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## ABSTRACT SUMMARY

### Author information

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### Title, content, keywords, and sessions

**Title:** Pulsed Electric Fields for Algae Predator Control in Open Ponds

**Body:** Pulsed Electric Field (PEF) treatment of algae predators appears to be a cost effective, chemical-free approach, which can be continuously applied to algae ponds without damage to the microalgae itself. PEF processing uses short, high voltage electrical pulses to disrupt cell membranes. The difference in size and structure of typical predators, when compared to algae cells, provides a treatment window where the predators are killed without impacting the algae. Our objective is to demonstrate PEF processing as a low-cost, chemical-free method for microalgae crop protection, and to determine the cost and effectiveness of this approach in open-pond raceways. Diversified Technologies, Inc. (DTI), in cooperation with the Arizona Center for Algae Technology and Innovation (AzCATI) at Arizona State University (ASU), is in the second year of our investigation into the application of PEF for predator control in algae cultivation. In our initial testing, naturally occurring contaminated cultures were PEF-processed in the laboratory under a range of conditions. Our results indicated that PEF treatment successfully killed rotifers, ciliates, amoeba and *Poterochromonas*, at field strengths that were non-lethal to algae strains, including *Chlorella vulgaris*. In early 2019, DTI installed a PEF system at AzCATI for long term assessment of its ability to control predators in open ponds in both continuous and intermittent applications. This system will be operated alongside non-treated ponds, under the same conditions, to assess the effectiveness of the PEF predator control. Microorganism predators are responsible for crop losses up to 30% in open pond systems, representing a huge cost for commercial algae growers. Existing crop protection methods, such as chemical treatment, are expensive, and can be difficult to apply without damaging the algae or downstream products. The operation of PEF units on pre-commercial scale, open-raceway ponds at AzCATI will allow us to collect long-term data on the costs and effectiveness of PEF predator control in real-world conditions, and provide a basis for scaling to larger ponds. This effort is funded by USDA NIFA Phase II SBIR Grant 2017-33610-27016.

**Keywords:** algae; predator; pulser; cultivation.

**Session(s):**

Symposium on Bio and Food Electrotechnologies (BFE) [special]

### Classification

Subject area	Topic	
Environmental applications	Microalgae treatment	✓
Pulsed-power devices, facilities and apparatus for Plasma and PEF treatment	Generator concepts, PEF modulators	✓
Technology	PEF treatment	✓

### Other data

Inquiry	Opted for
Please indicate your preferred type of presentation	Oral
If selected for Poster, willingness to participate in interactive poster session	Yes
Applying for Student / Early Career Investigator Award Note: Early Career Investigators must be either under the age of 35 or within 5 years of receiving their doctoral degree (i.e. M.D., Ph.D., etc.) and working in the field of electroporation and pulsed electric fields in biology, medicine and food & environmental technologies.	No
Invitation letter for Visa required (presenting author)	No