BACTERIOLOGY

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ABSTRACTS

Bacterial Dissimilation of Alpha-conidendrin, a Naturally Occurring Lignan. W. A. KONETZKA and JEAN STOVE, Indiana University.—Although it has been established that in nature certain of the wood-rotting fungi attack lignin, the study of the mechanism of microbial lignin degradation has been hampered by the failure to isolate any products of dissimilation. This investigation of the bacterial dissimilation of alpha-conidendrin was undertaken to determine the manner in which complex lignin-like compounds are attacked by microorganisms.

Simultaneous adaptation studies reveal that alpha-conidendrin-grown cells oxidize conidendric acid, alpha- and beta-conidendrol, vanillic acid, p-hydroxybenzoic acid and protocatechuic acid. Vanillic acid-grown cells oxidize p-hydroxybenzoic and protocatechuic acids, while p-hydroxybenzoic acid-grown cells oxidize protocatechuic acid. This information together with chromatographic and spectrophotometric analyses of the products of dissimilation leads us to propose the following tentative scheme for conidendrin dissimilation: alpha-conidendrin $\rightarrow$ conidendric acid $\rightarrow$? $\rightarrow$ vanillic acid $\rightarrow$ p-hydroxybenzoic acid $\rightarrow$ protocatechuic acid.

The Effect of Temperature on Survival of Mixtures of *Escherichia coli* Substrains. HAROLD W. BRETZ, Purdue University.—Two colonial mutant substrains designated ground-glass (gg) and flat-irregular (fi) were isolated respectively from each of two stock *Escherichia coli* strains: parent # 61 opaque (op) had a 25 to 27 minute generation time and was streptomycin resistant while parent # 7006 (op) had a 15 to 17 minute generation time and was streptomycin sensitive.

Various 50:50 mixtures of 10^8 cells per ml from washed slant cultures were stored in pH 7.0 Sorensen's M/15 phosphate buffer at 37°, 4°, and minus 9°C for ten weeks. Samples were examined at 0, 3, 6, and 9 weeks for total count and the proportion of substrains. Growth curves on single substrains and on mixtures were determined before and after 10 weeks storage at –9°C only. (The initial interest was in the change in generation time or lag time during –9°C storage.)

Data show that certain mixtures will survive at 37° and –9°C though not at 4°C but that no predictions can be made concerning any correlation between temperature, original parent strain, or colonial substrain. Substrains may not have the same growth curve characteristics as their parent strain, and a given substrain may survive in one mixture but succumb in another. Some mixtures even showed a subsequent in-

crease in numbers during storage. Several speculative interpretations are suggested including autophagy, increased recombination rate, phage infection, or ploidy.

Requirements for Complete Oxidation of Acetate by Azotobacter Extracts. JOHN J. JOSTEN and R. REPASKE, Indiana University.—Crude sonic extracts prepared from ethanol grown *Azotobacter vinelandii O* have been investigated to determine conditions for complete oxidation of acetate. Preliminary studies showed that these extracts completely oxidized acetate to CO_2 and H_2O provided a minimal amount of "sparker" was present. Cofactor requirements were not absolute; however, the rate of oxidation was increased by inorganic phosphate, GSH, DPN, and coenzyme A with tris (hydroxymethyl) aminomethane as buffer. The response to inorganic phosphate was greater than with the other supplements. If the optimum concentration of phosphate (5×10^{-3}M) were exceeded, the rate of oxidation decreased, but the maximum rate could be reestablished by increasing Co A. This suggests the presence of phosphotransacetylase.

No evidence was obtained for acetate oxidation occurring other than through the TCA pathway; a "sparker" was required for complete acetate oxidation as was shown by other investigators. Inhibitor studies with malonate and fluoroacetate further supported this hypothesis.

Acetate oxidation via the TCA cycle requires activation of acetate to acetyl-PO_4 or acetyl-Co A presumably by ATP in the extract and that formed during oxidation of substrate. Sufficient adenine nucleotides are present because their addition causes little stimulation. Although P/O ratios with these preparations range only between 0.1 and 0.3 with the hexokinase-glucose system as acceptor, the fact that acetate oxidation occurs at a rapid rate suggests there is rapid and extensive phosphorylation. There may be an ATP system which activates acetate with greater facility than it phosphorylates glucose. This possibility is now being explored.