

Effect of Seaweed Physical Condition for Biogas Production in an Anaerobic Digester

Abstract

The increasing demand for environmental protection and renewable energy has made bioenergy technologies such as anaerobic digestion substantially attractive. The main objective of this study is to determine the biogas yield from the raw seaweed *Eucheuma cottonii* and waste products using anaerobic digestion, operated under different physical conditions. Seaweeds comprise of a thallus (leaf like) and sometimes a stem and a foot (holdfast). Seaweed has the potential to be developed into the raw and waste material for biogas due to higher growth rates, greater production yields, and higher carbon fixation rates than land crops. Seaweed has 4–39% carbohydrate content and a high moisture content with low lignin compared to other terrestrial plants, thus it is simpler to be degraded. The integration of the findings may be the key to make seaweed waste product that is more efficient and affordable to serve as a sustainable and renewable energy source. The study used 1.5 L anaerobic digesters for fresh and 3-month-old *Eucheuma* sp. evaluated at different stages by monitoring the pH, chemical oxygen demand, and biogas production. The study found that within 18 days, the anaerobic digestion of *E. cottonii* seaweed yielded 0.4–1 ml biogas/g seaweed with up to 56% methane content.