to meet changing customer.

Our products meet the growing demand for safe foods and environmentally friendly, non-toxic disinfectants and cleaning fluids. Consumers are becoming more aware of the detrimental effects of toxic products, chemicals, and biocides (as evidenced by the preponderance of anti-microbial agents). There are numerous companies attempting to enter the ECA market with their own versions of electrolysis or plasma generators that create similar fluids as anolyte and catholyte. Envirolyte has focused much of its time and energy in developing high volume systems that meet the needs of a commercial marketplace. As a result, we have an opportunity to penetrate and sell our products in these markets because our equipment is better suited for larger applications.

Our Agricultural Products also provide an organic alternative at a reasonable price. Our solutions provide an ecologically safe alternative to toxic cleaning chemicals and pesticides. We have identified a large number of potential markets for our products within specific industry channels, but will focus initially on developing and marketing in the livestock and dairy production and processing, meat and poultry processing, environmental remediation and agricultural grow-out industries, drinking and waste water disinfection.

The safe food, sanitizing, disinfecting, agricultural and cleaning industries are currently using products and methodologies that have increasingly expensive environmental and social consequences as compared to our Fluids. We believe that our products provide an attractive alternative to the chemicals and other toxic substances currently being used.

Envirolyte takes a holistic approach to the problems encountered by the Poultry and Eggs producers. We have systems which eliminate disease from the egg stage to the finished dressed bird on the supermarket shelf.

Anolyte Liquids:
Used for all surface cleaning in poultry sheds.
Used neat as an aerobic fogging solution.
Used to clean drinking nozzles and water lines.
Used to purify drinking water (to potable water standards)
Used as a soak or wipe for egg washing.
Used as a surface cleaner for slaughter house equipment, bird transport crates and for utensils used in butchering the chicken into portions.

Used as a dosing agent for water spraying carcasses.
Used as a dosing agents for de-feathering baths.
Used as a disinfecting agent for disinfection of chicken feed.

The reported benefits:
1. Increased production of eggs by -5-6%
2. Decreased food conversion (food consumption index)
3. Improvement of viability (lower mortality)
4. Improving quality shell, stronger shell (less fragile egg)
5. Quieter hens
6. Elimination of E- coli contamination and disease associated with E-coli
7. Above all certain distribution of drinking water with zero bacteria count throughout the barns.
8. Applicaiton of Envirolyte drinking water disinfecting technology is the only way to prevent biofilms in pipes are
In conclusionsn Envirolyte offers bio-safety and increases profitability of poultry farming.

Typical layout of Envirolyte system at a poultry farm