Analysis of Antihypertensive Drugs by HPLC

Application

Drug Development

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Antihypertensive drugs are given to patients to lower their blood pressure. The compounds, captopril and enalapril, inhibit the enzyme that converts angiotensin II into angiotensin I. Angiotensin II is one of the strongest blood pressure decreasing substances. Figure 1 shows the separation of the two antihypertensive drugs, captopril and enalapril, using gradient analysis on a Zorbax SB-C18 reversed-phase column and UV detection. Chromatographic parameters, such as pH, mobile phase, column type, temperature, etc, can be varied to optimize an analytical method. Figure 2 shows the effect of increasing temperature on the peak shape of captopril and enalapril. Increasing the temperature improves the peak shape. The performance data of the HPLC method shown in Table 1 indicates the reliability of the analysis. The autosampler temperature was set to 4 °C to avoid decomposition of the samples.

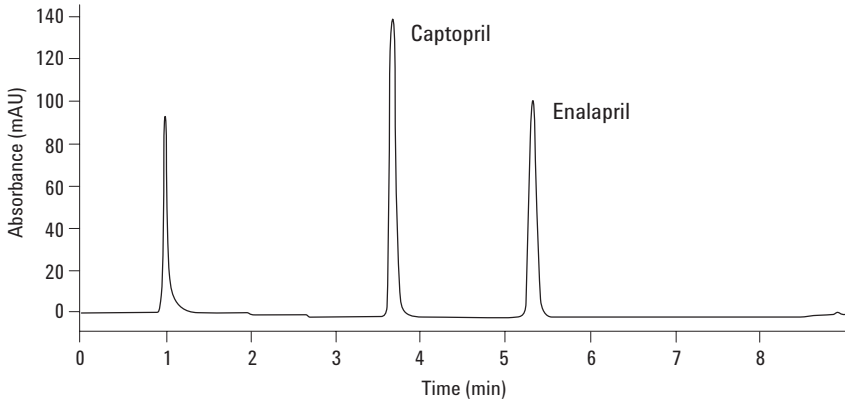

Figure 1. Analysis of two antihypertensive drugs.

Highlights

- The SB-C18 column provides an extensive coverage of sterically protected diisobutyl n-octadecylsilane stationary phase, which assists in deactivating surface silanols and participates in providing unique separation and selectivities of acids, bases, and other polar compounds.
- The SB-C18 column provides excellent selectivity and narrow peak shape for the antihypertensive drugs.
- The SB-C18 column shows excellent results at low pH with good reproducibility (Table 1).
- The SB-C18 column is suitable for low- and high-temperature analyses (Figure 2).
- The SB-C18 column provides rapid resolution of antihypertensive drugs at low buffer concentration.
- The HPLC method shows an easy, reliable, and precise analysis of the antihypertensive drugs.
- The values for limit of detection (LOD), precision of retention time (RT), and peak area demonstrate the good performance of the HPLC analysis (Table 1).

Experimental Conditions

Equipment: Agilent 1100 Series HPLC; **UV Detector:** Variable wavelength detector , 204 nm, standard cell; **Column:** Zorbax SB-C18, 3. 5 µm, 4.6 × 75 mm (part number 866953-902), Guard cartridges: SB-C18, 5 µm, 4.6 × 12.5 mm (part number 820950-920); **Mobile phase:** A = 0.025 M KH_2PO_4 in water (pH = 2), B = acetonitrile; **Injection volume:** 5 µL; **Temp:** 60 °C; **Flow rate:** 1.0 mL/min; **Gradient:** at 0 min 10% B, at 8 min 55% B, **Column wash:** at 9 min 10% B; **Stop time:** 9 min; **Post time:** 5 min

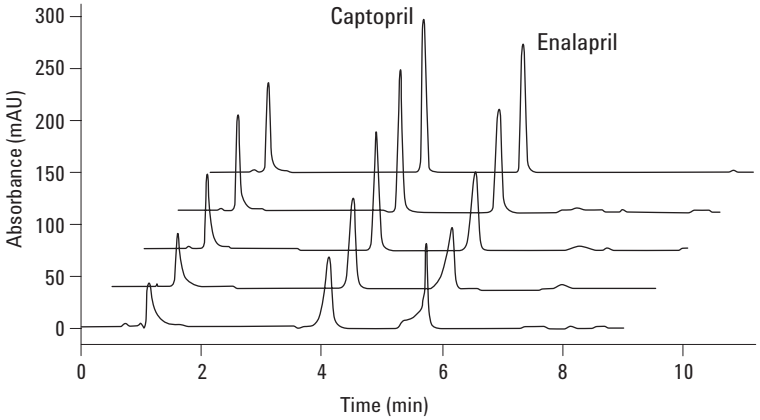

Figure 2. Effect of temperature on peak shape.

Table 1. HPLC Performance

Compound	LOD for S/N = 2 (mg/L)*	Precision of RT (RSD of 10 runs) (100 mg/L)*	Precision of area (RSD of 10 runs) (100 mg/L)*	Linearity correlation factor (0.1–100 mg/L)*
Captopril	0.5	0.05	0.12	1.00000
Enalapril	0.5	0.03	0.34	1.00000

*Injection volume: 5 µL

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