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Regeneration of amine solution using microalgae for absorption

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The removal of CO_2 for natural gas sweetening or flue gas treatments is most commonly done through absorption using aqueous amine solutions, due to their high capturing efficiency. However, the high energy demand of the stripping step, conventionally used to regenerate the solvents, after the absorption process is completed, remains the main challenge facing the overall absorption process. The high energy requirements in the regeneration raises the energy penalty of CO_2 capture by amine solvents in a fossil fuel power plant to about 23–30% of the energy output. In this work, the ability of microalgae to regenerate amine solutions saturated with CO_2 has been tested, with a far lower energy requirements. In addition, the harvested microalgae can be readily used to produce valuable products, such as lipids, proteins, and pigments. Two strains of microalgae (*Chlorella sp.* and *Pseudochlorococcum sp.*) and two amine solutions (10% DEA and 10% MEA) were investigated at different light intensities. The microalgae growth rate and the drop in dissolved CO_2 concentrations were monitored. Both strained behaved better in MEA solution, compared to DEA. With faster regeneration achieved using *Pseudochlorococcum sp*. The increased light intensity had a negative effect on the performance.

Biography

Sulaiman Al-Zuhair is a Professor and Coordinator of the MSc Program in the Chemical Engineering Department at UAE University. He earned a PhD in Biochemical Engineering from the University of Malaya (2003). Before joining UAE University, he held the position of Assistant Professor at the University of Nottingham, Malaysia campus. He published 1 book, 54 journal papers, 2 patents and 2 book chapters. Majority of his research work is on the uses of enzymes in various industrial applications. He has been serving as an Editorial Board Member of several reputable journals.

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