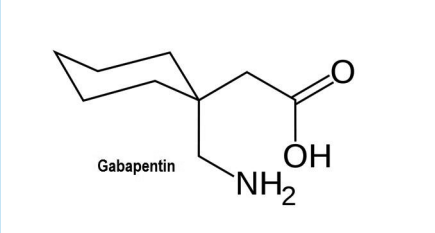
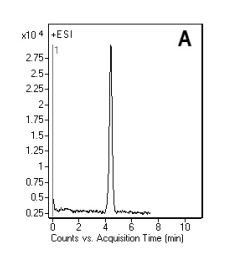
APPLICATION NOTES

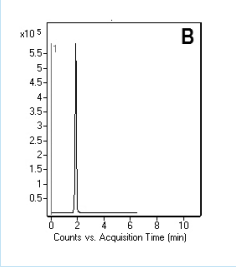
Cogent™ Diamond-Hydride

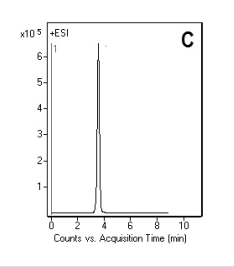
HPLC
ANP

Gabapentin Drug Product









Notes: Gabapentin is a gamma-aminobutyric acid analog used for treatment of seizures in adults and children. It is structurally related to neurotransmitter gamma-amminobutyric acid (GABA). It freely crosses the blood-brain barrier and has been shown to increase GABA levels in the brain. Various analytical methods for therapeutic monitoring of gabapentin in plasma or serum are described in the literature (GC, CE, HPLC), however all of these methods involve an extraction and derivatization step. It is well known that derivatization has drawbacks which include: the possibility of incomplete derivatization, additional interfering products, increased method complexity, increased costs (additional reagents and increased preparation time). Gabapentin marketed as Neurontin™ has been approved for sale as a generic product.

Method Conditions

Column: Cogent Diamond Hydride™ 4µm, 100Å.
Catalog No.: 70000-05P-2
Dimensions: 2.1 x 50 mm
Solvents:
Figure A: A: 50% isopropanol/50% DI water/0.1% formic acid
B: 97% acetonitrile/3% DI water/0.1% formic acid
Mobile phase: 70%B
Figure B & C: A: DI water/0.1% formic acid
B: 97% acetonitrile/3% DI water/0.1% formic acid
Mobile phase: Fig. B: 50%B and Fig. C: 70% B
Injection: 1 microL
Flow Rate: 0.4 mL/min.
Samples: 1. Gabapentin 172 m/z $(M^+H)^+$
Sample preparation: Contents of 20 capsules were ground into a fine powder using a glass mortar and pestle. A portion equivalent to 100 mg of Gabapentin was transferred into 100 mL vol flask and was sonicated (15 min) with 40 mL of the 50% solvent A and 50% solvent B followed by 15 min on a shaker at 100 rpm. The flask was adjusted to volume and mixed well. The solution was filtered using a 0.45um nylon syringe filter. 20 uL of the filtered solution was added to 1 mL of 50% solvent A and 50% solvent B mixture.
Detection: ESI – POS - Agilent 6210 MSD TOF mass spectrometer.

Discussion

Gabapentin is a very small, highly polar molecule, which can exist in solution as a cation, anion or zwitterions and is poorly retained on ordinary RP HPLC columns. Using a Cogent Diamond Hydride™ column, Gabapentin was retained successfully with a very symmetrical peak. Two different mobile phases were used and the advantage of the mobile phase used in Figure A is shown to be that isopropanol present in the solvent A helps clean the column which can be useful if biological samples containing lipids are used. Good retention of the drug was also achieved when solvent A was DI water with 0.1% formic acid – Figure B and C.
Extremely reproducible (%RSD=0.2) and robust, this method can be used to evaluate the potency of marketed Gabapentin drug products. Good for quantitative determination of gabapentin this method does not require an extraction or a derivatization step

Cat. No.	Description
70000-05P-2	Cogent Diamond Hydride™ HPLC Column, 100A, 4um, 2.1mm x 50mm