



luminescence biometer

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RAPID ASSAY OF BACTERIAL POPULATIONS

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The level of endogenous adenosine triphosphate (ATP) in bacteria has been shown to be relatively constant across several species and all phases of growth. ATP, extracted from samples of bacterial cultures by a variety of methods, showed excellent correlation with the number of cells in the samples as determined by standard plating techniques. Statistical evaluation of the data was done and comparison of log ATP versus log cells showed a correlation coefficient of 0.93. ATP was assayed by a modification of the firefly luciferin-luciferase reaction. An integrated system was devised to measure as few as 1,000 cells in less than 5 min. It consisted of a means to isolate and extract the bacteria and a sensitive luminescent photometer to detect low levels of light. Thirteen species of bacteria were examined in this system, and a mean ATP content of 4.7×10^{-10} μg per cell was found. Contaminated samples of food, milk, urine, and water were assayed. In all cases, instrumental ATP counts were comparable to plate counts.