



CREATING A SHIELD OF BIOSECURITY.™

## XTREME BIO – MODE OF ACTION OVERVIEW

Xtreme Bio contains citric acid, lemongrass oil and quillaja saponin (soapbark), and stearic acid which when combined have a synergistic effect in treatment against harmful viruses, bacteria and fungus.

Citric acid is known to reduce the energy metabolism of bacteria and has also been shown to disrupt the cellular membranes of the microorganism being targeted. This disruption leads to the leakage of cellular contents and results in the eventual death of the cell.

Saponins, when used as an antimicrobial, have been shown to reduce the surface tension of the cell thus resulting in increased permeability or leakage of the targeted cell. This action results in the discharge of intercellular compounds. Lemongrass oil is effective on a wide variety of disease-causing microbes. It is commonly used as an antibacterial, antifungal, and antiviral. Lemongrass oil has also been shown to inhibit growth and development of *Bacillus cereus*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Staphylococcus aureus*. Lemongrass oils induce the destruction of bacterial biofilms. Furthermore, it has been shown to destabilize the bonds between the lipid bilayer and neutralize the bacteria through membrane disintegration.

Stearic acid has a bifunctional combination which enables it to work as a surfactant and a softening agent. Stearic acid serves as a carrier to assist in the penetration of the cellular membrane. It lowers the over-all surface tension.



**Midwest Ag**  
SOLUTIONS

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