Research in Pharmaceutical Sciences, 2012;7(5)
School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences

Application of cationic additives in the enantioseparation of basic drugs by capillary electrophoresis

F. Sattari Javid*, A. Shafaati, A. Zarghi,

Pharmaceutical Chemistry, School of Pharmacy, Shaheed Beheshti University of Medical Sciences, Tehran, Iran

Background and Aims: The pharmacological, pharmacodynamical and toxicological behavior of the enatiomers of chiral drugs can differ widely. As the result developing enantioselective separation methods is important for studying these differences and monitoring chiral purity of pharmaceutical raw material and finished products. The aim of this study was to develop a simple capillary electrophoretic enantioseparation method for cetirizine as a basic model drug and application of non-ionic and cationic buffer additives for improving the resolution. The enantioseparation of cetirizine was studied in both cationic and anionic regimens, using phosphate buffer in the pH range of 2 to 4. Sulfated-β CD was used as chiral selector at low concentrations in cationic regimen but in the anionic regime sulfated-β CD was used as analyte carriers as well as selectors, at higher concentrations. Different kinds of non-ionic and ionic background electrolyte additives were examined to improve the separation. pH and concentration of phosphate buffer, concentration of the selector and buffer additives were the main parameters which were examined in optimizing the method. The capability of the developed method in enantioseparation of other basic drugs was studied. It was shown that strong interactions between sulfated beta-cyclodextrine and basic drugs lead to impossibility of enantio-separation in positive mode, but applicaiton of sulfated beta-CD derivatives as carrier and chiral selectors was successful in separating the enantiomers. The resolution was improved significantly by adding cationic buffer additives in the background electrolyte. The developed and optimized method could effectively achieve baseline resolution of strong basic drugs such as cetirizine HCL and other structurally similar drugs.

Keywords: Chiral; Capillary electrophoresis; Buffer additives; Sulfated beta-cyclodextrine