Free Surface Electrospinning of Microemulsions Containing Vitamin E

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***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 of APIs, we consider free surface electrospinning of microemulsion as a means of producing submicron size domains of API dispersed in an amorphous excipient. Microemulsions containing vitamin E, a poorly solubility 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.**