The Effects of an MOF on Wastewater Treatment When Combined With a Bioreactor

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By creating an HKUST-1 MOF, composed of the chemicals Copper (II) Nitrate Trihydrate and 1,3,5-benzenetricarboxylic acid, and implementing it inside the bioreactor, this experiment will test whether the addition of the MOF will produce clearer water or if it will make any sort of difference. A sample of the wastewater underwent a spectrophotometry test to ensure a baseline. Then, a sample of water taken after a regular bioreactor test will be analyzed with the same test. Finally, a sample of water will be taken where the MOF will have been dissolved into the wastewater and then put into the bioreactor, and it will also be run through the same tests. This data was run through an ANOVA and TukeyHSD test to prove statistical significance. The results from the TukeyHSD showed that the mean of the transmittance, absorption, and concentration values in the MOF-bioreactor treatment samples were vastly improved over the untreated wastewater, the MOF, and the bioreactor treatment samples. This means that only the combination of the MOF-bioreactor was able to provide significantly different results, not the bioreactor or the MOF by itself. The combination of the MOF-bioreactor provided a lower turbidity and fewer solid particles within its water samples than the other treatment methods, but that doesn't necessarily mean that the water was "cleaner".

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