MONTANA STATE UNIVERSITY
NORM ASBJORNSON College of ENGINEERING

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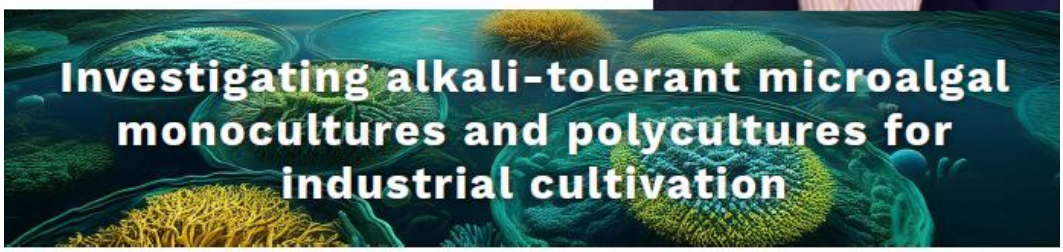
Charles Holcomb
M.S. Thesis Defense

PI: Dr. Robin Gerlach



Abstract:
The use of algae to create high value products from the biomass grown is not a novel idea. However, problems with culture stability, productivity, and resource costs have limited the large-scale production of algae. The ability for growth in alkaline conditions allows for stability of the culture's pH and a more efficient capture of atmospheric CO2. This thesis explores the use of high pH and high alkalinity tolerant algal strains both as monocultures and in polyculture combinations to produce lipids and other high value products. The algae used were a green alga (strain ALgE), a cyanobacterium (blue-green 'alga', strain SLcyaH) and a diatom (strain SLdC) that were isolated from a Soda Lake chain near Spokane, WA. The monocultures, two-member cocultures, and the three-member polyculture were compared for their product spectrum and productivity rates. While not as productive as monocultures, algal polycultures incorporating the diatom SLdC produced similar amounts of lipids (4.23*10-2 ± 1.84*10-2 grams of lipids per liter per day) and biomass (0.357±3.85*10-2 grams of biomass per liter per day) while having lower input costs due to the lower amount of silica used in the media. Polycultures may also have the benefit of providing better resistance to culture crashes and the ability to control the product spectrum through promoting a dominant organism.

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Center for Biofilm Engineering
366 Barnard Hall
P.O. Box 173980
Bozeman, MT 59717-3980

www.biofilm.montana.edu

Tel 406-994-4770
Fax 406-994-6098
cbeinfo@biofilm.montana.edu

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