Increasing the solubility of spironolactone by the solid dispersion method

Saeed Bokharaee1*, Alaleh Mohammad Ghasemi2*, Mohammad Ali Darbandi3 and Majid zandkarimi4

*Student Research Committee, Zabol University of Medical Sciences, Zabol, Iran.
1,2,3,4Pharmaceutical Research Laboratory, School of Pharmacy, Zabol University of Medical Sciences, Zabol, Iran

Abstract:
Spironolactone belongs to the second class of the biopharmacy classification system (BCS). All of the drugs, which are classified in this group, suffer from the solubility as the major problem. For this reason, application of any different technique which increases the solubility of drug in the gastrointestinal fluid plays the important role in increasing the oral bioavailability of drug. The goal of this study is to increase the solubility of spironolactone by the solid dispersion method.
The different formulation containing PEG with different Mw (4000,6000,8000,20000g/mol) and spironolactone were prepared by solid dispersion method. the effect of same parameter such as PEG:Drug ratio and Mw of polymer on the solubility of drug in dissolution medium was evaluating by in-vitro tests. Two optimized formulations were selected for in-vitro tests.
The plasma samples were collected 1, 2, 3, 4, 12 and 24 hours after oral prescription of the drug and formulations on rats. the concentration of spironolactone in plasma samples were determined by the sensitive HPLC method.the plasma concentration vs time was drown and the pharmacokinetics parameters such az AUC, Cmax, Tmax and T1/2 was calculated.
The result of the study showed that the solid dispersion method could increase the solubility of drug in in-vitro dissolution medium. increasing the dissolution rate of drug in in-vitro environment by application of peg caused to increase in the rate and the extent of oral absorption in in-vivo environment. the pharmacokinetics parameters such as AUC, Cmax was increased and Tmax was decreased. These results are generalizable and can be used as a new method.

Keyword: spironolactone, solid dispersion, PEG, solubility, oral bioavailability