

Pulsed Light found to be a rapid and effective method for reducing harmful bacteria in milk

Overview

In a study at Pennsylvania State University, researchers investigated the efficacy of a flow-through pulsed UV-light treatment system to inactivate *Staphylococcus aureus* in cow's milk. Experiments were conducted using a XENON Corp Pulsed UV Light sterilization system. The results demonstrated the efficacy of the flow-through pulsed UV-light treatment system in reducing *Staphylococcus aureus* counts in milk. Importantly, the treatment process did not significantly affect the temperature of the milk samples, preserving their nutritional and sensory qualities.

Results show Pulsed UV Light can benefit dairy processing with rapid treatment times, microbial inactivation efficiency, and minimal impact on milk quality. Implementing this system in the dairy industry could enhance food safety, extend shelf life, and outperform traditional thermal pasteurization methods.

Markets/Applications

- Dairy Industry: Improve safety and quality of milk by inactivating harmful bacteria.
- Food Safety: Food products prone to bacterial contamination, such as juices, liquid eggs, and other liquid-based food products.
- Shelf-Life Extension: Extend the shelf life of milk products, benefiting dairy processors, retailers.
- Food Processing Equipment: Integrate into equipment such as milk pasteurization systems or milk filling lines during production and packaging.
- R&D: Continued research could lead to the development of improved technologies, protocols, and guidelines for microbial control in various food processing applications.

Highlights

- Flow-through Pulsed UV-Light demonstrated effective inactivation of *Staphylococcus aureus* in milk
- Treatment did not significantly alter the temperature of the milk samples, ensuring minimal impact on the nutritional and sensory qualities of the product
- Compared to traditional methods, Pulsed UV Light offers shorter treatment times and improved performance in microbial inactivation
- The mercury-free Pulsed Light alternative minimizes the production of hazardous by-products and promotes environmental sustainability.
- Has the potential to offer a safe and effective solution for milk processors, enabling them to meet stringent food safety regulations and deliver high-quality, pathogen-free milk products to consumers.

Researchers used a XENON Corp. Pulsed Light sterilization system to demonstrate potential for safer and faster dairy processing methods.

The information in this report was prepared by XENON and does not contain the complete research conducted by Krishnamurthy et al. A full version of the research paper is available at https://www.academia.edu/3668722/Inactivation_of_Staphylococcus_aureus_in_Milk_Using_Flow_Through_Pulsed_UV_Light_Treatment_System

Summary of Research

Inactivation of *Staphylococcus aureus* in Milk Using Flow-Through Pulsed UV Light Treatment System

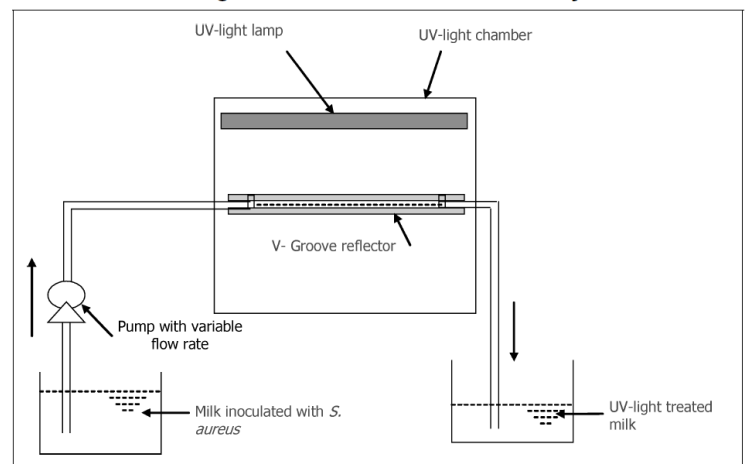
Original research by K. Krishnamurthy, A. Demirci, and J.M. Irudayaraj

Objective: Investigate the efficacy of a flow-through Pulsed UV Light treatment system for the inactivation of *Staphylococcus aureus* in milk, and evaluate its potential as a non-thermal method for milk disinfection.

Methodology: The study used a XENON Corp flow-through Pulsed UV Light treatment system to expose milk samples contaminated with *Staphylococcus aureus* to Pulsed UV Light. The flow rates were varied (20, 30, and 40 mL/min) to evaluate the system's performance under various conditions. The treated milk samples were then analyzed for microbial inactivation using appropriate microbiological techniques.

Additionally, temperature measurements were taken during the treatment process to assess any temperature changes induced by the UV-light exposure. Temperature measurements indicated the Pulsed UV Light treatment caused near-zero temperature changes in the milk samples, preserving the nutritional and sensory qualities of the treated milk.

Schematic diagram of continuous milk treatment system



Results and Conclusions: Pulsed UV Light achieved a 5-log reduction in *Staphylococcus aureus* count in only 4 and a half seconds. This conclusion shows flow-through pulsed UV-light treatment systems have potential as a non-thermal microbial intervention method in milk production, with advantages such as rapid treatment times, effective microbial inactivation, and minimal impact on milk quality. Implementing this system in the dairy industry could provide a better alternative to traditional thermal pasteurization methods, improving food safety and extending the shelf life of milk products.