Maxwell Moran: Land Resources & Environmental Sciences
Mentor: Rich Macur, Mark Kozubal -- Center for Biofilm Engineering, Land Resources & Environmental Sciences
Biofuel Production Using an Acidophilic Fungus

Novel strain MK7, an acidophilic fungus isolated from a geothermal spring in Yellowstone National Park, shows significant potential for use in the biofuels industry. Experiments, funded through the USP program, have shown that it can produce biofuels and biofuel precursors from lignocellulosic materials, glycerol and waste algal biomass. Under aerobic conditions, MK7 produces intercellular lipids that can be converted into biodiesel. Under microaerophilic or anoxic conditions, ethanol and hydrogen can be produced. One of the most notable features of MK7 is its ability to grow under extremely acidic conditions (pH range: 0.6 - 6.5). Consequently, strain MK7 can grow on acid pretreated substrates such as wheat straw without the need for pH neutralization. Cellulose is the primary molecule targeted for biofuels production and acid pretreatment is commonly used to degrade lignin and hemicellulose and release cellulose from lignocellulosic materials. Strain MK7 neutralizes the pH during growth on acidified substrates. This ability to neutralize pH makes strain MK7 valuable to the biofuels industry since the addition of pH buffering salts is costly and creates significant downstream water quality problems. These attributes suggest that the extremely acidophilic fungal strain MK7 has the potential to become an important player in the
biofuel industry.