

## **Anti-Microbial Copper: MD-Cu29**

MD-Cu29 is an EPA registered anti-microbial copper that fights off microorganisms including MRSA and e coli. Oasis uses MD-Cu29 on key touch point areas to help prevent the spread of disease.

The copper continuously works to control the growth of bacteria on the copper surfaces.

### **How does copper affect bacteria?**

Science suggests that copper surfaces affect bacteria in two sequential steps: the first step is a direct interaction between the surface and the bacterial outer membrane, causing the membrane to rupture. The second is related to the holes in the outer membrane, through which the cell loses vital nutrients and water, causing a general weakening of the cell.

### **How can copper punch holes in a bacterium?**

Every cell's outer membrane, including that of a single cell organism like a bacterium, is characterized by a stable electrical micro-current. This is often called "trans-membrane potential", and is, literally, a voltage difference between the inside and the outside of a cell. It is strongly suspected that when a bacterium comes in contact with a copper surface, a short circuiting of the current in the cell membrane can occur. This weakens the membrane and creates holes.

Another way to make a hole in a membrane is by localized oxidation or "rusting." This happens when a single copper molecule, or copper ion, is released from the copper surface and hits a building block of the cell membrane (either a protein or a fatty acid). If the "hit" occurs in the presence of oxygen, we speak of "oxidative damage", or "rust." An analogy is rust weakening and making holes in a piece of metal.

## **After punching holes, how do copper ions further damage the cell?**

Now that the cell's main defense (its outer envelope) has been breached, there is an unopposed stream of copper ions entering the cell. This puts several vital processes inside the cell in danger. Copper literally overwhelms the inside of the cell and obstructs cell metabolism (i.e., the biochemical reactions needed for life). These reactions are accomplished and catalyzed by enzymes. When excess copper binds to these enzymes, their activity grinds to a halt. The bacterium can no longer "breathe", "eat", "digest" or "create energy."

## **How can copper's effect be so fast, and affect such a wide range of microorganisms?**

Experts explain the speed with which bacteria perish on copper surfaces by the multi-targeted nature of copper's effects. After membrane perforation, copper can inhibit any given enzyme that "stands in its way," and stop the cell from transporting or digesting nutrients, from repairing its damaged membrane, from breathing or multiplying.

The anti-microbial copper is featured on the Barrier free line of products, Oasis' most popular line of water coolers.

