483d Formula to Calculate the Rate of Biooxidation of Elemental Sulfur (Rbes) by Thiobacillus Thiooxidans Bacteria

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The oxidation of elemental sulfur catalyzed by Thiobacillus thiooxidans bacteria has been studied in a continuous gradientless recycle reactor with an excess of oxygen and carbon dioxide. A formula has been devised, by which the behavior of the biooxidation rate as a function of varying pH (0.35-4.5) and temperatures (288-321 K) could be described. The formula has been developed based on experimentally achieved kinetic data. The applicability of the formula has been tested by comparing the experimental results, which were obtained from the system, and those predicted by the formula. Data reduction by the least square method reveals that the values agreed within $\pm(1-4)*10-4$. Parameters like: properties of bacteria, bacteria concentration in liquid, and others, are not considered in this study. Sulfur quality (tabulated sulfur powder or pastilles sulfur) dose not effect the RBES, the kinetic rates were comparable with both sulfur kinds. The enzymatic oxidation of sulfur to sulfuric acid by Th. thiooxidans occurs stoichiometrically.