



luminescence biometer

Abstracts from 1967 BACTERIOLOGICAL PROCEEDINGS

LEVELS OF ADENOSINE TRIPHOSPHATE DURING BACTERIAL GROWTH

by

A. J. D'EUSTACHIO

Instrument Products Division

E. I. du Pont de Nemours & Co. (Inc.)

&

G. V. LEVIN

Hazleton Laboratories

Microbial growth is related to the amount of adenosine triphosphate (ATP) present and/or produced by metabolism of nutrient energy sources. Three aerobic bacteria, *Escherichia coli*, *Pseudomonas fluorescens*, and *Bacillus subtilis*, were studied during lag, exponential, and stationary periods of growth for variation of endogenous ATP. ATP, obtained by sonic rupture of the cells, was assayed by the bioluminescent firefly system, which allowed measurement to 10^{-7} μg . *E. coli* demonstrated a relatively constant level of ATP at 1.45×10^{-10} μg per cell throughout all phases of growth. *P. fluorescens* and *B. subtilis* showed a slight increase in ATP during exponential growth, which receded as growth declined. Mean values of μg of ATP per cell for these organisms were 1.6×10^{-10} and 2.82×10^{-10} , respectively. Statistical treatment of the data suggests a relatively constant level of cellular ATP (i.e., 1.4-fold variation from the mean) was maintained across all phases of growth for these three taxonomically different organisms. Thus, a steady-state balance for endogenous ATP may exist to provide sufficient energy for maintenance of vital enzyme systems during all growth phases.



INSTRUMENTS

E. I. DU PONT DE NEMOURS & CO. • WILMINGTON, DELAWARE 19880 • INSTRUMENT PRODUCTS DIVISION • WILMINGTON, DELAWARE 19880