Efficiency of fractionated γ-irradiation doses to eliminate vegetative cells and spores of Bacillus cereus from raw rice

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Abstract

Efficacy of fractionated γ-irradiation to eliminate vegetative and spore forms of Bacillus cereus from raw rice was studied. Viable bacteria and spores count performed after irradiation treatment revealed that vegetative cells and spores (7.9 and 7.7 log CFU/g) of B. cereus in raw rice tolerated γ-irradiation up to 10 and 20 kGy, respectively and were eliminated at 15 and 25 kGy respectively on single treatment. Exactly 2 times of 5 kGy irradiation treatment eliminated all vegetative B. cereus (7.9 log CFU/g). A treatment with fractionated doses of γ-irradiation effectively eliminated vegetative bacteria but not spores of B. cereus. Field emission SEM images revealed the damage by γ-irradiation to the spore exosporium. This study suggests new approach of using fractionated doses of γ-irradiation to eliminate foodborne pathogens in food which are affected by high doses of γ-irradiation.

Keywords

Fractionated; γ-irradiation; Bacillus cereus; spore; vegetative cell