**Australian Bay Lobster Producers Limited**
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# RE: ALGAE-FREE ULTRASOUND TRIAL – REPORT 1

ABLP Ltd cultures Moreton Bay Bugs at its' marine production facility located at Chinderah NSW. The facility uses the latest in membrane filtration technology and indoor recirculation aquaculture systems to ensure stringent standards in water quality and temperature are maintained through the production process.



Figure 1: Initial Reservoir Biofilm

The extent of biofilm development in a culture system is closely related to the systems' feed input and management processes utilized to routinely remove the film. ABLP's nursery systems are in continuous use which hinders routine disinfection (e.g. chlorination) and as such physical scrubbing is employed either by staff or by pool cleaning robots to control fouling. Additionally system temperatures are maintained at 26 °C, these elevated levels contribute to rapid biofilm development.

This report focusses upon an initial 21 day trial to evaluate the efficiency of an Ultra Q 4-Ways Ultrasound in its ability to control biofilm development in a seawater storage reservoir, in one of ABLP's nursery systems. The circular reservoir is 3.05m in diameter and constructed from HDPE. Water is continuously recirculated through the reservoir as part of the production process. The photo in Figure 1 was taken prior to the installation of the Ultra Q 4 Ways unit to give an indication of biofilm development at the onset of the trial.

Biofouling showed no initial response to the ultrasound installation during the first week. By the beginning of the second week sections of biofilm began to 'flake off' and after approximately 16 days, the reservoir was almost completely clean. Figure 2 shows the Ultra Q 4-Ways installed centrally within the reservoir, positioned mid-depth. This picture was taken after 21 days of ultrasound treatment. Physical cleaning of the reservoir was not necessary during the trial period. Under normal circumstances the tank would have been cleaned twice weekly.

On completion of the trial, the Ultra Q 4-Ways was removed and within 5 days biofilm began to re-establish, requiring the resumption of normal cleaning practices.



Figure 2: Biofilm Levels After 21 Days Continuous Ultrasound Treatment

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# RE: ALGAE-FREE ULTRASOUND HOLDING TANK TRIAL – REPORT 2

ABLP Ltd cultures Moreton Bay Bugs at its' marine production facility located at Chinderah NSW. The facility uses the latest in membrane filtration technology and indoor recirculation aquaculture systems to ensure stringent standards in water quality and temperature are maintained through the production process.

The extent of biofilm development in a culture system is closely related to the systems' feed input and management processes utilized to routinely remove the growth. ABLP's nursery systems are in continuous use which hinders the ability to employ routine disinfection processes (e.g. chlorination) and as such physical scrubbing is employed either by staff or by pool cleaning robots to control fouling. Additionally system temperatures are maintained at 26 °C, these warm conditions contribute to rapid biofilm development.



Figure 1: Initial Reservoir Biofilm (Day 0)



Figure 2: Biofilm Coverage Day 8

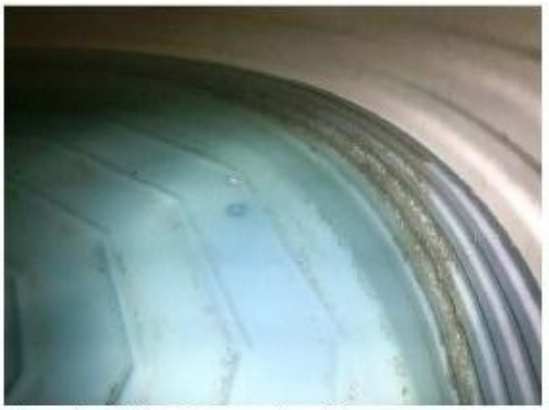


Figure 3: Biofilm Coverage Day 23



Figure 4: Biofilm Completely Removed (Day 29)

Following the first trial using the Algaefree Ultra Q 4-Ways Ultrasound (see Report 1) to control heterogeneous biofouling to one of ABPLs' nursery seawater storage reservoirs, the unit was transferred to a second nursery system with significant fouling dominated by calcareous sponges thought to be *Sycon ciliatum*. The floor and

lower wall of the 3.05m diameter HDPE reservoir is cleaned twice weekly using a robot pool cleaner. Biofouling is able to become established above the height (approx. 40cm) at which the robot cleaner can reach and has to be routinely removed by vigorous scrubbing using scourers. On day zero of the trial, the reservoir had not had the upper walls cleaned of biofouling for approximately 6 weeks.

There was no apparent change in appearance to the biofouling during the first week of continuous ultrasound treatment. During the second week the sponge began to fade in colour and within a few days more, small pieces began to flake off. Routine robot cleaning was continued to remove the settled material. By the third week, large bald patches were evident and the sponge appeared to be completely dead. On inspection of the dead sponge it was found to be easily removed by hand without the need of scourers. After 28 days the remaining sponge was completely removed as seen in Figure 4.

ABLP Ltd is extremely happy with the ultrasonic Algaefree results. When employed to control biofouling organisms in seawater reservoirs the Algaefree Ultra Q 4-Ways has proven to:

- Reduce labour requirements for system maintenance;
- Reduces biofouling organism loadings which diminishes potential for disease vectors;
- Removes the risk and cost associated with chemical usage;
- Provides operator safety as the ultrasound head is energized with extra low voltage power.