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Pulsed Light Technology to Enhance Food Safety and Quality: a Mini-Review

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Highlights

- Review manuscript address the current trends in pulse light technology
- Pulsed light treatment is a recognized technique for surface decontamination
- PL technology also acts as stress inducing treatment for quality enhancement
- PL technology is effective against surface contaminated pathogens
- PL is a useful technology for post-processing surface microbial decontamination

Abstract

Pulsed Light (PL) technology is one of the emerging technologies which can be used to inactivate several pathogenic and spoilage microorganisms both in vitro and in different foods while resulting in minimal influence on the quality attributes. The short duration - high power light pulses have been demonstrated to be powerful enough for inactivating microorganisms by a combination of photochemical, photothermal and photophysical mechanisms. In addition to the inactivation of microorganisms, PL treatment has been shown to be effective in some in-package microbial decontamination, reduction in allergens and for extending the shelf-life of certain foods while retaining its nutritional value. PL treatment can be used alone as well as in combination with other technologies as a hurdle concept. This mini-review provides an overview of the various applications of PL technology with special focus to the enhance food safety and quality.

Introduction

Pulsed Light (PL) technology involves the use of inert-gas flash lamps to produce short-duration, high-power pulses of an intense broad spectrum of light within the frequency regions of ultraviolet (UV), visible (VL), and infrared (IR) light (200-1000 nm). It is one of the emerging technologies among the different non-thermal processes used as an alternative to the traditional thermal treatment and can kill many pathogenic and spoilage microorganisms in foods, including bacteria, yeasts, molds and viruses. This technology is also known by several other names such as high-intensity light, broad-spectrum white light, intense pulsed light, pulsed white light and pulsed UV

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