Effect of Polymer Structure on the Ganciclovir Release Rate of Biodegradable Ocular Implant

S. K. Ho, CP. Ooi
School of Materials Engineering, Nanyang Technological University, 639798 Singapore
E-mail: ps7919560z@ntu.edu.sg

ABSTRACT

Poly (L-lactic acid) of IV 1.63 and poly(DL-lactic-co-glycolic acid) of IV 0.86 were cast into films using the solvent casting technique to fabricate an in situ sustained drug delivery ocular implant to study the effect of a change in the polymer structure on the drug release profile of the implant. PLLA film of IV 1.63 displayed a biphasic release with an initial burst of approximately 50% after 7 days of degradation. The initial burst observed was due to the rapid dissolution of GCV deposited on the surface during the solvent casting process. After the dissolution of the GCV on the surface of the films, hydrolysis has to occur before more GCV can be released into the medium. The minimal amount of GCV detected for PLLA of IV 1.63 for up to 130 days after the initial burst, indicated that hydrolytic degradation has not yet commenced. This postulation was further affirmed by the constant molecular weight and T_g for PLLA observed throughout the degradation period. In contrast, PDLGA of IV 0.86 had a tri-phasic drug release pattern after 7 days of degradation with an initial burst release of 80% followed by very little amount of GCV released for the next few weeks. The second burst for the PDLGA of IV 0.86 film observed after 49th days of degradation was due to the hydrolytic degradation of the polymer shown from its reduction in molecular weight and T_g.

Materials Processing for Properties and Performance (MP^3) Vol. 3
Edited by K.A. Khor, R. V. Ramanujan, C. P. Ooi and J. H. Zhao
Institute of Materials East Asia, 2004