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Whole-body Voluminous Antiviral and Antibacterial Disinfection of Photodynamic Therapy using Edible Food Dyes

Visible-light activated aerosol disinfection using safe FDA-approved dyes for large indoor spaces and PPE chambers.

Purdue University researchers have developed a voluminous antiviral phototherapy technique that uses aerosols or vapor of FDA-approved food coloring dyes to mitigate risk of airborne transmission of pathogens. Many viruses and bacterial diseases are transmitted through air, making it critical to disinfect and sanitize large volumes of indoor air where many people are present. Contemporary disinfection methods include using biohazardous materials such as aerosolized hydrogen peroxide and cancer-causing UV illumination, limiting their utility indoors and exemplifying the need for biocompatible air sanitation methods in population dense areas. To address this need, Purdue University researchers have demonstrated visible light activation of several FDA-approved food coloring dyes generate singlet oxygen, which can be used to kill airborne pathogens. The short traveling distance of singlet oxygen (less than 300 nm) acts as a safeguard against human exposure. They have also ideated an electrostatic spray system for the dyes allowing for uniform fog-like dispersion to minimize wetting. In addition, as healthcare workers are often infected when removing personal protective equipment (PPE), this technology can be installed in a confined chamber for healthcare professionals to change PPE in hospital settings.

Advantages:

-Non-UV light Illumination

-No Need for Carcinogenic Nanomaterials

-Safe, Increase Reusability of PPE

-Minimize Solvent Usage

Potential Applications:

Technology ID

2020-KIM-69064

Category

Chemicals & Advanced Materials/Green & Bio-Based Chemistry

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-Healthcare

-Hospital Acquired Infection Mitigation

-Personal Protective Equipment (PPE)

COVID-19 Pandemic

TRL: 3

Intellectual Property:

Provisional-Patent, 2020-05-07, United States

Provisional-Patent, 2020-07-29, United States

Utility Patent, 2021-05-07, United States

Keywords: Aerosols, Bacteria, Coronavirus, COVID-19, Dyes, Electrospray, Fluorescence, Health, Hospital Acquired Infections, Ionization, Medical, Photosensitizers, Phototherapy, Reactive Oxygen Species, ROS, Virus