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Evaluation of processed, de-oiled clean algal biomass as a biofertilizer

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Although synthetic fertilizers boost crop production, increasingly aggressive use has led to environmental problems and ironically, diminished crop yields. In response, sustainable biofertilizers have become an increasingly popular option. UT has developed a process to de-oil algal biomass to produce clean algal biomass. Our algal biofertilizer pilot study assesses the effects of processed *Chlorella sp*. biomass on soil health and the growth kinetics and yield of Bermuda grass.

Methods: *Chlorella sp*. were cultured in vertical bioreactors using nutrients from a waste stream. The processed algal biomass was analyzed for percentage nitrogen, phosphorus, potassium (N:P:K) and trace elements. 1/8th acre plots of loamy soil were treated monthly with increasing concentrations (50 – 200 mg/L) of processed algae, or the same concentration of commercial fertilizer, and then seeded with Bermuda grass. Grass density, soil nutrient (NPK), and microbial content were assessed and compared to untreated control plots over a 6-month period.

Results: The NPK of the processed *Chlorella sp*. biomass was 1:0.4:0.4, with trace elements in concentrations comparable to the commercial fertilizer. Both the commercial and algal fertilizers caused rapid germination and improved grass density compared to untreated controls. The algal biofertilizer, however, further improved microbial activity of the soil, indicating improved soil health compared to the commercial fertilizer plots.

Conclusions: The processed *Chlorella sp*. biomass generated for this study increased grass density comparable to that of the commercial fertilizer and improves soil health over the commercial fertilizer. Algal biomass generated by different processing streams or growth conditions will require further investigation.

Biography

Rhykka Connelly completed her Ph.D at Northern Illinois University in Cell Biology and postdoctoral studies at The University of Texas. She is the Technical Director of the University of Texas Algae Science and Technology Facility located in the heart of Austin, TX. She has published more than 15 papers in reputed journals and is an inventor on more than 12 patents, including “Organic fertilizer derived from processed algal biomass”.

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