# Ultrafast Light-Induced Inactivation of both Bacteria and Virus based on Bio-Affinity Ligands

Tech ID: 33934 / UC Case 2021-926-0

## ABSTRACT

Researchers at the University of California, Davis have developed an approach for the rapid inactivation of bacteria and virus using photo-active matrices enhanced with bio-affinity ligands under daylight irradiation conditions.

## FULL DESCRIPTION

This technology utilizes unique photosensitizer materials designed with novel photo-active matrices modified with bio-affinity ligands. These ligands attract microbes to the surface of the matrix for their rapid inactivation. The matrices have shown significant enhancement in the rate of inactivation against both bacterial and viral models. The system relies on the production of reactive oxygen species (ROS) under light irradiation, a green and sustainable process that does not produce toxic byproducts.

## APPLICATIONS

- Food safety: Reducing microbial contamination in food processing and packaging.
- Clinical treatment: Immediate sterilization of medical equipment and surfaces.
- Water purification: Fast and effective disinfection of water sources.
- Air filtration: Elimination of airborne pathogens in public and private spaces.

## FEATURES/BENEFITS

- Rapid inactivation of microbes within 2-5 minutes.
- Environmentally-friendly process that does not produce toxic byproducts.
- Effective against both Gram-negative and Gram-positive bacteria, as well as viruses.
- Reduces risk of cross-contamination in targeted applications.
- Suitable for translation into food, environmental, and biomedical applications.
- Addresses limits of existing antimicrobial materials that require close contact between microbes and antimicrobial surfaces.
- Reduces risks of cross-contamination in surfaces, air, and water due to slower rate of inactivation.
- Mitigates environmental and toxicity issues related to chemical bactericides.

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| Patent Cooperation Treaty | Published Application | WO 2025/151782 | 07/17/2025 | 2021-926 |

Additional Patent Pending

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Methods for Selecting and Identifying Cancer Stem Cells
- Method for Efficient Loading of Bioactives into Lipid Membrane Microcapsules
- In-situ Production of Anti-inflammatory Lipids for Treating Inflammation
- Polyphenol Infusions to Improve Gastro-Intestinal Stability of Probiotics

## CONTACT

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

photosensitizer, daylight induction, bio-affinity, reactive oxygen species, ultrafast microbe inactivation, environmental sensors, food safety, medical sterilization, water purification, air filtration

### CATEGORIZED AS

- **Biotechnology**
  - Health
- **Environment**
  - Remediation
- **Medical**
  - Devices
- **Nanotechnology**
  - NanoBio

### RELATED CASES

2021-926-0

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