Defatted Algal Biomass as Feedstock for Short Chain Carboxylic Acids and Biohydrogen Production in the Biorefinery Format

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Abstract

The objective of the study was to evaluate the potential application of defatted algal biomass (DAB) as a resource for biobased product synthesis in the biorefinery framework. Acid-catalyzed pretreatment of DAB resulted in higher reducing sugars (RS) solubilization (0.26 g RS/g DAB) than corresponding base method (0.19 g RS/g DAB). Subsequently, resulting RS were acidogenically fermented for the production of Bio-H_2 and short chain carboxylic acids (SCA) at varying redox conditions (pH: 6, 7 and 10). Biosystem with pH-6 resulted in higher SCA (0.54 g SCA/g RS) and Bio-H_2 production (0.83 l) followed by pH-10 (0.43 g SCA/g RS, 0.71 l) and pH-7 (0.27 g SCA/g RS, 0.48 l). Higher SCA production in pH-6 system resulted in maximum acidification (23%). Algal biomass majorly derived from CO_2 and its residues after lipids extraction accounted as major feedstock for acidogenic product synthesis, thus offers sustainability to algal refineries on its entirity use.

Keywords: *Algal Biomass, Short chain carboxylic Acids, Reducing Sugars, Acidification, Fermentation, Acetic Acid*