EXECUTIVE SUMMARY [NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]: State **in layman's terms** the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California.

Enzymes are used for many large-scale applications, including for the food, textile and commodity chemical industries. The production of such proteins by bacteria is the preferred route due to the fast growth rate of the organisms, their ability to secrete proteins and to grow on low cost media. This proposal will examine the use of a thermotolerant bacterium, *Bacillus methanolicus*, for the production of a model protein. Some of the biochemistry of the burden to the cell involved with protein production will be determined as a way to compare the protein production of *Bacillus methanolicus* to other, more frequently used bacterial hosts. The high growth temperature of *Bacillus methanolicus* in addition to its ability to grow on methanol, a low cost substrate, offers some potential advantages to these bacteria as compared with the other hosts. The analysis of the flow of carbon through metabolic pathways in bacteria has been studied using an instrument called a Liquid Chromatograph/Mass Spectrometer (LC/MS). The liquid chromatograph separates molecules based on variations in physicochemical properties and the subsequent analysis by the mass spectrometer allows the molecular weight of the separated molecules to be determined. The separation and analysis of amino acids (protein building blocks) by LC/MS has been well established. Use of a 13C labeled substrate in the feed results in the amino acids produced to have unique labeling patterns related to the metabolic pathways utilized by the bacteria leading to their production.

The establishment of this analysis technique in the PI's laboratory can lead to many student projects related to bacterial biocatalysis. These students will be ideally prepared to work in the California Biotechnology Industries.