

Pulsed Light extends the quality and shelf life of one of the world's most popular cheese products

Overview

In a study conducted by UCD Dublin and the University of Foggia, researchers evaluated the effectiveness of Pulsed UV Light treatment in preserving mozzarella cheese by reducing microbial contamination. The study specifically targeted the susceptibility of *Pseudomonas fluorescens* and *Enterobacteriaceae* to Pulsed UV Light treatment in three areas: in transparent liquid through in-vitro tests; on inoculated mozzarella cheese; and on naturally contaminated mozzarella cheese during cold storage.

The study revealed promising results. Pulsed UV Light treatment significantly reduced the microbial load on both the inoculated and naturally contaminated mozzarella cheese samples. These findings suggest that Pulsed UV Light treatment has the potential to control microbial growth and serve as a promising method for decontaminating the surface of mozzarella cheese.

Markets/Applications

- Dairy Industry: Cheese production facilities can extend the shelf life of mozzarella cheese and maintain its quality.
- Food Preservation & Safety: Reduce spoilage and enhance shelf life, ensuring consumer safety.
- Cheese Packaging: Integrate into packaging processes to minimize microbial proliferation and preserve the quality of cheese products during storage and distribution.
- Food Technology & Research: Novel technologies like Pulsed UV Light open avenues for further research and development in the field of food technology.

Highlights

- Pulsed UV Light demonstrated significant microbial inactivation in a transparent liquid with just 2 seconds of treatment.
- The ultraviolet (UV) portion of the light spectrum emitted by the XENON flash lamp was found to be the most important for microbial inactivation.
- Treatment effectively reduced the microbial counts on the surface of inoculated mozzarella cheese with 4 seconds of exposure.
- Pulsed UV Light treatment showed potential in controlling microbial growth and decontaminating the surface of mozzarella cheese, making it a promising option for application in high-volume production lines.

Pulsed UV Light treatment is a promising approach for microbial control in mozzarella cheese, especially considering its short treatment time and potential for high-volume production.

The information in this report was prepared by XENON and does not contain the complete research conducted by *Lacivita* et al. A full version of the research paper is available at <https://www.cambridge.org/core/journals/journal-of-dairy-research/article/abs/high-intensity-light-pulses-to-reduce-microbial-load-in-fresh-cheese/62C2F4C99FD2C70525DAB9E2E9552B59>

Summary of Research

High intensity light pulses to reduce microbial load in fresh cheese

Original research by Valentina Lacivita, Amalia Conte, James G Lyng, Cristina Arroyo, Vittorio A Zambrini, and Matteo A Del Nobile

Objective: Investigate the effectiveness of Pulsed UV Light treatment for microbial inactivation in mozzarella cheese.

Methodology: The experiments were conducted in three phases to simulate real-life conditions. In the first phase, preliminary experiments were performed using a transparent liquid medium with a high microbial concentration. The microbial count of *Pseudomonas fluorescens* and *Enterobacteriaceae* was evaluated after exposure to pulsed UV treatment at different light fluences and treatment times. The reduction in microbial populations was assessed to determine the efficacy of the treatment.

In the second phase, mozzarella cheese samples were inoculated with *P. fluorescens* and *Enterobacteriaceae*, then subjected to pulsed UV treatment. The reduction in microbial populations was compared to untreated control samples.

In the third phase, native flora samples of mozzarella cheese were treated with Pulsed UV Light without any preliminary contamination. The microbial counts of *Pseudomonas spp.* and *Enterobacteriaceae* were monitored during a 2-week refrigerated storage period at 10 °C to evaluate the long-term effect of pulsed UV treatment on microbial growth.

Results and Conclusions: The study's results demonstrated that Pulsed UV Light treatment is effective in microbial inactivation in mozzarella cheese. In the preliminary experiments using a transparent liquid medium, a significant reduction in microbial populations of *Pseudomonas fluorescens* and *Enterobacteriaceae* was observed with just a few seconds of pulsed UV treatment. In addition, when pulsed UV was applied to native flora samples of mozzarella cheese, it effectively controlled the growth of *Pseudomonas spp.* during refrigerated storage. Notably, the levels of *Pseudomonas spp.* remained consistently below the microbiological acceptability limit (106 cfu/g) throughout the entire storage period.

The study concluded that pulsed UV treatment could be a promising approach for microbial control in mozzarella cheese, especially considering its short treatment time and potential for high-volume production. Further research could explore optimization and sensory effects of Pulsed Light on food products.