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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This research program is concerned with elucidating the routes of biosynthesis of sulfonates in bacteria, and with the fate of a variety of sulfonates of animal, microbial and plant origin(s) when these molecules are mineralized by bacteria inhabiting diverse habitats. Of special focus are the fates of sulfonates in anaerobic environments where their metabolism might be expected to give rise to sulfides or thiols, and thus affect events in corrosion.					
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PROGRESS REPORT: Contract W00014-88-K-0120
R&T CODE 4412-034

PRINCIPAL INVESTIGATOR(S): Edward R. Leadbetter, Walter Godchaux III

CONTRACTOR: The University of Connecticut, Storrs

CONTRACT TITLE: Formation and Fate of Bacterial Sulfonates

START DATE: 1 January 1988

RESEARCH OBJECTIVE: a. To isolate and characterize bacteria able to utilize sulfonate-sulfur for biosynthesis as well as for dissimilatory purposes, and to assess the physiology and biochemistry of these processes. b. To examine the routes of sulfonate-S formation in the simple gliding bacteria that are known to biosynthesize cysteate in significant amounts.

PROGRESS (First one-half of Year 1): a. Enrichment cultures have led to pure cultures of a variety of bacteria able to utilize sulfonate-S as sole sulfur source. Taurine, cysteate, and isethionate have been the sulfonates studied under aerobic, denitrifying, and phototrophic conditions. Some enrichments have led to organisms able to utilize one or more of these sulfonates as sole sources of C, S, and N. b. Conditions have been developed that permit the ready electrophoretic and chromatographic separation of low molecular weight S-containing metabolic intermediates, and isotopic competition approaches, as well as direct labeling studies are being employed to determine the nature of the carbon-skeleton to which S, derived from sulfate, becomes attached and at just what oxidation/reduction level of S this occurs.

WORK PLAN (Year 2): a. The objectives of the remaining six months of Year 1, and the coming second year of this project, are to characterize microbiologically the isolates thus far obtained, and to examine the enzymology of the attack on the C-S linkage of sulfonates. This latter will involve a comparison of the attack by bacteria under aerobic, denitrifying, and phototrophic conditions. Enrichment cultures for sulfonate-reducing bacteria (of the dissimilatory type) will continue to be pursued. b. The goals for this aspect of the research will be to identify the nature of the biosynthetic precursors of cysteate in Cytophaga johnsonae.

INVENTIONS: none

PUBLICATIONS, REPORTS: "Sulfonates and the Sulfur Cycle", an invited presentation at The NEMPET Meetings, 5th Annual, U Mass, Amherst; 6-88

TRAINING ACTIVITIES: Three graduate students--Catherine Green, David Gilmore, and Thomas Pitta are involved in this research, and have been supported in whole or part by the contract. An undergraduate student--Angelica Seitz--has just come into the laboratory and will spend the summer and academic year working on the project, as well.

Demographic data requested: Women: 1 graduate, 1 undergraduate student
Non-citizens: 0