

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 biosorb 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 biosorb 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 biosorb 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.

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