Correlation study of microalgae carbonation in membrane integrated photobioreactor

Abstract

Microalgae ability to utilise CO_2 higher compared to terrestrial plant making it suitable for biomass production and as CO_2 utiliser. This could be one of many ways to preserve a safer and healthier environment with less air pollutant. For study purposes, CO_2 usually transported to microalgae culture broth with the aid of membrane technology to prevent formation of large bubble and to accelerate the carbonation of microalgal media. However, membrane susceptible to accumulation of CO_2, which can cause extreme acidic to microalgal media. This prevents microalgae to assimilate CO_2. Thus, this study proposes correlations to prevent the extreme acidic: which represents the relationship of: (1) CO_2 inlet and accumulation, (2) CO_2 inlet and CO_2 at the membrane-liquid interphase and (3) CO_2 inlet and CO2 solubility in the media. The correlations were successfully validated with a deviation of less than 20% compared to the theoretical value.