

## Water is Part of Your Bio-security Program

In the USA, it has been estimated by the Centers for Disease Control and Prevention that as many as 1 in 4 consumers will suffer from a foodborne illness each year, resulting in an annual incidence of 76 million cases, 325,000 hospitalizations and 5,000 deaths (Mead *et al*, 1999). If contaminated poultry products were linked to only 10% of human cases of food poisoning, this would equate to an estimated 500 deaths and 7.6 million cases each year. The USDA has done everything possible to reduce foodborne pathogens at the processing level. Currently, more emphasis is being placed at reducing harmful bacteria at the grower's level.



Water sources available to livestock have been identified as important biosecurity and agroterrorism concerns. Many foodborne pathogens, in particular *Campylobacter*, *Salmonella*, *E. coli*, *Pseudomonas*, and *Staphylococcus*, can be spread throughout the flock via the drinking water. Protective measures need to be in place to reduce vulnerability for microbial infection.

  
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**Poultry Water  
Disinfection System**

**Intec's**

# Water Magic III



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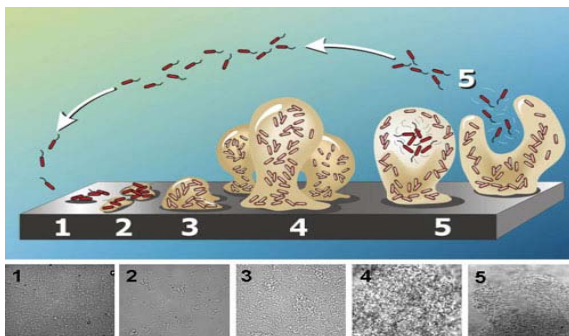
## Functions of Water in Poultry Diets



It is imperative that poultry have access to a clean healthy water supply. Young rapidly growing birds often consume twice as much water as they do feed. Water not only serves as a nutrient, but it has other functions as well. Water softens the feed in the crop, serves as a carrier of feed moving through the digestive tract, and acts as an aid in several digestive processes. It is also a key component of blood and lymph that are vital for a healthy immune system.

## Importance of Sanitary Water Lines

Over a period of time, any water delivery system will be affected by material build up and contamination. Lime, calcium, manganese, iron will form scale. Rust, dirt, and algae will attach to the inside of water lines. Water soluble additives used in poultry drinking water often contain sugar or sugar additives that can promote the growth of a biofilm inside the water line. It is the buildup of these materials on the inner surface of the service lines that will provide a place for microorganisms to take hold and multiply. Organic materials and additives will supply nutrients for microbial growth and will have a negative impact on medication and vaccines delivered through the water lines. Every time the bird consumes water, it will become exposed to an ever increasing microbial load. Other negative effects of microbial growth include poor feed conversion, downgrading of carcasses, increased mortality and increased condemnation. This will affect the profitability of the integrator and the farmer.



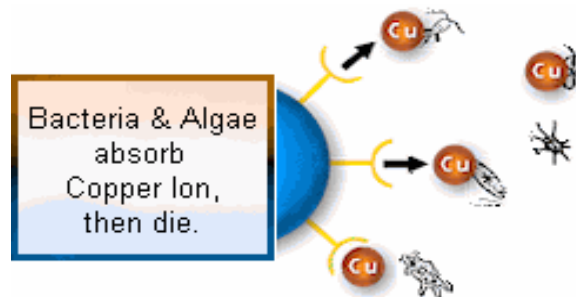
Growth cycle of microorganisms and biofilm formation

## Transition Metal Ionization (TMI)

There is sufficient evidence that transition metal ionization can offer superior disinfection capabilities over currently utilized methods without producing harmful disinfection byproducts. It also will provide required nutritional trace elements in poultry that can help build immunity against common avian pathogens. Water is an extremely important aspect of a biosecurity program. A reduction in microorganisms on the farm will help reduce the contamination in the processing plants, and ultimately better protect the consumer.

## How TMI Works

The biocidal effect of copper ions stems from a combination of mechanisms. These positively charged metallic ions attach to the negatively charged bacteria cell membrane and cause cell lysis and death (Britton, et al., 1978; Freedman, et al., 1968; Slawson, et al., 1990). Metal ions will bind to the sulfhydryl, amino and carboxyl groups of amino acids, thereby denaturing the proteins they compose. This renders enzymes and other proteins ineffective, compromising the biochemical processes they control. Cell surface proteins necessary for transport of materials across cell membranes also are inactivated as they are denatured. When copper binds with the phosphate groups that are part of the structural backbone of DNA molecules, the result is the unraveling of the double helix and consequent destruction of the molecule (Meyer, 2001). Unlike chlorine, transition metal ionization does not result in dangerous halogenated organic byproducts such as trihalomethanes, chloramines and chloroform. Also, copper ions are stable, making it easier to maintain an effective residual (Meyer, 2001). Furthermore, the ions will remain active until they are absorbed by a microorganism.



## Health Benefits of Copper

Supplemental copper intake in poultry and swine diets has shown growth promotion abilities (Burnell *et al.*, 1988; Cromwell *et al.*, 1989; Dove, 1993) which are believed to be attributable to the biocidal affect of copper (Varel *et al.*, 1987). The health benefits of copper is well documented. The trace mineral copper helps prevent anemia, bone and skeletal defects, a degeneration of the nervous system, defects in the color and structure of hair, reproductive problems, and abnormal cardiovascular problems. Also, copper is as important as calcium and zinc for bone formation, red blood cell integrity, skin and immune functions, nervous system functions, propagation of oxygen throughout the bloodstream, and the conversion of beta carotene into vitamin A.



## Advantages

- Installation and maintenance is easy
- Efficacy is not effected by water temperatures
- Very good residual disinfection. Recolonization is delayed because transition metal ions kill rather than suppress
- Effective on a wide range of pathogens and algae
- Does not contain/produce harmful disinfection byproduct such as trihalomethanes
- The only disinfection method that offers health benefits on the market
- Most cost effective disinfection method
- Various sizes available to meet any need
- Intec offers a wide variety of other water treatment solutions for the farm and home



Water Magic II & electrode

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