Latin American Journal of Pharmacy
(formerly *Acta Farmacéutica Bonaerense)*
Lat. Am. J. Pharm. **31** (1): 68-77 (2012)

Regular Article
Received: December 8, 2011
Revised version: January 17, 2012
Accepted: January 19, 2012

Polyethylene Glycol-phosphatidylethanolamine Conjugate as a Pulmonary Nanocarrier for Poorly Soluble Drug

Mohanad N. SAHIB, Yusrida DARWIS, Kok K. PEH, Shaymaa A. ABDULAMEER & Yvonne T.F. TAN

School of Pharmaceutical Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia

***SUMMARY*. The aim of this study was to investigate the potential of a polyethylene glycol-phosphatidylethanolamine conjugate (PEG_{2000}-DSPE) to solubilize budesonide (BUD) for pulmonary delivery. The BUD-strictly stabilized phospholipid nanomicelles (SSMs) were prepared using the coprecipitation and reconstitution method and the physicochemical characteristics and pharmacodynamic duration of the BUD-SSMs were determined. The solubility of BUD was highly improved by at least 52 times its intrinsic solubility. The hydrodynamic particle size and zeta potential were 14.31 ± 1.40 nm and -46.61 ± 2.94 mV, respectively. The *in vitro* release of BUD from SSMs was completed within 6 days. Aerosolization of rehydrated BUD-SSMs with different nebulizers showed superior and significant aerodynamic characterizations compared to Pulmicort Respules® (PR). An *in vivo* study showed a significant reduction in the inflammatory cell counts of bronchoalveolar lavage fluid compared to PR. As a result, this study suggested that PEG_{2000}-DSPE is a promising candidate as a budesonide carrier for pulmonary delivery.**

KEY WORDS: Budesonide, Micelles, Nebulizer, Pharmacodynamic, Pulmonary delivery.

* Author to whom correspondence should be addressed. E-Mail: mohanad_pharm@yahoo.com

ISSN 0326-2383