

COPPER KILLS THROUGH THREE MAIN PATHWAYS

The three pathways may be the “kill method” at any given time the copper ions come in contact with the bacteria and thus, it is a complex kill that makes it more difficult for bacteria to become resistant to its powerful effect.

HOW IT KILLS

Copper is a metal. When metal reacts with water - either in liquid form or through air moisture - it oxidizes. We call this “rusting” when it applies to metals.

Through a pathway of RUSTING

Through the process of creating rust molecules, copper pulls electrons from the members of the bacteria’s cell wall like lipids or oxygen or proteins.

Oxidizing copper atoms weaken the bacteria when they pull the electrons from the proteins, etc. that make up the cell wall. Eventually the wall breaks, killing the bacteria.

Through a pathway of MICROBIAL CELLULAR TOXICITY

As the oxidizing copper atoms break down the cell wall, the bacteria attempts to adapt to the environment by taking in from its surroundings or pushing unneeded elements out. As a result, the copper ions flood into the cell.

Copper is quickly toxic to the inside of the cell, which is full of fragile, DNA-making parts.

Through a pathway of FREE RADICALS

Oxidizing copper also releases free radicals, atoms of oxygen and hydrogen or oxygen hydroxide. These atoms are highly reactive with other substances because they have one or more unpaired electrons; this makes the atoms unstable.

All cells want to be stable and so they want to find an electron to make a pair. As a result, they “steal” an electron from surrounding molecules, setting off a destructive chain reaction in the bacteria’s cell membrane, rupturing it and ultimately killing the bacteria.

METAPHOR

This is like pulling bricks out of a wall. Eventually, the wall breaks. When the protein wall breaks, the bacteria dies.

This is like the story of the Trojan Horse. Outside, the army was struggling to break down the wall. But once inside, the army was quickly able to destroy the inhabitants.

This is like acid corroding a material. It basically “eats” through it until it breaks a hole in it, causing a weakness or an inability to survive.

