

Cryptosporidium oocysts, Can we kill them?

Research into Technology Combating Microbiological Contaminants in Water

A basic requirement of civilisation, as we know it, is the supply of safe water for drinking, domestic, industrial and recreational purposes. Choices of technology available for disinfection of water in treatment processes are diverse. Chemical disinfection, ozonation, ultraviolet radiation, and pressure driven membrane-based methods such as reverse osmosis are commonly used. Electro assisted methods for water treatment are gaining more interest in the water industry but are yet to be widely accepted for various reasons. The main limitation to acceptance of this technology is the lack of understanding of the mode of action of electro assisted treatment. Griffith University and Anti Bio are working towards expanding the understanding of electromagnetic and sound frequencies on biological and chemical components in water and exploring beneficial applications of the technology.

Anti Bio Technologies Ltd (ABT), an Australian company, have developed a system designed to emit variable sound frequency ranges into surrounding media. The system has previously employed a fixed frequency emittance in the residential swimming pool arena and some commercial pools. At the frequency used. Preliminary investigations using the Anti Bio System (ABS) on swimming pools have demonstrated improvements in

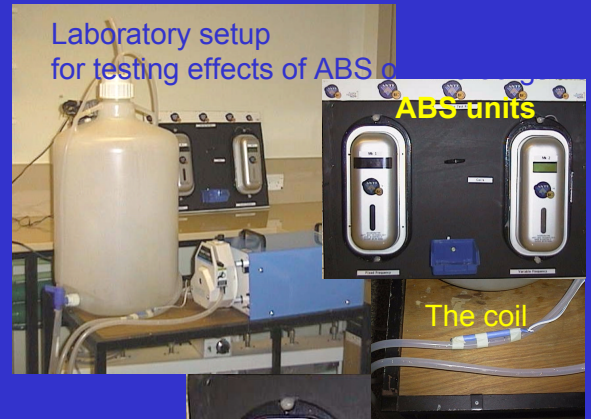
- i) biological water quality
- ii) reduced chemical usage
- iii) maintenance requirements are minimized.

Griffith University have been testing the ABS for the past year. The tests have included investigating the effects of the ABS on:

Cryptosporidium oocysts
Legionella pneumophila cells

This year further investigations into the ABS include:

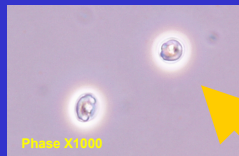
- Further studies into the effect of the ABS on *Cryptosporidium* oocysts
- How the ABS effects biofilms that build up in pipes carrying water



After the oocysts are exposed to the sweeping sounds they are checked under the microscope.

This is what we see under the microscope!

It's alive!!!



Intact and potentially infectious oocysts under phase microscopy

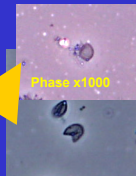
Sporozoites

Intact oocyst



Ruptured oocyst

It's dead!!

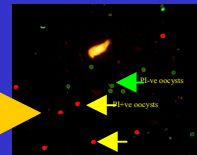


Empty oocysts contain no infective agents (sporozoites)

PI +ve

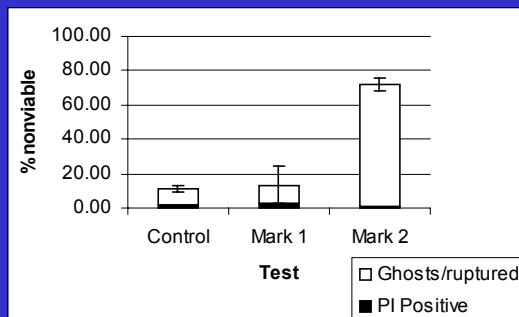


Control Unit

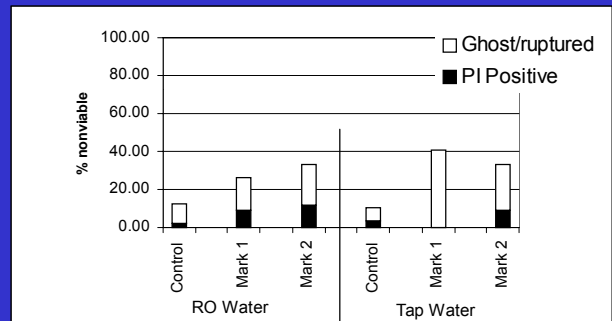


Fluorescently stained oocysts showing "dead" PI +ve and "alive" PI -ve

Some Results from the *Cryptosporidium* investigations!



Percent nonviable *Cryptosporidium parvum* oocysts after treatment with the AntiBio System and using the Molecular Probes Live/Dead kit and phase contrast microscopy. All experiments were carried out in triplicate and the results are expressed as a mean of these 3 experiments with the standard deviation indicated by the error bars.



Percent nonviable *Cryptosporidium parvum* oocysts after treatment with the AntiBio System and using the Molecular Probes Live/Dead kit and phase contrast microscopy. Controls consisted of identical experimental procedures in the absence of the ABS.