NASA SBIR/STTR Technologies
Proposal No. X14.02-9524
Non-Thermal Sanitation by Atmospheric Pressure Plasma

PI: Ross W. Remiker
Orbital Technologies Corporation, Madison WI

Identification and Significance of Innovation

Non-thermal Sanitation by Atmospheric Pressure Plasma (NTSAPP) uses non-thermal, atmospheric pressure plasma to produce reactive oxidizing species to sanitize fresh fruits and vegetables.

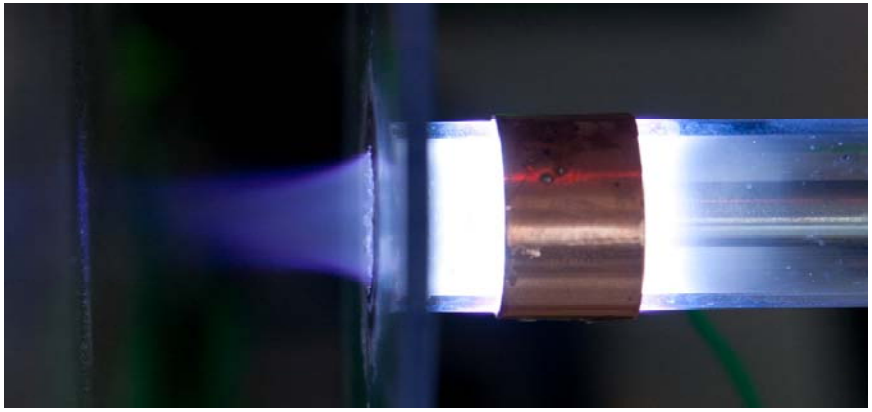
NTSAPP sanitizes fresh fruits and vegetables without the use of consumable chemicals; so there is no residue from treatment and food taste is not affected.

NTSAPP sanitizes fresh fruits and vegetables without significantly raising the temperature of the food; so food taste and quality are not affected.

The technology can function in reduced gravity and pressure environments, and is efficient in terms of mass, volume, waste, and resource use.

NTSAPP technology could also sanitize working surfaces and instruments.

Expected TRL Range at the beginning / end of Contract : 2 / 4



Technical Objectives and Work Plan

Objective

To design and test two SAPP concepts, and to determine the feasability of non-thermal sanitation of contaminated foods and surfaces by atmospheric pressure plasma.

Work Plan

1. Establish system level sanitation requirements for space exploration applications and develop protocols that will be used for testing NTSAPP.
2. Design and build a NTSAPP reactor utilizing a plasma jet reactor concept based on dielectric barrier discharges (DBD). Test antimicrobial performance of the jet reactor on plastic and vegetable substrates.
3. Design and build a NTSAPP reaction chamber that incorporates several plasma jet reactors and enables treatment of three dimensional objects . Test antimicrobial performance of the reaction chamber on plastic and vegetable substrates.
4. Compare advantages and disadvantages of each design and their sanitation performance. Select the best concept for pursuing in Phase 2 and develop a conceptual design.

NASA and Non-NASA Applications

NTSAPP technology can be used to sanitize fresh foods grown in the space habitat and to sanitize raw ingredients either produced on orbit or sent up as bulk raw ingredients. Non-thermal plasma can replace chemical disinfectants in most spaceflight food applications.

NTSAPP technology can be used for sanitizing food at the point of use, such as a restaurant, or at a food processing facility. This technology can be used in place of chlorinated water, which can leave a residue and is not entirely effective, and irradiation, which generally has a poor public perception.

Firm Contacts

Ross Remiker
Orbital Technologies Corporation
1212 Fourier Dr.
Madison, WI 53717
(608) 229-2750
remikerr@orbitec.com

Thomas Crabb
Orbital Technologies Corporation
1212 Fourier Dr.
Madison, WI 53717
(608) 229-2750
crabbt@orbitec.com