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Decontamination of food and surfaces from viral contamination using photodynamic treatment

An inexpensive, non-thermal method for decontamination of foods from viral contaminants without affecting their quality.

Technology No. 2021-011

IP Status: Provisional Patent Application Filed; **Application #:** 63/055,220

Applications

- Food decontamination, esp. fresh produce
- Surface decontamination, esp food-contact surfaces

Key Benefits & Differentiators

- **Non-thermal process** preserves food quality.
- **Scalable and easy implementation:** process can be implemented in processing units; works well with food on conveyor.
- **Inexpensive** method; does not require expensive equipments.
- Materials used are already approved and being used in food industry.
- Kills 99.99% of Tulane virus and feline calicivirus (surrogates of hepatitis A and Norovirus, respectively) within 5 min of exposure and kills 99.99% Transmissible gastroenteritis virus (TGEV, a surrogate of SARS-CoV-2) within 1 min.

Overview

Human noroviruses (HuNoVs) are a leading cause of acute gastroenteritis resulting in 21 million cases of vomiting and diarrhea illnesses each year in the US alone. One of the common ways in which norovirus spreads and infects humans is through contaminated foods such as leafy greens (such as lettuce), fresh fruits, and shellfish (such as oysters). Currently, following strict personal and food processing hygiene is the most commonly used solution to prevent a norovirus outbreak. Existing non-thermal food processing technologies are not effective, impractical, not-scalable, or affect the quality of the treated food.

Researchers at the University of Minnesota have developed an inexpensive non-thermal processing technique for decontamination of foods from viral contaminants without affecting their quality. This technique uses a combination of photodynamic treatment (PDT) and approved photosentizers to quickly and effectively decontaminate surfaces. Experimental results show that, by shining visible LED light at specific wavelengths onto food that is coated with photosensitizers, model noroviruses and TGEV have been inactivated with 99.99% efficacy on stainless steel and lettuce leaves surfaces. This non-thermal process is beneficial especially in treatment of foods that are consumed fresh (such as leafy greens and fruits). Other applications may include decontamination of SARS-CoV-2 and other viruses from non-food surfaces including for hand and device sanitization. This technology may also be integrated as an eco-friendly process for decontamination of utensils in restaurants.

Phase of Development

TRL: 3-4
Model viruses inactivation and efficacy characterization performed in emulated lab settings.

Researchers

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Desired Partnerships

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