

Loading Capacity of Amitriptyline using Luna® Omega and Kinetex® PS C18 Columns

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Overview

Amitriptyline is a member of the Tricyclic Antidepressants (TCAs) which are a class of medications that are used primarily to treat depression. TCAs generally have a three-ring structure, with an attached secondary or tertiary amine, and they are classified as weak bases (pKa ~8.5).

Many C18 columns show strong ionic interactions of basic amines due to interactions with residual unbonded silanol groups under low pH mobile phase conditions. This has the potential to result in peak tailing and poor resolution. However, the Luna Omega 1.6 µm PS C18 and the Kinetex 2.6 µm PS C18 columns are designed to have a positively charged functional group on the surface. This reduces or eliminates the ionic interactions of aromatic amines and other basic compounds. This translates into a dramatic improvement in peak shape for basic analytes, especially when using a low ionic strength 0.1% formic acid buffer system.

In this application note, we compared the loading capacity of Amitriptyline on six columns run under the same HPLC conditions. Compared to the traditionally bonded C18 columns with no positive ligand on the surface, the Luna and Kinetex PS C18 columns showed superior loading capacity up to 5000 µg/mL. All columns, however, showed an increase in tailing as the concentration increased. Both the Luna Omega and Kinetex PS C18 columns showed better loading capacity as compared to competitor C18 columns with similar surface modifications.

Having the PS chemistry on both high performance fully porous and core-shell silica allows for the optimization of high column efficiency and loading capacity.

LC-UV Conditions

Column: Luna Omega 1.6 µm PS C18 ([OOB-4752-AN](#))
Luna Omega 1.6 µm C18 ([OOB-4742-AN](#))
Kinetex 2.6 µm PS C18 ([OOB-4780-AN](#))
Kinetex 2.6 µm C18 ([OOB-4462-AN](#))
Waters® CORTECS™ 2.7 µm C18+
Waters ACQUITY™ CSH 1.7 µm C18

Dimension: 50 x 2.1 mm

Pressure (bar): 451 (Luna Omega 1.6 µm PS C18)
480 (Luna Omega 1.6 µm C18)
270 (Kinetex 2.6 µm PS C18)
252 (Kinetex 2.6 µm C18)
208 (Waters CORTECS 2.7 µm C18+)
448 (Waters ACQUITY CSH 1.7 µm C18)

Mobile Phase: A: 0.1 % Formic Acid in Water
B: 0.1 % Formic Acid in Acetonitrile

Flow Rate: 500 µL/min (75 % A)

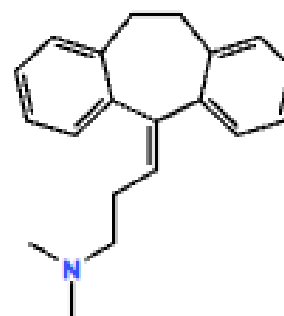
Injection Volume: 8 µL

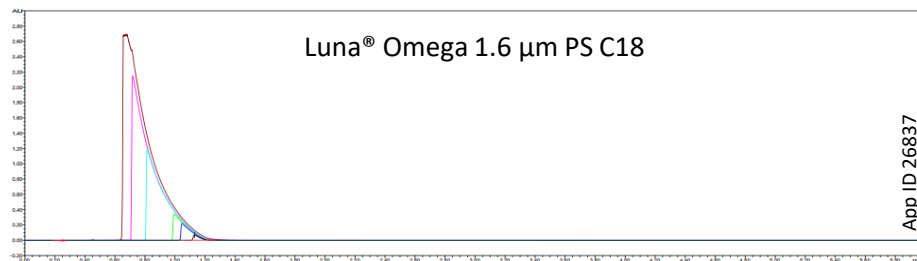
Temperature: 30 °C

LC System: Waters ACQUITY UPLC I-Class

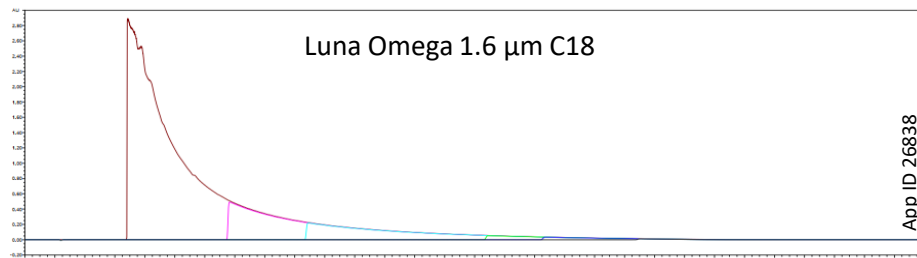
Detection: UV @ 254 nm

Figure 1. Amitriptyline Structure

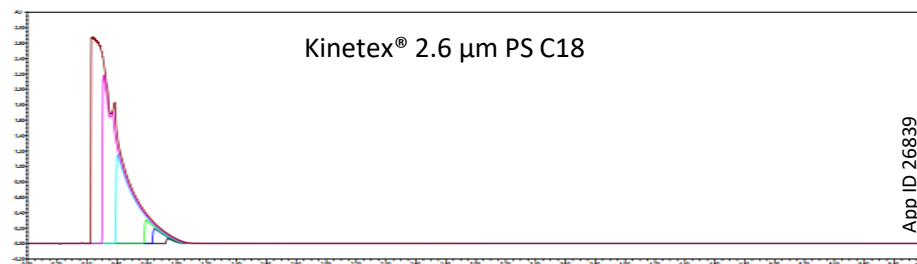




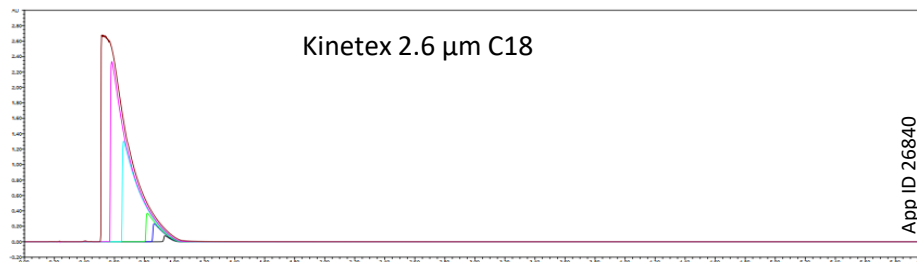
- 10 µg/mL
- 50 µg/mL
- 100 µg/mL
- 500 µg/mL
- 1000 µg/mL
- 5000 µg/mL



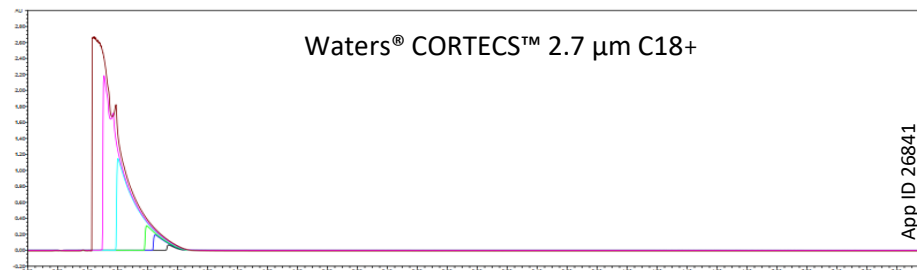
- 10 µg/mL
- 50 µg/mL
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- 500 µg/mL
- 1000 µg/mL
- 5000 µg/mL



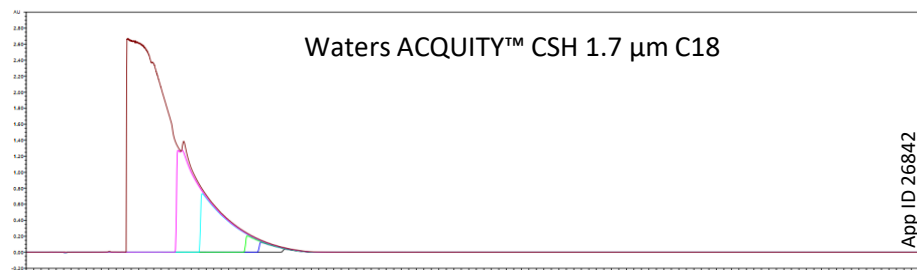
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- 500 µg/mL
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- 5000 µg/mL



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