# Lead Ion Biosorption with Candida albicans, Escherichia coli, and Saccharomyces cerevisiae via Engineered Bio-Sand Filters as a Method for Pollution Remediation

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The purpose of this experiment is to test if Saccharomyces cerevisiae, Escherichia coli, and Candida albicans can biosorp lead, which is currently one of the most problematic heavy metals that creates toxicity water. This experiment will show if Saccharomyces cerevisiae, Escherichia coli, and Candida albicans can biosorp lead ions and neutralize the solutions to a pH that is closer to water. Also, this experiment will test a self-engineered bio-sand filter, for its viability in removing lead ions from water. Research, prior to experimentation predicts that, the use Saccharomyces cerevisiae, Escherichia coli, and Candida albicans will remove lead ions from greatest to least, respectively. However, this hypothesis was incorrect due to the Candida albicans biosorption, which caused lead nitrate to become more neutral than Saccharomyces cerevisiae and Escherichia coli. The final result was that the pH of lead nitrate, after being filtered through Candida albicans was 4.62, while that of Saccharomyces cerevisiae was 4.60 and Escherichia coli was 4.44. This shows that Candida albicans can biosorp lead ions from aqueous solutions slightly better than Saccharomyces cerevisiae and Escherichia coli. After further statistical analysis, (the ANOVA Statistical Test), it can be concluded that the type of biomass (Saccharomyces cerevisiae, Escherichia coli, and Candida albicans) does not directly cause an increase in the pH due to its statistical P value which is 0.806371981. Therefore, the type of biomass does not affect biosorption, rather the presence of the biomass. It can also be concluded that the bio-sand filter works alone to create an increase in pH, but that the increase is substantially greater when accompanied by biomasses.

**Awards Won:**