



“Production of medium-chain-length polyhydroxyalkanoates from unrelated carbon sources”

C. T. Nomura,

Department of Chemistry, State University of New York College of Environmental Science and Forestry
Syracuse, New York

Thursday, Sep 15, 9:30am

Dupuis Hall, Room 215

ABSTRACT

Poly-3-hydroxyalkanoates (PHAs) are biodegradable polyesters produced by some bacteria as a carbon and energy from renewable resources. PHAs have attracted great interest as environmentally friendly replacements of petroleum-based plastics and have potential applications as bulk-commodity plastics and biomaterials for biomedical use. The physical properties of PHA polymers are dictated by their repeating unit composition and can be divided into three main classes: short-chain-length (SCL) PHA polymers are made up of monomers of 3-5 carbons and exhibit thermoplastic properties, medium-chain-length (MCL) PHA polymers are made up of monomers of 6-14 carbons and exhibit elastomeric properties and SCL-MCL PHA copolymers that exhibit a range of physical properties dependent on the mol ratio of SCL to MCL monomers in the polymer. Our lab is interested in understanding what metabolic pathways in bacteria are used to generate MCL monomers from unrelated carbon sources such as sugars and alcohols. In this study, we used quantitative real time PCR (QRT-PCR) to identify key genes (*alkK*, *phaG*) that exhibited upregulated gene expression in *Pseudomonas putida* KT2440 when grown under conditions that induced PHA production from unrelated carbon sources. These genes were cloned into an expression vector and transformed into *Escherichia coli*, a non-native PHA producing bacterial strain, in order to confirm their role in PHA production from unrelated carbon sources. This study has defined a new pathway for producing MCL PHA polymers from unrelated carbon sources.