
In order to investigate the feasibility of microbial detoxification of dimethyl sulphide (DMS), the physiology of \textit{Hyphomicrobiun BC} was studied. This bacterium had been isolated in our laboratory by chemostat enrichment on dimethyl sulphoxide (DMSO), which was metabolised via DMS. \textit{Hyphomicrobiun BC} could easily be grown on DMSO and DMS, provided the latter compound was kept growth-limiting. High respiration rates were observed. A comparison of the organism's yield on DMSO and DMS with that on methionine suggested that it gained energy from the oxidation of their sulphur moiety. An increase in yield of a methylene-limited chemostat culture upon addition of thiosulphate of sulphide confirmed this. Respiration and respiration data showed that DMSO metabolism was constitutive and that both thiosulphate and sulphide were inducers of the enzymes involved. DMS, methyl mercaptan (MM) and sulphide, intermediates of DMSO metabolism were toxic to the organism. This was partly due to the extreme sensitivity of MM-oxidase to its substrate. This enzyme catalyses the stoichiometric conversion of one mol of MM plus half a mol of O$_2$ into one mol each of formaldehyde, sulphide and hydrogen peroxide.

183. MONOBROMOMOBANE DERIVATIZATION AND HPLC SEPARATION OF REDUCED SULFUR COMPOUNDS IN SEDIMENT FOREWATERS AND ASSOCIATED SULFUR OXIDIZING MOLLUSCS. Russell D. Yeele and Barbara Javor, A-031, Scripps Institution of Oceanography, La Jolla, California 92037.

Many of the invertebrates associated with reducing sediments or hydrothermal vents can utilize the energy contained in reduced sulfur compounds either directly or through symbiotic chemosynthetic bacteria which are retained within the animal host. The method of monobromo-mobane derivatization and HPLC separation of reduced organic and inorganic thiols has been adapted for the study of sediment forewaters, hydrothermal fluids and the blood and tissues of invertebrates from high sulfide environments. The above method has the following advantages: it prevents oxidation so that samples can be processed at a later time; it permits separation of almost all oxidation states of inorganic sulfur on a single chromatogram and with the addition of radio-labeled sulfide and a flow-through scintillation counter it allows the study of the complete oxidation of sulfide to sulfate. The method has been enormously useful in defining the sulfur chemistry of different environments and in understanding how different organisms metabolize these energy rich but often toxic compounds.

184. FACTORS AFFECTING THE PHOTOCHEMICAL TREATMENT OF HAZARDOUS WASTE. Richard G. Zepp, USEPA, Environmental Research Laboratory, Athens, Georgia 30617.

The photochemical treatment of hazardous waste can be optimized by taking into account various factors that influence the rates of photochemical reactions. Physical factors that facilitate photochemical treatment include: (1) maximizing the irradiated surface to volume ratio of the system, (2) selecting a light source with a spectrum that strongly overlaps the absorption spectrum of the chromophore, and (3) vigorously mixing the reaction mixture. Although hazardous wastes are degraded by direct absorption of light, the overall rate of light-induced reactions can usually be accelerated by adding to the treatment system various dissolved or particulate substances that, on light absorption, produce reactive states of free radical intermediates that react with the waste. Examples of such additives include ozone, peroxides, semiconducting metal oxides such as titanium dioxide, and various organic photosensitizers that efficiently photoproduce excited triplet states.