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Controlling Release Kinetics of PLG Microspheres Using a Manufacturing Technique NADER BERCHANE, MALCOLM ANDREWS, Texas A&M University — Controlled drug delivery offers numerous advantages compared with conventional free dosage forms, in particular: improved efficacy and patient compliance. Emulsification is a widely used technique to entrap drugs in biodegradable microspheres for controlled drug delivery. The size of the formed microspheres has a significant influence on drug release kinetics. Despite the advantages of controlled drug delivery, previous attempts to achieve predetermined release rates have seen limited success. This study develops a tool to tailor desired release kinetics by combining microsphere batches of specified mean diameter and size distribution. A fluid mechanics based correlation that predicts the average size of Poly(Lactide-co-Glycolide) [PLG] microspheres from the manufacturing technique, is constructed and validated by comparison with experimental results. The microspheres produced are accurately represented by the Rosin-Rammler mathematical distribution function. A mathematical model is formulated that incorporates the microsphere distribution function to predict the release kinetics from mono-dispersed and poly-dispersed populations. Through this mathematical model, different release kinetics can be achieved by combining different sized populations in different ratios. The resulting design tool should prove useful for the pharmaceutical industry to achieve designer release kinetics.

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