ALBERTA INNOVATES

# AGRICULTURE & ENVIRONMENT

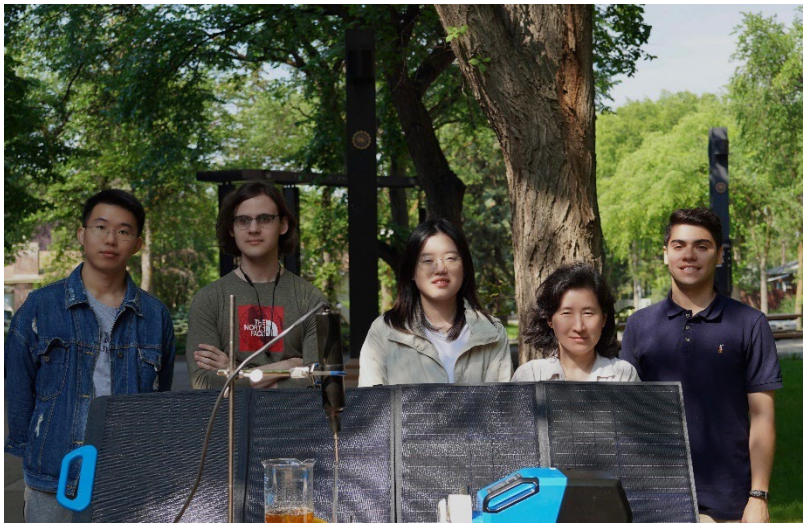
ENVIRONMENTAL INNOVATION

WATER INNOVATION

## Microbubble-Enhanced Cold Plasma Activation (MB-CPA) for Treatment of Wastewater From Food Processing

There is a large demand for a sustainable, low-cost and scalable technology that can effectively treat food processing wastewater for recycling. One promising technology for treating this wastewater is cold plasma activation, which generates active species using electricity, and air. Cold plasma activation has been shown to effectively treat a wide range of microorganisms, including stubborn organic contaminants in water.

The goal of this project is to develop a scalable, microbubble-enhanced cold plasma activation (MB-CPA) technology for treatment of wastewater from slaughterhouse and food processing facilities.



### FUNDING DETAILS

**RECIPIENT:**
Dr. Xuehua Zhang, University of Alberta

**PARTNERS:**
Disruptive Separation Tech, PlasmaLeap Tech, FreshPal Farms, Ying Fat Foods, VNFI, Sofina Foods, Scotford Colony Poultry Products, NSERC

**TOTAL BUDGET:**
$1,203,500

**AI FUNDING:**
$597,000

**PROJECT DATES:**
JUL 2023 – JUN 2026

**PROJECT TRL:**
Start: 4
End: 7

## APPLICATION

Initial application of the technology is targeted at the food processing industry in Alberta to treat and potentially recycle the facility wastewater streams. The technology could be applied to other industrial and municipal waters where organics, recalcitrant chemicals, and residues of pharmaceuticals and personal care products are a concern.

ALBERTA INNOVATES

# AGRICULTURE & ENVIRONMENT

## ENVIRONMENTAL INNOVATION

### WATER INNOVATION

## PROJECT GOALS

The main objective of the research program is to develop microbubble-enhanced cold plasma activation (MB-CPA) as a sustainable technology for wastewater treatment in food processing industry. The project will address the current challenge in scalability and advance the technology from the current lab scale (TRL 4) to prototype demonstration in an operational environment (TRL 7).

## BENEFITS TO ALBERTA

The developed technology has the potential to create the following benefits:

- Improved quality of water discharged to municipal sewers and/or the environment.
- Reduced water consumption through water recycling and reuse.
- Reduced wastewater disposal fees/reduced water treatment costs for food processors.
- Reduced energy (and GHG emissions) for wastewater treatment.
- Job creation from commercialization of a new product.
- Potential for global exports.
- Potential to treat challenging contaminants such as residues of pharmaceuticals and personal care products, and perfluorochemicals.
- Development of highly qualified and skilled personnel.

**24 Publications**

**8 Students Trained**

**2 Patents**

**2 Project Jobs**

**~100 Future Jobs**

**2 New Products/Services**

**~4 kt/yr Future GHGs Reduced**

## CURRENT STATUS

**AUG 2024**

Work completed to date: Determination of physiochemical properties of wastewater to be treated by MB-CPA, evaluation of efficiency and energy yield of pathogen elimination and pollutant degradation under different activation conditions, optimization of cavitation tubes design to achieve more stable activation, and evaluation of MB-CPA using two different discharge electrodes. Three research articles have been published thus far, with one more manuscript submitted and one in preparation.