Unlocking the Untapped Potential of Microalgae Harvesting Through Foam Flotation

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As the potential of microalgae as a resource becomes increasingly recognized, this study explored foam flotation as a means to extract it from an aqueous environment. A small-scale column flotation system was constructed using pipes, stoppers, and an air pump to simulate the extraction process. Algae were first cultivated in a controlled environment, and then a small sample was mixed with CTAB surfactant solution, which was chosen for its established superior harvesting potential, as supported by previous studies. This new solution was placed in the column, where the air stone was used to extract the surfactant while keeping algae attached. A UV-Vis Spectrometer was used before and after to measure the absorbance of light at a certain wavelength in the algae and the remaining liquid, providing an estimate of the biomass extracted. Experimental conditions were standardized to minimize variables, aiming to ensure consistency. Additionally, two separately grown cultures of algae were used to demonstrate reliability. Over six separate tests, a mean of 86.65% of microalgae was extracted from the solution. These results demonstrate that foam flotation is a significantly more efficient method of microalgae harvesting than the widely-used method of filtration, which currently yields 40-85% of microalgae extracted. Foam flotation offers more uniform results while avoiding problems associated with filtration such as clogging or fouling. This suggests that foam flotation is a very strong means to harvest microalgae, offering very promising alternative to traditional harvesting methods, with applications in biofuel production and wastewater treatment.

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