Isocratic Separation of Narcotics Using a Thermal Gradient

Introduction

HPLC at elevated temperatures reduces analysis time and improves resolution. Reduced viscosities at elevated temperatures result in significantly lower backpressure, allowing for higher flow rates and shorter analysis times. It also permits the use of smaller particle size packings to increase efficiency while operating at lower backpressure. Flatter van Deemter curves mean that operating at higher flow rates does not sacrifice efficiency. Solvent properties also change as the temperature is increased. Hydrogen bonding interactions in water are reduced at higher temperatures, making water less polar so that it behaves more like an organic solvent as the temperature is elevated. This suggests that many solvent gradients can be replaced with temperature gradients so that samples requiring complex solvent gradients can be separated isocratically. A mixture of narcotics was separated employing an isocratic mobile phase and a temperature gradient.

Experimental Conditions

Conditions are summarized in Table 1. A Milton Roy CM4000 pump, Alltech vacuum degasser, Thermo Separations UV2000 variable wavelength detector and Alcott autosampler were used in conjunction with a Selerity Technologies Series 8000 programmable HTLC oven.

Results

Figure 1 shows the separation of narcotics on a Thermo Hypersil-Keystone Hypercarb® column using a thermal gradient from 50°C to 150°C. This analysis is typically performed using a solvent gradient.

Figure 1: *Separation of Narcotics using a thermal gradient from 50°C to 150°C.*

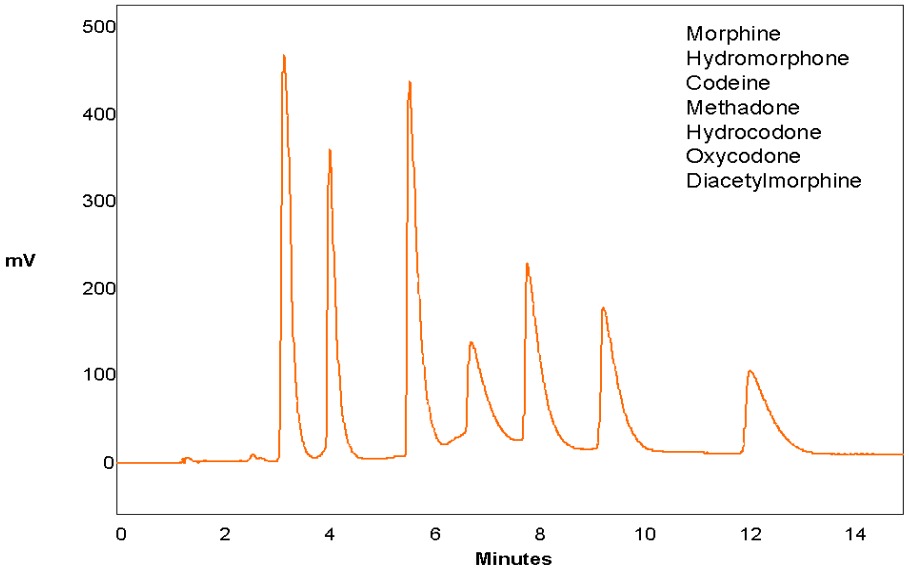

Table 1:
HTLC Conditions for Analysis of Narcotics on Hypercarb® Column

Column:	Thermo Hypersil-Keystone Hypercarb®, 100 x 4.6 mm, 7 µm
Mobile Phase:	50:50 Acetonitrile:Ammonium Acetate pH 9.0
Flow:	1.0 mL/min
Detection:	UV @ 220 nm
Injection:	5 µL
Temperature:	50°C (hold two minutes) ramp to 150°C at 30°/min, hold ten min