1.) Grad student John Roesgen examines algae at the UNM Biology lab; 2.) Students at NMSU set up algal-based wastewater treatment system; 3.) Outdoor algae cultivation beds at ENMU

BIOALGAL ENERGY

Algal biomass has the potential to contribute significantly to new renewable fuel standards if solutions can be found for several biological and techno-economic problems. For large scale, outdoor production of algal biomass, supplying light, CO_2 and nutrients introduce their own unique issues. *Energize New Mexico*'s Bioalgal Energy component is looking for solutions that make use of non-traditional organisms and non-potable water in order to generate knowledge about algal biology and scaling biofuels production from cells to large reactors.

Several findings resulted from Year 2 research. At UNM, the team is pursuing novel ways to culture cells while maintaining photosynthetic function. The team found thinner gels are better at maintaining photosynthetic function of encapsulated living algae cells, and that encapsulated polycultures of alga and bacterium generate electricity better than monocultures of each and liquid polycultures.

The NMSU team demonstrated regrowth of liquid-phase *Galdieria sulphuraria* after hydro-thermal liquefaction processing (HTL). HTL converts algae into a liquid biofuel that can be used directly as energy or as materials to help fuel wastewater decontamination and utilization. *G. sulphuraria* also demonstrated removal of contaminants and a decrease in quantity of oxygen used by microorganisms in primary-settled wastewater. Based on these findings, the NMSU bioalgal team recently completed deployment of an algal-based wastewater treatment system for pilot-scale demonstration at the Las Cruces Wastewater Treatment Facility, providing new research opportunities for other faculty and students at NMSU, UNM and ENMU, under EPSCoR support.