Bioluminescent assay of hygiene quality of ground beef

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Bioluminescent assay of total bacterial contamination (TBC) was applied for assessment of hygiene quality of ground beef. For assay, bacteria cells were washed away from ground beef particles to saline by shaking. Non-bacterial ATP was eliminated by filtration of bacteria suspension obtained through Filtravette™ (special luminometric microcuvette with the bottom made of bacterial membrane filter). ATP from bacteria cells concentrated in Filtravette™ was released by dimethylsulfoxide and ATP-reagent designed in our laboratory was added to the same Filtravette™. Bioluminescent signal from Filtravette™ was measured using portable luminometer 3550i from New Horizons Diag. Corp. (USA). Detection limit of the assay proposed is $10^4$ CFU/g and duration is ~35 min/sample. We analyzed ground beef samples (n=20) with TBC varied in the range $10^4$-10$^9$ CFU/g both by bioluminescent assay and Plate Count. A good correlation was observed (R=0.96). The intervals of bacterial ATP concentration (mole/g) were established for ground beef samples: good hygiene quality ($<10^{-11}$), contaminated ($10^{-11}$-10$^{-10}$) and low hygiene quality ($>10^{-10}$).