



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003AZ15B

Title: Selection of High Performance Microalgae for Bioremediation of Nitrate-Contaminated Groundwater

Project Type: Research

Focus Categories: Nitrate Contamination, Groundwater, Treatment

Keywords: Nitrate Contamination, drinking water source, algae, biological treatment, public health

Start Date: 03/01/2003

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Matching Funds: \$49624.00

Congressional District: 1st

Principal Investigators: Hu, Qiang; Sommerfeld, Milton

Abstract: We propose to advance the concept to develop a large-scale engineered microalgal nitrate-stripping system for groundwater nitrate removal. Since nitrate can be effectively taken up by photosynthetic cyanobacteria and microalgae, which require mostly nitrate, inorganic carbon, and light for growth, the use of photosynthetic organisms would minimize the need of chemicals and energy from fossil fuels for nitrate removal. Since an engineered microalgal bioreactor may sustain continuous cultures of a high cell density of desirable organisms, large quantities of raw water can be stripped of nitrate within a short period of time (Hu et al. 1996; 1998). Moreover, since the nitrate is converted mainly into cell proteins, pigments and vitamins, the algal biomass from the treated water may be used as animal feed, bio-fertilizers, and soil-stabilizers. Therefore, an engineered microalgal nitrate-stripping biotechnology has the potential to become a long-term, environmentally safe, and cost-effective approach for large-scale nitrate removal from contaminated groundwater in Arizona.

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