Chiral separation of bisoprolol using high performance liquid chromatography with amylose chiral stationary phase

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Abstract A high performance liquid chromatographic HPLC method using amylose chiral stationary phase for the separation of bisoprolol enantiomers has been developed. Tris 3\[5\]-dimethylphenyl carbamate amylose chiral stationary phase was used in the normal-phase mode. The effects of the concentration of organic solvents iso-propanol and ethanol flow rate and column temperature on the enantiomer separation were studied systematically. The best separation was obtained with hexane-ethanol-dielamyl amine 88: 12: 0.1 v/v/v as mobile phase at 20 °C. The optimal flow rate was 0.6 mL/min. The detection wavelength was set at 270 nm. By using this method the enantiomers of bisoprolol can be separated quickly and easily.

Key words amylose chiral stationary phase high performance liquid chromatography HPLC bisoprolol enantiomer separation

1. Introduction

Bisoprolol (结构见图 1) is a β-blocker used to treat hypertension, angina, and arrhythmias. It is a racemic mixture of two enantiomers with different pharmacological properties. The separation of bisoprolol enantiomers is of great importance for quality control and clinical studies.

2. Experimental

2.1. Materials and Methods

The chromatographic separation was carried out on a Tris 3\[5\]-dimethylphenyl carbamate amylose chiral stationary phase in normal-phase mode. The effects of the concentration of organic solvents, flow rate, and column temperature on the enantiomer separation were studied systematically. The best separation was obtained with hexane-ethanol-dielamyl amine 88: 12: 0.1 v/v/v as mobile phase at 20 °C. The optimal flow rate was 0.6 mL/min. The detection wavelength was set at 270 nm.

3. Results and Discussion

The separation of bisoprolol enantiomers was successfully achieved using the optimized conditions. The method allows for the rapid and easy separation of the enantiomers of bisoprolol.

4. Conclusion

A high performance liquid chromatographic method using amylose chiral stationary phase has been developed for the separation of bisoprolol enantiomers. The method is suitable for quality control and clinical studies.

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References


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作用控制，氢键作用仅影响了药物的保留而没有对体分离的影响见表
为选择性和分离度（选择性产生大的影响。当乙醇比例为
达到完全分离，但选择因子（乙醇作流动相时，能够获得高的对映体
异丙醇体系为流动相，）
而以正己烷醇（体积比为
醇的结构不同，造成手性空穴的立体环境不同，从而影响对映体的分离。本实验在正相条件下，调节醇
类有机改性剂与正己烷的配比，考察不同流动相组
成对的分离效果。

表 8%& 9

<table>
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<th>流动相组成</th>
<th>保留因子</th>
<th>选择因子</th>
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<tr>
<td>75:25</td>
<td>1.93</td>
<td>3.08</td>
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<tr>
<td>80:20</td>
<td>1.69</td>
<td>2.73</td>
</tr>
<tr>
<td>85:15</td>
<td>1.28</td>
<td>1.98</td>
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<tr>
<td>90:10</td>
<td>0.84</td>
<td>1.33</td>
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</table>

2.2

Grieb [20] 

\begin{equation}
\ln \alpha = - \frac{\Delta H^\alpha}{R} T + \frac{\Delta S^\alpha}{R}
\end{equation}

\begin{table}|
<table>
<thead>
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<td>1.55</td>
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图 2.5

图示了富马酸比索洛尔对映体(%)色谱图。图中显示了两对映体达到了基线分离，且峰面积比为2:1。表明该方法可用于比索洛尔实际药物的分析。

2.6 拆分机理的探讨

ChiralPak AD-H 柱对富马酸比索洛尔的拆分效果较好。C=O -NH

参考文献:

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