

application note

use of the expressLC™ system for bioanalytical/pharmacokinetic studies

rapid, high throughput separation of analytes in complex biological matrices accelerates DMPK analysis

introduction

Bioanalytical/pharmacokinetic studies present the analytical challenge of very high sample loads, low sample volumes, complex chromatograms, and the necessity of consistent chromatographic repeatability. The ExpressLC system answers the challenge with unmatched analysis throughput, sample volumes significantly lower than conventional HPLC, high efficiency chromatography and the precision and accuracy of high-pressure gradients with lightning fast re-equilibration times. Even in difficult samples containing a urine matrix, superior chromatographic performance translates into faster, more reliable data.

figure 1. benzodiazepines in human urine

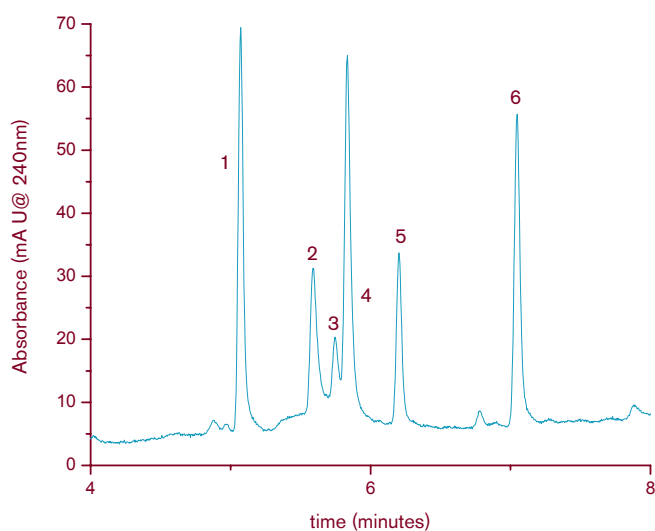


figure 2. experimental conditions

Instrument: ExpressLC system
Column: Zorbax C18, 150 x 0.32 mm, 3.5 μ m particle
Mobile phase: A/B water/acetonitrile
Gradient: 10 to 95% acetonitrile in 10 minutes
95% acetonitrile held for 5 minutes
Flow rate: 5 μ L/minute
Injection: 100 nL
Sample: Human urine spiked with benzodiazepines
1. Chlordiazepoxide
2. Flunitrazepam
3. Oxepam
4. Lorazepam
5. Clonazepam
6. Diazepam



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expressLC system specifications

configuration

expressLC-100 Single-channel System: Includes binary gradient pump, electronic injection valve, column temperature control, and array-based UV detection system. Optional high-speed autosampler available.

expressLC-800 8-channel Parallel System: Includes 8 binary gradient pumps, 8 electronic injection valves, 8 column temperature control compartments, an array-based UV detection system and high-throughput autosampler.

flow rate range

0.20–30 μ L/min

pump type

Microfluidic direct pumping system with independent flow control feedback for each mobile phase. Retention time RSD < 0.5%.

gradient formation

High pressure gradient mixing. System can run full gradients as rapidly as 8 seconds. Maximum gradient length 2 hrs. at 5 μ L/min.

delay volume

< 500 nL from mixer to column.

mobile phase compatibility

All mobile phases compatible with 316 stainless steel, PEEK, and silica.

injection valve

Eksigent Variable-Volume Injection System (software selectable). Standard injection volume 10–250 nL (larger injection volumes available).

columns

System optimized for 2.5–15 cm, 300 μ m i.d. capillary LC columns

column temperature control

Software selectable from 27–40°C; stability within \pm 0.1°C

detection

UV absorbance detection from 200–380 nm using linear CCD array detector. Detector drift \leq 4 x 10⁻⁴ AU/hr Non-linearity \leq 5% @ 2 AU.

flow cell

45 nL microfabricated flow cell with integral fiber optics, 4 mm path length

autosampler

High-throughput CTC autosampler available

system control

Computer with graphical user interface for control of all system parameters. Software allows import of run tables and creates CDF, text, and Excel files for data export and analysis. Tracking of instrument runtime, column usage, total injections, solvent usage, lamp hours, and error codes. System drivers available for Thermo Electron's Xcalibur and Applied Biosystems/MDS SCIEX Analyst 1.4.1 mass spectrometer software.

report features

Generates reports that include method conditions, chromatograms, peak retention times and areas, and spectral absorbance map.

dimensions

expressLC-100 System:

21" (53 cm) wide, 20" (51 cm) deep, 18" (46 cm) high

expressLC-100 Autosampler:

Additional 14" (36 cm) high and 6" (15 cm) wide

expressLC-800 System:

30" (76 cm) wide, 34" (86 cm) deep, 40" (102 cm) high

expressLC-800 Autosampler:

Additional 16" (41 cm) high and 16" (41 cm) wide

computer

Additional lab space needed for keyboard, mouse and monitor