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AEC-NASA TECH BRIEF

Lawrence Radiation Laboratory

Analytical Methods for Bacterial Kinetics Studies

Analytical methods for studying the kinetics of bacterial growth and metabolism, utilizing mathematical equations and models and specialized computer techniques, have been reviewed. The study of bacterial kinetic activity is applicable to fields as far ranging as food production, complex chemicals production, and polluted water purification. Through the methods developed, a better understanding of such activity can be achieved, greater control over the processes involved can be made possible, and optimal process conditions over a broad range of variables can be predicted.

The computer technique described is applicable to the analysis of batch culture kinetic data and is used for fitting equations to the data. The equations can then be used for data interpolation, extrapolation, integration, differentiation, and other manipulations.

The data presented in the report were obtained with a salt-tolerant strain of sulfate-reducing bacteria grown in both batch and continuous cultures. The results of the computer analysis of this data are discussed in relation to some of the proposed mathematical models. The report also includes a description of a novel continuous-culture apparatus used in these experiments.

The apparatus used for measuring bacterial cell size-concentration distributions employs a measurement technique which differentiates between normal cells and heat-killed cells, a result that should be of considerable value in the study of bacterial sterilization kinetics. The apparatus was calibrated and used in obtaining information on the cell size under a variety of experimental conditions. A computer program was used to analyze the computer-coupled output.

Note:

The following documentation is available from:

Technical Information Division
Lawrence Radiation Laboratory
University of California
Berkeley, California 94720

Reference:
UCRL-16398, Analytical Methods in Bacterial Kinetics

Patent status:

No patent action is contemplated by AEC or NASA.

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Category 05