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Optimization and Kinetics of Ureolysis by *Sporosarcina pasteurii*

The aim of this research was to advance the understanding of the sources of nutrients with which the ureolytic organism *Sporosarcina pasteurii* would thrive more cost effectively. The reason this was researched was to try to make the use of ureolytic organisms in biocementation processes a more feasible option in the future. Two types of experiments were utilized to reach this goal: Media optimization experiments followed by extensive kinetic experiments. The media optimization experiments were designed to determine whether a less expensive source of nutrients could be used in place of lab grade urea and Difco nutrient broth to attempt to make this biocementing method more applicable in the field. These experiments focused on fertilizer with high concentrations of urea as the nitrogen source, molasses as a carbon source, and ice melt as a calcium source. The kinetic experiments were designed to determine rates and fit these rates to kinetic models which were used to predict how these bacteria would grow under different conditions and to compare between different types of nutrient sources. These studies were aimed at the definitive goal of making ureolytic bacteria a practical option for biomineralization projects, like carbon sequestration, in the near future.