TITLE: PHOTODYNAMIC INACTIVATION OF *Bacillus cereus* MEDIATED BY EOSINA Y.

AUTHORS: BONIN, E., SILVA, A.F., SANTOS, A.R., BATISTA, A.F.P.; RIBEIRO, L. H; FREITAS, C. F; MIKCHA, J.M.G.

INSTITUTION: UNIVERSIDADE ESTADUAL DE MARINGÁ, MARINGÁ, PR (AVENIDA COLOMBO, 5.790, CEP 87020-900, MARINGÁ-PR, BRAZIL).

ABSTRACT:

The methods applied for the inactivation of microorganisms in foods are not always efficient, ecologically friendly and some technologies employed can cause changes in the organoleptic properties of foods. In addition, resistant microbial strains also limit the efficiency of emerging technologies. One technique for microbial control in food is the photodynamic inactivation. It is based on the combination of a photosensitizing agent (PS) and light in the presence of oxygen. This PS, when irradiated by light at a specific wavelength, generates reactive oxygen species that cause cellular damage and inactivates the microorganisms. The present work investigated the effect of the photodynamic inactivation of *Bacillus cereus* ATCC 11778, using eosin Y as PS. To perform the assays, 50 µL of the bacterial suspension (10^7 CFU /mL) was transferred to test tubes containing 950 µL of eosin Y at concentrations of 1, 2.5, 5 and 7.5 µmol / L and incubated for 10 minutes in the absence of light. Then 500 µL of this suspension was exposed to green LED illumination for 5, 10 and 15 minutes. Three controls were performed: microorganism in phosphate buffered saline without LED irradiation (PS- L-), microorganism with PS without irradiation with LED (PS+ L-), and microorganism in phosphate buffered saline with irradiation (PS- L+). Afterwards, all groups were diluted, plated on Tryptone Soy Agar and incubated at 35 °C for 24 hours. For the three control groups, no reduction in bacterial counts was observed, evidencing that both PS and LED light alone can't inactivate *B. cereus* at the concentrations and times evaluated. On the other hand, in the groups submitted to PS treatment followed by LED irradiation, it was observed that all treatments were able to significantly (p<0.05) reduce the number of cells compared to the control group (PS- L-). However, there was no significant difference among treatments, in which were observed average reductions of 2.7 log CFU/ mL. These results indicate that photodynamic inactivation mediated by Eosin Y and green LED light was effective in inactivate foodborne pathogen *B. cereus.* Photodynamic inactivation could be a promising alternative for bacterial control in food industry.

Keywords: *Bacillus cereus*, eosina Y, LED light, photodynamic inactivation.

Development Agency: Cnpq, PPG-UEM, Capes.