

Liquid-phase Electrical Discharge Plasmas for Inactivation of Pathogens and Spoilage Organisms in Fruit Juices and Milk

The electrical discharge plasma process has the potential to inhibit food spoilage and increase liquid food shelf life thereby reducing food waste and preventing the formation of greenhouse gases.

Keywords: electrical discharge, fruit juice, pathogens, plasma

Process Implementation Readiness



Background and Technology Description

The U.S. wastes 40% of all edible food at a value of \$165 billion per year. When disposed down drains, it increases organic loads to wastewater treatment facilities, demands further energy for treatment, and produces greenhouse gas emissions. Thermal processing techniques, which include pasteurization, are very effective in reducing the microbial load in a variety of liquid foods. However, the treatment negatively affects the organoleptic and nutritive properties of the treated food and is unable to inactivate heat-resistant microorganisms. Electrical discharge plasmas are less energy intensive and as effective as UV sterilization and pasteurization. An electrical discharge between two metal electrodes immersed in or placed above an aqueous medium is a technology that generates a plasma and results in the formation of strong electric fields, short-lived active radicals, electrons, ozone, hydrogen peroxide, charged particles, shockwaves, and the emission of UV light all of which inactivate microorganisms.

Technology Benefits and Value

- Improved preservation technologies can reduce food waste and burden to landfills
- Food preservation can prevent extraneous resource utilization on the production side (energy and water), and reduce environmental

impacts associated with waste food management

- Plasma technologies are less energy intensive than traditional preservation techniques like pasteurization



Target Customers

Fruit juice, baby food, dairy manufacturers as well as water bottling companies.

Intellectual Property

This technology is currently not under patent.

Opportunity

NYSP2I and Clarkson are interested in working with qualified parties for continued technology and product development.

Dr. Eugene Park, Assistant Technical Director www.nysp2i.org 585.475.2512