

Microalgae grown on swine wastewater as a biofuel feedstock

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Current biofuel production relies on limited arable lands on the earth to supply feedstocks of starch, sugar and vegetable oil, making it impossible to meet the global biofuel demands and the US government's target for biofuel production without disrupting food production. Algae are promising second generation biofuel feedstocks that offer many potential technical and economic advantages. Algae can potentially produce 1,000-4,000 gallons of oil/acre/yr which is significantly higher than soybeans (48 gallons of oil/acre/yr for soybean) and other oil crops. Algae can use and sequester CO₂ from many sources and may be processed into a broad spectrum of products including biodiesel, green diesel and gasoline replacements, bioethanol, methane, heat, bio-oil and biochar (fertilizers), high protein animal feed and biomaterials, etc. Some algal strains offer excellent potential for algal oil production as well as treatment of wastewater by reduction of nitrate, phosphate and organic matter in the wastewater.

A swine wastewater contains highest amount of ammonia nitrogen and active phosphorus, which could be a suitable growth medium for microalgae. Therefore, the goal of this research is to develop fast growing microalgae strains to assimilate nutrients in wastewater for swine wastewater treatment and bioenergy production. Following algae strains: *Chlamydomonas reinhardtii*, *Chlorella vulgaris*, *Scenedesmus dimorphus*, and *Neochloris oleoabundans* were grown in the swine wastewater. The growth environment of microalgae was optimized, and the microalgae growth kinetics was determined.

Biography

Bo Zhang is the Research Scientist of Biological Engineering Program in the Department of Natural Resources and Environmental Design at North Carolina A&T State University, USA. He earned his Ph.D. at the prestigious Department of Chemical Engineering and Materials Science of University of Minnesota. He has published over 20 peer-reviewed research articles in internationally renowned journals and 7 academic book chapters, and has one patent granted in China and one pending patent in the U.S. He is the Editor of Journal of Petroleum & Environmental Biotechnology. He also reviews articles for more than 10 professional journals regularly. He is invited to judge proposals by United State Department of Agriculture (USDA). He is the senior member of American Institute of Chemical Engineers (AIChE), full member of the selective Sigma Xi, The Scientific Research Society, and full member of American Chemical Society (ACS).

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