J Fundam Renewable Energy Appl 2017, 7:3(Suppl)
http://dx.doi.org/10.4172/2090-4541-C1-027

Cultivation of marine microalga *Nannochloropsis gaditana* under various temperatures and nitrogen sources: Effect on the growth and lipid content

Asfouri N, Djalt S, Maroc F, Zelal A, Lamara S A C, Bab Hamed M B and **Abi-Ayad S M E A**
University of Oran, Algeria

Microalgae based biofuels are getting attention due to energy crisis and environmental protection. There is potential to increase yields by manipulating environmental factors, which cause stress for microalgae and induce maximum accumulation of lipids. Sources of stress include manipulating environmental conditions such as salinity, pH, temperature, and nutrients. Among 30 microalgae, *Nannochloropsis gaditana* was identified to have the highest biomass and lipid productivity. These are marine microalgae that are tolerant to a large range of environmental conditions. In the present study, *Nannochloropsis gaditana* was cultivated in F2 guillard medium at batch mode over 12 days. Here, we observe how various nitrogen treatments and temperatures can impact the growth and lipid accumulation on this species. We used five different nitrogen treatments; ammonium chloride (NH_4Cl), ammonium hydroxide (NH_4OH), sodium nitrate ($NaNO_3$), urea (CH_4N_2O), a mixture of all these sources and three different temperatures (20°C, 25°C, 30°C). The highest biomass growth was found (0.307d-1) in ammonium chloride treatment. However, the results showed that under 30°C Nannochloropsis gaditana were found to grow favorably with a maximum growth rate 0.197d-1. The lipid content was examined using Bligh and Dyer method and found better in CH_4N_2O nitrogen source (47.67%). Among all the temperatures, the maximum lipid content (35.79%) was found in the case of 30°C. Our results suggest that tradeoffs between growth and lipid yields as well as culture success can ultimately decide what nitrogen sources to use. We advocate an approach that provides multiple sources of microalgae available nitrogen which may alter assimilation rates and ultimately microalgae's physiological responses.

asfouri.n@gmail.com

Impacts of climate change on life cycle greenhouse gas (GHG) emission savings of advanced bioenergy systems

Nasir Anka Garba[1] and **Les John Duckers**[2]
[1]Federal University Gusau, Nigeria
[2]Coventry University, UK

This paper assessed the potential impacts of climate change on life cycle Greenhouse Gas (GHG) emission savings of advanced bioenergy systems from corn and soybean. The methodology was underpinned by life cycle thinking. Climate change projections coupled with Cropping System Modelling (CSM) were linked to Life Cycle Assessment (LCA) modelling. Projected changes in crop yield were calculated using the DSSAT-CSM model with observed climate data for the baseline 1981-1990 period and projected climate change scenarios. The life cycle GHG emission savings was calculated using GaBi 4 LCA software according to the ISO 14044 standard. Results indicated that under the baseline (1981-1990) scenario, Corn Integrated Bioenergy (CIBE) and Soybean Integrated Bioenergy (SIBE) could save-10996.7 kg CO_2-equivalent ha-1 and -1350.04 kg CO_2-equivalent ha-1 respectively, of the total life cycle GHG emissions of CO_2, CH4, and N_2O for the production and utilization of an energetically equivalent amount of fossil-based fuel counterpart, which they displaced. However, model predictions showed that the responses of corn and soybean to simultaneous changes in T, P, and [CO_2] were different under different climate change scenarios. In the future period, life cycle GHG emissions savings of CIBE was predicted to decline in all cases ranging from -1.6% to -33.4% compared with the baseline (1981-1990) period. On the other hand, the life cycle GHG emission savings of SIBE was predicted to increase by +0.1% to +31.6% under some climate change scenarios (e.g., [CO_2]=680; P=+20%; and T=+1.5°C scenario) and also decline by -0.1% to -82.6% climate change scenarios (e.g., [CO_2]=400; P=-20% and T=+5°C scenario). This revealed that the potential impacts of climate change on energy crops productivity and net life cycle GHG emissions savings could be very large and diverse.

nasiranka@yahoo.com