

Indirect membrane-based bubbling as an alternative technique to increase the carbonation of microalgal media

Abstract

This work discusses an indirect membrane-based bubbling technique and operating conditions for using membranes for high carbonation efficiency and microalgae productivity. The technique resulted in 82% carbonation efficiency compared to 42% and 29% using a direct membrane-based bubbling and direct bubbling without using a membrane, respectively. The indirect membrane-based bubbling resulted in microalgae productivity that was approximately 10% higher than the typically accepted technique, prevented cell collection from fouling the membrane, and increased microalgae capacity to capture and use CO₂ for photosynthesis. This technique has significance not only for CO₂ mitigation progress but also for the biomass production of microalgae. This technique also decreases the amount of CO₂ that escapes into the bioreactor headspace and atmosphere during carbonation. can be a win-win situation for the local community and the forests in the long run.