2nd Annual Cal Poly Pomona Student Research Conference
March 7, 2014
University Library, Oral Presentations from 1 to 4 pm
Bronco Student Center (Ursa Minor), Poster Session and Reception from 4 to 6 pm

Lead Author: Jeffrey Miller

Degree objective when research was completed: Bachelor's

Major: Chemical Engineering

College: ENG

Co-presenter(s): Alexis Goebel and Matthew Lee

Faculty Mentor(s): Dr. Keith Forward

Session 6: University Library - W.K. Kellogg Arabian Horse Library

Time of Presentation: 3:15 PM

Presentation Type: Oral presentation

Project Title: Free Surface Electrospinning of Microemulsions Containing Vitamin E

Synopsis: To improve oral bioavailability of vitamin E, microemulsions were encapsulated in polymer nanofibers by free-surface electrospinning. The morphology and bioavailability of the fibers were studied.

Abstract: It is estimated that 90% of active pharmaceutical ingredients (APIs) in research and development are insoluble or partially soluble in water. Due to poor solubility, these APIs exhibit poor bioavailability in solid dosage forms. To improve the release rates of APIs, we consider free surface electrospinning of microemulsions as a means of producing submicron size domains of API dispersed in an amorphous excipient. Microemulsions containing vitamin E, a poorly soluble API, and Polyvinylpyrrolidone, an excipient, are electrospun to produce a highly porous and high surface area material, which promotes rapid drug release. The electrospun materials were characterized by scanning electron microscopy and high performance liquid chromatography to determine the morphology of the fibers and the bioavailability of the final material. As the fiber diameter of the electrospun material decreases, the dissolution rate of the API increases rapidly. In addition to improving the bioavailability of APIs, this technique may be utilized to streamline the downstream processing of pharmaceuticals, resulting in lower operating cost and improved uniformity over current batch manufacturing techniques.