Carbonized Biofilms as a Green, Affordable Material for Water Purification and Pollutant Removal

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The need for an effective, renewable water filter is greater than ever. One solution to this is novel carbon materials, with a potential source of these materials being cyanobacteria. Cyanobacteria make microbial mats that have the potential to take over entire lakes and if this accessibility could be cultivated, many lives could be changed for the better. In this project, cyanobacteria was cultivated 2 weeks and 2 days respectively with a flax fiber base. Following culturing, samples were lyophilized and carbonized at 700C for 1 hr. Samples were then introduced to 50 mg/L of methylene blue in water. While running these trials, the researcher noticed fibers of the samples in the cuvettes that were being used for the spectrophotometer which prompted a second trial. In the second trial, the samples were submerged in 10 mg/L. In the second trial, the sample that was most efficient was Anabaena 1 which adsorbed 50 mg/g of sample while the sample that adsorbed the least was Mix 2 which adsorbed 6.25 mg/g. After observation of the first trial, it's clear that microfibers from the samples were disrupting spectrophotometry in the cuvettes. The second trial implemented syringe filters to bypass this. One explanation as to why Anabaena 1 adsorbed most efficiently is Anabaena has nitrogen-fixing abilities which may have led to a bio-doping of nitrogen on the activated carbon surface.

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