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Analysis of alcohol-resistance phenomenon in opportunistic pathogens

The ongoing COVID-19 pandemic has introduced isopropanol to natural selection in the form of sanitizing products. Isopropanol resistance is now a trait that is beneficial to be selected for. This begs a question of whether or not there are some bacteria which are already growing resistant to isopropanol, and if we should be taking measures to combat antimicrobial resistance safety.

In this study the aim was to understand whether or not it is possible to grow an isopropanol-resistant bacterial strain. I grew five bacterial species in minimal media to show whether or not they have potential to show antibiotic resistance: *Escherichia coli* because it has also shown to be able to develop alcohol-resistance, *Staphylococcus epidermidis*, *Enterococcus faecalis*, since these bacteria commonly reside on hands are part of the resident flora; as well, I tested *Pseudomonas aeruginosa* and *Staphylococcus aureus* since they are also commonly found residing temporarily on the hand as transient flora.

All of these bacteria are also the most common causes of infection in the often sanitized environments, like hospitals and laboratories. After I grew them in minimal media, I exposed them to varying concentrations of isopropanol over a period of time using serial passage. The results were quite astounding as all of the bacteria proved it can get resistant to rising percentages of isopropanol at a reasonably quick rate. The Adaptation process was Minimal Inhibitory Concentration based, which determined the next serial passage point. At the end of the experiment two bacteria showed an MIC: *E. coli* at 50% and *S. epidermidis* at 55%. The rest adapted so well, that at the end of the experiment there was no MIC to report. The last concentrations of reported growth for the other bacteria are as follows: *S. aureus* at 60%, *P. aeruginosa* at 50% and *E. faecalis* at 50%.

The experiment took place in the Biosafety Level 2 lab provided by Concordia University of Edmonton.

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