

ARTICLE: FOOD PREPARATION & MANUFACTURING - RESEARCH ARTICLE

Bioluminescence ATP Assay for Estimating Total Plate Counts of Surface Microflora of Whole Cantaloupe and Determining Efficacy of Washing Treatments

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Abstract:

The surface microflora of cantaloupes were estimated using a bioluminescence ATP assay, and results were compared to plate count data. Cantaloupes were treated as follows: (i) water washed, or (ii) washed in solutions of sodium hypochlorite (1,000 mg/liter) or hydrogen peroxide (5%) for 5 min. Bioluminescence ATP assay results showed differences in ATP level/ cm² of cantaloupes dipped in chlorine or hydrogen peroxide solution; ATP levels in these washed samples were lower than in controls due to antimicrobial action of the treatments on the cantaloupe surface. Linear correlations were found between the bioluminescence ATP assay and aerobic plate counts of unwashed cantaloupe ($r^2 = 0.995$) and those washed with water ($r^2 = 0.990$) determined before storage. Lower correlations between the bioluminescence ATP assay and the aerobic plate counts were observed on cantaloupes stored for 120 h at 20°C ($r^2 = 0.751$) than at 4°C ($r^2 = 0.980$) without washing treatment. Lower correlation at 20°C may be the result of clusters or growth that occurred in chains. ATP levels of washed cantaloupes correlated well with bacterial plate counts ($r^2 = 0.999$). A reliable minimum detectable threshold using the bioluminescence ATP assay was established at 3 log₁₀ fg/cm² corresponding to 4 log₁₀ CFU/cm². Bioluminescence ATP assay is not recommended for washed samples where the microbial load is near or below the threshold. Therefore, the bioluminescence ATP assay will be recommended for quick estimation of total microbial load on cantaloupe surfaces where the population is expected to exceed this threshold. The assay can save the industry time by eliminating the required incubation required by the conventional methods.

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