Saeed Shojaee, Drug Des 2018, Volume 7
DOI: 10.4172/2169-0138-C3-028

28th International Conference on
CHEMISTRY & DRUG DESIGNING
December 05-06, 2018 | Vancouver, Canada

Influence and development drug release stability of sustained released polyethylene oxide tablet matrices using various water-soluble drugs

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Abstract Summary: Drug solubility is one of the primary parameters that dictate drug release and dissolution from solid dosage forms. Results showed that release rate from propranolol HCl increased at longer storage time, but a stable drug release was obtained for theophylline and zonisamide at the same time.

Introduction: Recently, in addition to HPMC, polyethylene oxide (PEO) has been used in the pharmaceutical industry because of its availability in a range of molecular weights, wide regulatory acceptance, and high water-swellability and erosion characteristics. As PEO is sensitive to thermal oxidation, it might also be susceptible to free radical oxidative attack. It has been shown that the properties of PEO were subjected to changes because of degradation. The aim of this study was development of drug release stability in PEO tablet matrices using different soluble drugs when they were stored at accelerated ageing (40°C) for 8 weeks.

Materials and Methods: The model drugs (propranolol HCl, theophylline and zonisamide) and high molecular weight PEO 303 (7000,000) were mixed with a 1:1 ratio. Matrix tablets of 240 mg were prepared by the direct compression of the mixture at 1500 psi. The tablets were stored in an oven at 40°C and at different time intervals (0, 2, 4 and 8 weeks) the release rate of the tablets were determined using dissolution tester, USP II paddle apparatus. Distilled water at 37°C was used as a dissolution medium. A differential scanning calorimetry (DSC) was used to evaluate thermal properties of the polymer. Viscosity and Gel permission chromatography (GPC) was used to confirm dissolution profiles.

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