

FOOD DISINFECTION SYSTEM USING ULTRAVIOLET GERMICIDAL RADIATION

DESCRIPTION OF THE TECHNOLOGY

A research group at the University of Alicante has recently developed the technology for the use of ultraviolet (UV) germicidal radiation in the disinfection of foods.

Disinfection of liquid foods such as milk and fruit juices is usually carried out by means of thermal treatments or by using chemicals. The formers often induce changes in the organoleptic properties as well as in the nutrient value of the food whereas the latter may lead to the presence of non-desired by-products or residues in the treated products.

The developed technology is based on the irradiation of food, and food ingredients with UV radiation in the germicidal wavelength range (i.e. 200-300 nm) using low-cost instrumentation. This is a clean treatment that allows the elimination of pathogens present in food without comprising its quality.

Researchers have been working with different UV sources and instrumental designs in order to optimize the results for different foods such as vegetable milks and grape juice.

MARKET APPLICATION

All types of food processing industry. It can be applied to liquids (for example milk, juice or wine) and solids foods in a superficial disinfection.

In addition, this technology can be used in any process requiring a stage of microbiological disinfection such as in water treatment or in the sterilization of medical supplies.

MAIN ADVANTAGES AND INNOVATIVE ASPECTS

Main advantages:

- Low cost technology.
- Chemicals are not used and hence no chemical by-products are generated in the finished product.
- Disinfected materials are not heated.
- Uses non-ionizing radiation hence no residual radioactivity is delivered to the product.
- Effective to remove most microorganisms.
- Can be used for liquid and solid materials.
- Quality characteristics are preserved.
- UV-C radiation sources are easily available at a reduced cost.
- Light Emitting Diode (LED) technology can also be used with a considerable reduction of the environmental impact of the technique.
- Low energy needs.
- Combination with a less aggressive thermal treatment can be also easily implemented

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Innovative aspects:

- Non transparent liquid foods, having low UV radiation penetration depth, are fully higienized.
- It is an alternative to thermal processes because it provides similar results being less aggressive to the product characteristics.
- Superficial disinfection of solid surfaces can be accomplished.
- Low cost and effective technology.
- UV disinfection can be implemented anyway in the production process.

CURRENT STATE OF DEVELOPMENT

Researchers at the University have been working on this technology for several years. They have developed several prototypes tested with different opaque liquids. This technology has already been implemented in manufacturing companies with a high degree of satisfaction.

The knowledge developed is available to food producing companies. An advisory service is offered and the developments of specific solutions for each case are provided.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected by Spanish patent (P201400150). University has already licensed the technology to a company for a specific application (horchata processing) but is available for other applications.

COLLABORATION SOUGHT

Companies interested in incorporating this technology for industrial applications. This research group provides advice on the possibilities provided by this technology in the manufacturing process. Research project proposals are also welcome.

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RELATED IMAGES



Image 1: UV light emission disinfection device



Imagen 2: Installing the disinfection device inside commercial equipment

CONTACT DETAILS

Víctor Manuel Pérez Lozano
SGITT-OTRI (Universidad de Alicante)
Teléfono: +34 96 590 9959
Fax: +34 96 590 3803
Email: areaempresas@ua.es
URL: <http://innoua.ua.es>

