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Determination of Enantiomeric Purity of ν-Pyrrolidinyl Phenylpropanol by Capillary Electrophoresis Using β-Cyclodextrin Polymer as Chiral Selector

Tong WU[1], Xin ZHOU[2], Jia Hua CHEN[2] , Jun Ling GU[1]*, Ruo Nong FU[1]

[1]College of Chemical Engineering and Material Science
Beijing Institute of Technology, Beijing 100081
[2]Bioorgnic Molecule Engineering Education Department Opening Laboratory
Peiking University, Beijing 100871

Abstract: Enantiomer of ν-pyrrolidinyl phenylpropanol was studied by capillary electrophoresis using β-cyclodextrin polymer as chiral selector. We determined the enantiomeric excess value of ν-pyrrolidinyl phenylpropanol with RSD 0.48%.

Keywords: Capillary electrophoresis, ν-pyrrolidinyl phenylpropanol, enantiomeric excess value, enantioseparation, β-cyclodextrin polymer.

Determining the enantiomeric excess value of novel chiral compounds is of great importance in asymmetry synthesis. NMR[1], HPLC and GC are the ordinary methods applied in this work. In recent years, capillary electrophoresis has been successfully used in chiral separation[2]. In this paper, we separated the enantiomer of ν-pyrrolidinyl phenylpropanol (**Figure 1**) by capillary electrophoresis using β-cyclodextrin polymer as chiral selector. According to the ratio of peak area with migration time, the enantiomeric excess value of ν-pyrrolidinyl phenylpropanol was determined.

Experiment and Results

Capillary electrophoresis was performed with a spectra PHORESIS^{TM}1000 capillary electrophoresis system (Thermo Separation Products, Fremont, CA, USA) equipped with an on-column detector and an untreated fused-silica capillary (Yongnian Optical Fiber Factory, Hebei, China) of total length 70 cm, effective length 63 cm×50 μm i.d.. The temperature was 35℃. Detection of the analytes was performed at 290 nm. Samples were pressure injected for 1 s. The applied voltage of the electrophoresis separation was set at 19 kV. 80 mmol/L tris (hydroxymethyl) aminomethane containing 3% β-cyclodextrin polymer (g/ml), pH 3.2. The result was shown as **Figure 2**. The data of measurment were listed in **Table 1**.

Figure 1 Structure of ν-pyrrolidinyl phenylpropanol

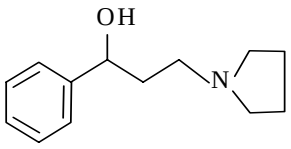

Figure 2 Capillary zone electrophorogram of ν-pyrrolidinyl phenylpropanol optical active enantiomer

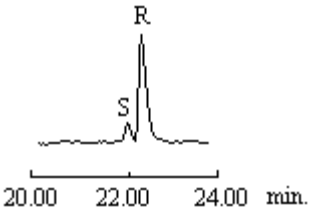

Table1 Migration time, peak area/migration time and % e/e

Experiment No.	Migration time (min.)		Peak area/migration time		% e/e
	S-form	R-form	S-form	R-form	
1	22.08	22.31	192.93	1396.68	75.73
2	21.71	21.94	180.79	1317.73	75.87
3	22.12	22.37	164.15	1152.35	75.06
4	19.20	19.36	180.31	1307.39	75.76
Average	21.28	21.50	179.54	1293.54	75.60
RSD%	6.57	6.68	9.25	7.90	0.48

Conclusion

Capillary electrophoresis can be successfully used in determination of enantiomeric purity. The deviation of migration time and peak area do not affect the determination of enantiomeric excess value.

References

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