

Toxics Use Reduction Institute's Cleaning Lab
UMass Lowell
The Offices at Boott Mills West
126 John Street, Suite 14 (2nd Floor)
Lowell, MA 01852
978-934-3133

**Competition studies between the beneficial bacterial of Pollet SA biotechnology products and Healthcare-associated infections (HAI) bacteria
September 17, 2019**

Project Description

TURI was asked to perform competition studies between selected pathogenic bacterial strains and a beneficial *Bacillus* strain supplied by POLLET SA. Growth rates over the course of 96 hours were to be calculated for the pathogen alone, the pathogen plus a high concentration of *Bacillus* and the pathogen plus a low concentration of *Bacillus*.

Bacterial strains

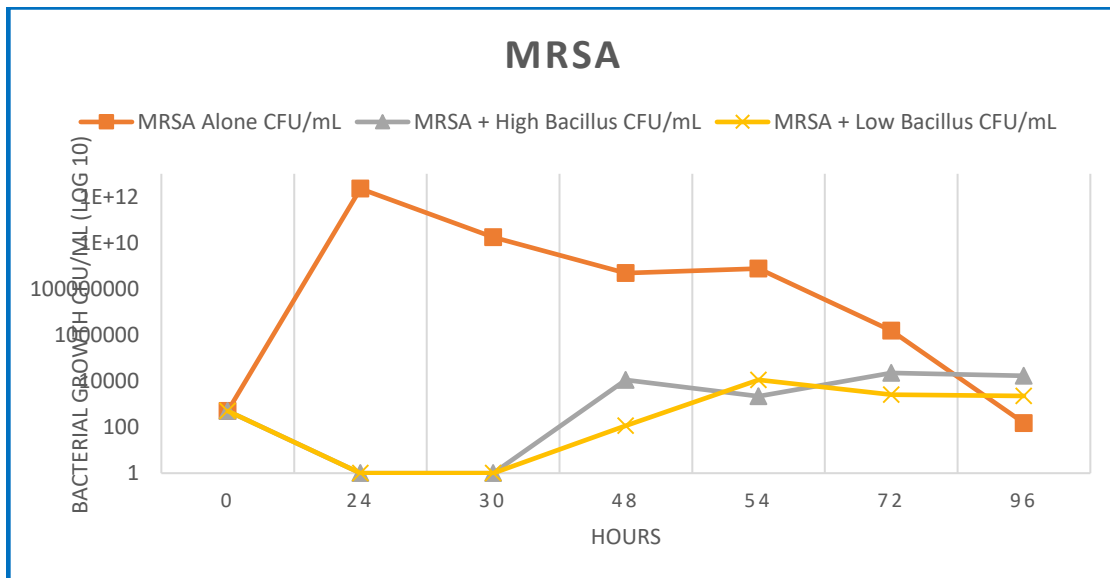
- Methicillin-resistant *S. aureus*
- *Escherichia coli*
- *Candida albicans*
- *Bacillus subtilis* – provided by Pollet SA

Time Points Sampled

- 24 hours
- 30 hours
- 48 hours
- 54 hours
- 72 hours
- 96 hours

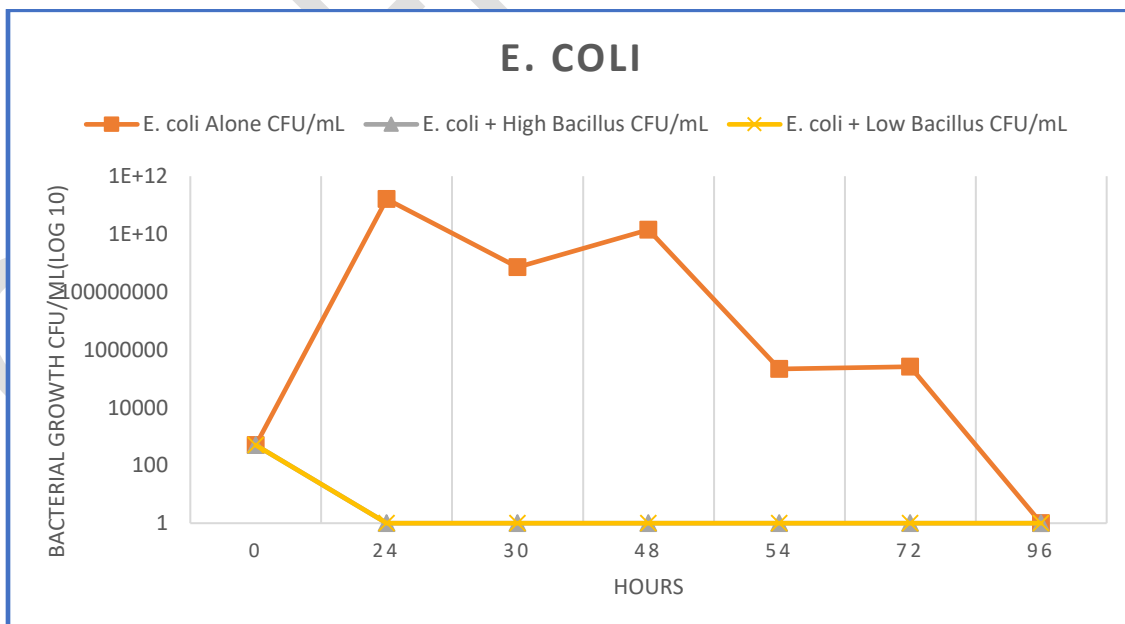
Results – MRSA

Figure 1. CFU/mL for MRSA alone and in the presence of high and low *Bacillus*.



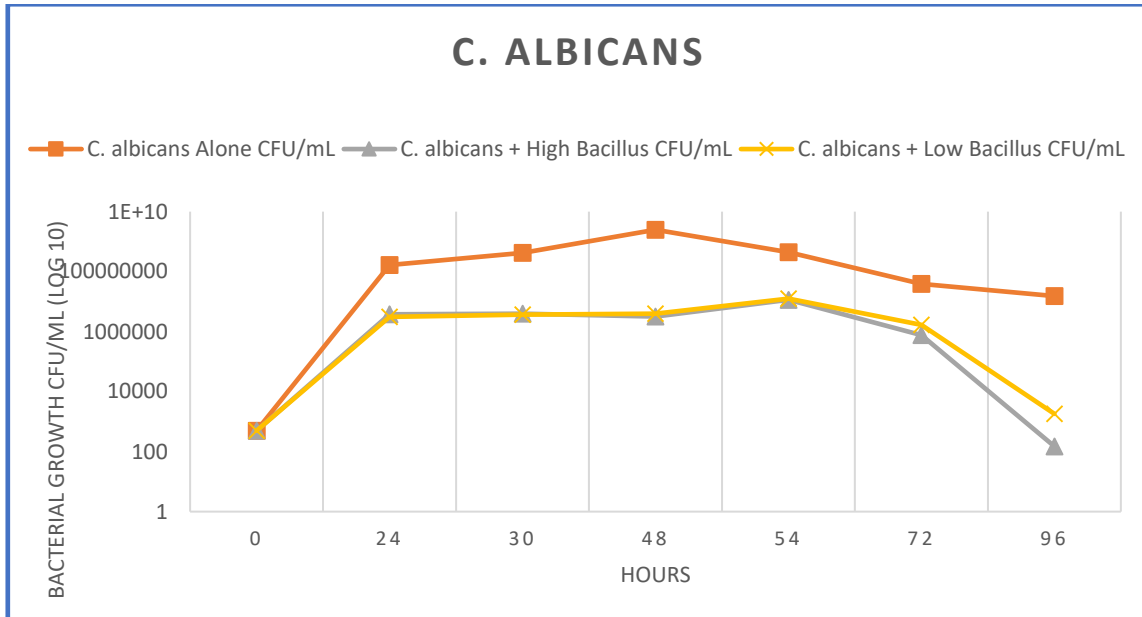
Results – *E. coli*

Figure 2. CFU/mL for *E. coli* alone and in the presence of high and low *Bacillus*.



Results – *C. albicans*

Figure 3. CFU/mL for *C. albicans* alone and in the presence of high and low *Bacillus*.



Conclusions

The bacterial strain provided by Pollet SA was effective at reducing growth of all three pathogens, MRSA, *E. coli*, and *C. albicans* under the co-culture conditions performed. MRSA growth in the presence of the *Bacillus* strain rebounded somewhat after 48 hours, but remained below the level of MRSA alone until 72 hours. *E. coli* was completely inhibited by the *Bacillus* strain for the entire length of the experiment (96 h). *Candida albicans* was also inhibited for the entire length of the experiment, although not to the level of *E. coli*.