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Evaluation of drug release kinetics from polymeric nanoparticles loaded with poorly water-soluble APIs

Ramona-Daniela PAVALOIU[*],[1] Fawzia SHA'AT1,[1,2] Cristina HLEVCA,[1] Mousa SHA'AT,[3] Gabriela SAVOIU,[1] and Sibel OSMAN[4]

[1]*National Institute for Chemical-Pharmaceutical Research and Development - ICCF Bucharest, Vitan Avenue 112, 3rd District, Bucharest, Romania*
[2]*Faculty of Applied Chemistry and Materials Science, University Politehnica of Bucharest, 1-7 Gheorghe POLIZU St., 011061, Bucharest, Romania*
[3]*Faculty of Pharmacy, Grigore T. Popa University of Medicine and Pharmacy, 11, Universitatii Street, Iasi, Romania*
[4]*Department of Chemistry and Chemical Engineering, "Ovidius" University of Constanta, 124, Bd. Mamaia, 900521, Constanta, Romania*

Abstract. The aim of this research was to investigate the release behavior of a combination of two poorly water-soluble active pharmaceutical ingredients (APIs) from poly (D,L-lactide-co-glycolide) (PLGA) nanoparticles. Amlodipine besylate - AML, a calcium channel blocker, and valsartan - VAL, an angiotensin II receptor antagonist drug, were used as poorly water-soluble model drugs. PLGA nanoparticles loaded with AML-VAL (1:16 w/w) were obtained by nanoprecipitation using an amphiphilic block copolymer - Pluronic F127 as stabilizer. The drugs release from the PLGA nanoparticles was determined by a dialysis membrane method under sink conditions. Nanoparticles provided a slow release for both APIs and an attenuated burst effect compared to free drug. Five kinetics models such as Zero-order, First-order, Korsmeyer-Peppas, Higuchi and Hixson-Crowell were applied to predict drug release profiles. The Higuchi and Korsmeyer-Peppas models ($R^2 > 0.97$) best described physicochemical release phenomenon for each PLGA formulations.

***Keywords*:** nanoparticles; amlodipine; valsartan; drug release.

[*] Corresponding author. *E-mail address:* pavaloiu_daniella@yahoo.com (Ramona-Daniela Pavaloiu)