ABSTRACT

TITLE:	Characterization of Acidobacterium Capsulatum Growth in Minimal Media Containing Glucose as a Single Carbon Source
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ABSTRACT: Acidobacterium capsulatum is an acidophilic organism first isolated in 1991 from an acid mine drainage in Japan. The bacterium has been shown to be very prevalent in the soil and is thought to play a vital role in the ecosystem. The metabolic pathways of this bacterium are not well known making it an ideal subject for conducting metabolic research. Genomic information suggests in glycolysis the enzyme aldolase is not present. These studies are being done in an attempt to understand how A. capsulatum is metabolizing glucose. Research was conducted on A. capsulatum in a minimal medium using glucose as a single carbon source to try and better understand glucose metabolism. We were able to characterize the growth of the A. capsulatum by measuring changes in glucose concentration, protein concentration, and cell density as measured by absorbance at 600 nm and pH level. These experiments were perfomed by inoculating one liter of media with a one percent of a liquid inoculum of actively growing cells. We grew the Acidobacterium capsulatum in one liter of minimal media containing 10 mM glucose as a single carbon source, a standard E. coli mineral mix, and Bryant's vitamin mixture and various salts. The medium was brought to a pH of 3.1. Lowry Protein assays and hexokinase-based glucose assays were performed daily and correlated to cell growth. Using these methods we were able to correlate glucose consumption with bacteria growth, protein production and changes in pH. From the growth curve information, we found that the optimal time for harvesting cells is about 90 hours from the time of inoculation. We found that A. capsulatum used all measurable amounts of glucose under these minimal media conditions in three primary ways. The glucose was used to create biomass, it was used to expend energy creating biomass, and it was used to create an extracellular polysaccharide. By correlating glucose consumption to protein concentration, we can estimate the percentages of glucose present as biomass and as extracellular polysaccharides and the percentage of glucose utilized as fuel to create the biomass.