

# Bacterial Use of Arsenite as an Energy Source

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Final Report

This grant supported research that addressed whether the bacterium, *A. faecalis*, could use the energy in arsenite as metabolic energy. Associated with this project was research of the growing conditions for *A. faecalis* growth in nutrient broth in the presence and absence of either arsenite or arsenate. In addition, bacteria were grown in the presence of defined media, with succinate as the carbon source.

The grant allowed two students and myself to work collaboratively on this project. The project was quite productive and contributed significantly to the general knowledge of the metabolism of this bacterium as it detoxifies arsenite. In addition to identifying growth parameters for the bacterium, this project was able to address discrepancies in the literature and show that arsenite utilization occurs through the logarithmic growth phase, and not significantly during the stationary phase, as previously reported.

The students involved in the project were productive and were coauthors on a peer-reviewed publication that resulted from the research: Anderson, G.L., Love, M., Zeider, B.K. "Metabolic energy from arsenite oxidation in *Alcaligenes faecalis*" *J. Phys.* **107**, 49-52 (2003). In addition several oral presentations were given at professional conferences both by myself and by one of the students, Brian Zeider, including the International Conference on Heavy Metals in the Environment (Grenoble, France), the National Conference of Undergraduate Research (Salt Lake City), and the Indiana University Undergraduate Research Conference (Indianapolis).

The results from this research will have far-reaching effects. Although one collaboration that resulted from the interest generated from this project fell through, the information gained will be invaluable in another research collaboration to clone the gene for arsenite oxidase and express arsenite oxidase without the necessity of using hazardous chemicals and the waste issues associated with working with toxic compounds.