Abstract

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Journal of Nutraceuticals and Food Science

2022
Vol 7 Issue 3

Pulsed UV light for bacterial reduction: Impact of physical parameters on Aspergillus brasiliensis

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Abstract

Foodborne illnesses related to the ingestion of pathogenic microorganisms remain a major cause of morbidity encountered worldwide, with 420 000 deaths each year. To ensure food safety, several processes have been developed to reduce the microbial load of food: thermal, chemical and athermal treatments. With regard to the latter, the use of mercury-based UV for bactericidal action was demonstrated by Bedford (1927) and Gates (1929). Pulsed Light technology was developed in Japan in 1980 and has highlighted the germicidal action of intense light flashes on micro-organisms. This alternative to mercury UV lamps uses xenon gas, which is chemically inert, more environmentally friendly, and more effective. The bactericidal activity of the broad light spectrum (200-1300 nm) is based on its absorption by the DNA double strand, which causes a break in the DNA and the formation of thymine dimers making bacterial replication impossible. Pulsed Light has been shown to be effective on reference micro-organisms for UV decontamination, such as the mould Aspergillus brasiliensis DSM 1988, and other micro-organisms commonly found in the food industry. While many scientific papers have reported on the performance of Pulsed Light, few have highlighted the impact of physical parameters of the light on microbiological activity. This study proposes to establish a parallel between two sciences, that of life and that of physics.

Received: April 08, 2022; **Accepted:** April 15, 2022; **Published:** April 22, 2022

Biography

After a DUT in Biological Engineering with a food industry option, a degree in Biotechnology and a Master's degree in Microbiology applied to the food, biomedical and environmental sectors, Clara Chamontin joined the Sterixene team to focus on the issue of microbiology control for safety in the food, medical and cosmetic sectors. As Microbiology Project Manager, and through the management of Research and Development projects, she is interested in the mechanisms involved in decontamination by Pulsed Light and LED-UV technologies, and the use of light treatments for bacterial destruction.