

Separation of Benzodiazepines by Non-Aqueous Capillary

Electrophoresis and Sweeping-Micellar Electrokinetic

Chromatography

Student : Ren-De Wang

Advisor : You-Zung Hsieh

Department of Applied Chemistry
National Chiao Tung University

Abstract

In this study, non-aqueous capillary electrophoresis (NACE) method and on-line concentration by sweeping in micellar electrokinetic chromatography (MEKC) method were employed to analyze benzodiazepines. The benzodiazepines are used clinically as sedatives to counteract anxiety. These compounds are frequently prescribed for pharmacotherapy of epilepsy, convulsion and many psychiatric disorders. They have been prescribed as muscle relaxants, tranquilizer and anticonvulsants. Benzodiazepines can lead to sudden death if misused, and have been the subject of abuse in suicide and criminal cases. The application of CE for the analysis of pharmaceutical drugs is limited because these drugs are hydrophobic and conventional aqueous CE methods do not generate useful separation. Using completely non-aqueous separation media instead of water as the CE buffer solvent allow improved selectivity. A successful separation of eight benzodiazepines drugs was completed within 10 min in a methanol-acetonitrile (95:5) buffer containing 450mM Oxalic acid and 2.5mM Triethylamine. The RSDs of migration times were less than 1.25%. However, the small sample volume and short optical length restricted the detection limits of CE. Thus, On-line concentration by sweeping in electrokinetic chromatography method was also used to improve the detection limits of benzodiazepines. The limits of detection were reduced to ppb level by the on-line concentration method. The highest response improvement was over 300-fold.