Photoinactivation of pathogens in experimentally contaminated milk

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Because milk is a highly nutritious food, it provides an excellent medium for growth of pathogenic microorganisms. Thus, dairy industry associates most of its processes and costs to keep contamination levels as low as possible. Thermal decontamination methods are the only antimicrobial strategies adopted, however, they are incapable to provide excellent organoleptic, nutritional and decontamination properties simultaneously. Microbial inactivation by exposure to blue light rises as a promising alternative in food industry due to its intrinsic antimicrobial properties without the harms of UV or ionizing radiation or the involvement of residual substances. Therefore, the aim of this study was to determine the inactivation kinetics of blue light (λ_{LED} = 413 nm) against *Staphylococcus aureus*, *Escherichia coli*, *Listeria monocytogenes* and *Mycobacterium fortuitum* cells suspended in whole milk or saline solution. The inactivation data was adjusted to the Weibull statistical model to extract theoretical values of lethal doses for any level of survival fraction. All species were sensitive to photoinactivation either suspended in milk or in saline solution. Inactivation kinetics significantly diverges according to the suspension medium and each species is differently affected. While *S. aureus* and *E. coli* are more sensitive to photoinactivation in milk, *M. fortuitum* and *L. monocytogenes* become more tolerant. Even though, more than 99,9% of any bacteria could be inactivated within less than 3 hours of irradiation. The organoleptic and nutritional properties of blue light irradiated milk still needs to be determined, however, photoinactivation presents great potential to microbial control in dairy industry.