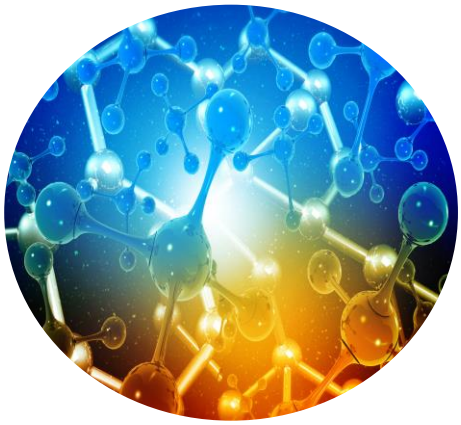

Performance of Surface Modified Luna® Omega and Kinetex® PS Columns for the Separation of Tricyclic Antidepressants

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Overview

Tricyclic Antidepressants (TCAs) 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 with residual unbonded silanol groups under low pH mobile phase conditions. However, the Luna Omega 1.6 µm PS C18 and the Kinetex 2.6 µm PS C18 columns are designed with 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, even when using a low ionic strength 0.1% formic acid buffer system.

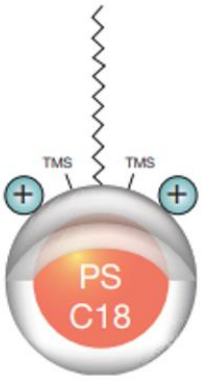
In this work, we compared the performance of six columns in the separation of three TCA analytes run under the same HPLC conditions. Compared to the traditionally bonded C18 columns with no positive ligand on the surface, the Luna and Kinetex PS C18 columns showed superior separation producing excellent peak shape and overall resolution (**Figure 1**, (**b**) and (**c**)). Both Luna Omega and Kinetex PS columns provided narrow peak widths with minimal peak tailing compared to the results obtained using competitor C18 columns with similar surface modification technology (**Figure 1**, (**e**) and (**f**)).

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

LC-UV Conditions

Column: Luna Omega 1.6 µm PS C18 (00B-4752-AN)
Luna Omega 1.6 µm C18 (00B-4742-AN)
Kinetex 2.6 µm PS C18 (00B-4780-AN)
Kinetex 2.6 µm C18 (00B-4462-AN)
Waters® CORTECS™ 2.7 µm C18+
Waters ACQUITY™ CSH 1.7 µm C18
Dimensions: 50 x 2.1 mm
Mobile Phase: A = 0.1% Formic Acid in Water
B = 0.1% Formic Acid in Acetonitrile
Pressure (bar): 420 (Luna Omega 1.6 µm PS C18)
480 (Luna Omega 1.6 µm C18)
270 (Kinetex 2.6 µm PS C18)
251 (Kinetex 2.6 µm C18)
207 (Waters Cortecs 2.7 µm C18+)
450 (Waters ACQUITY CSH 1.7 µm C18)
Flow Rate: 0.5 mL/min
Injection: 1 µL
Temperature: 30 °C
Detector: UV @ 254 nm
System: Agilent® 1260 Binary UHPLC

Kinetex PS C18



Luna Omega PS C18

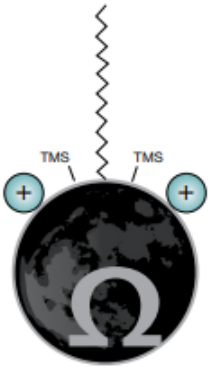
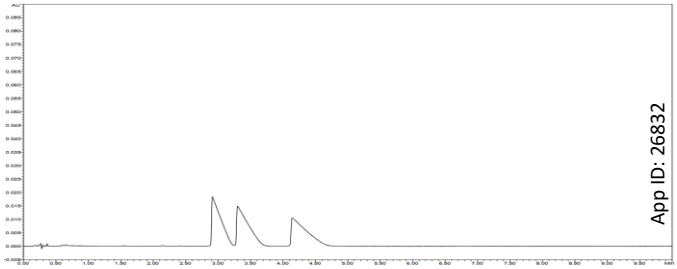


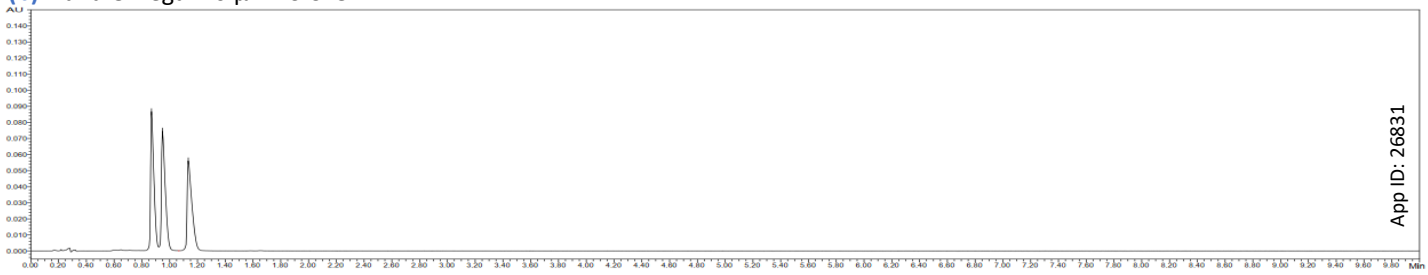
Figure 1. Results and Observations

(a). Luna® Omega 1.6 µm C18

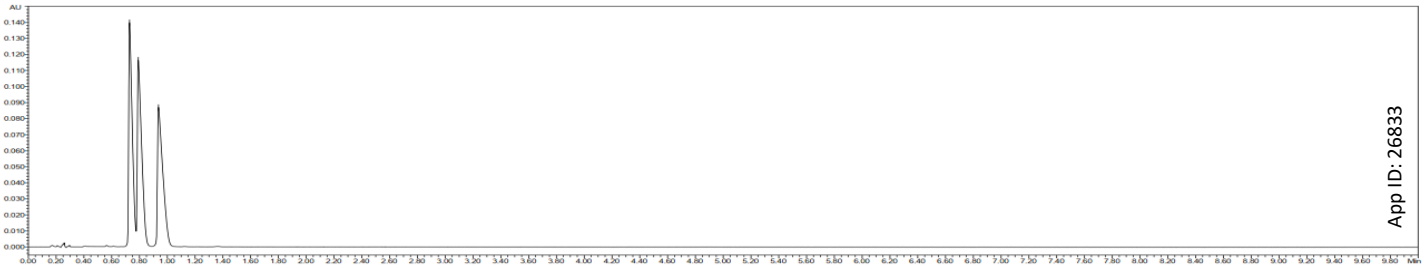


Peak #	Analyte
1	Desipramine
2	Imipramine
3	Amitriptyline

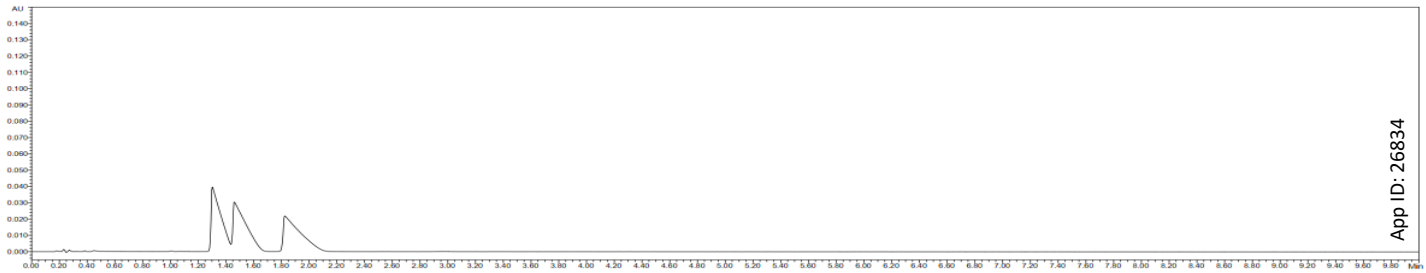
(b). Luna Omega 1.6 µm PS C18



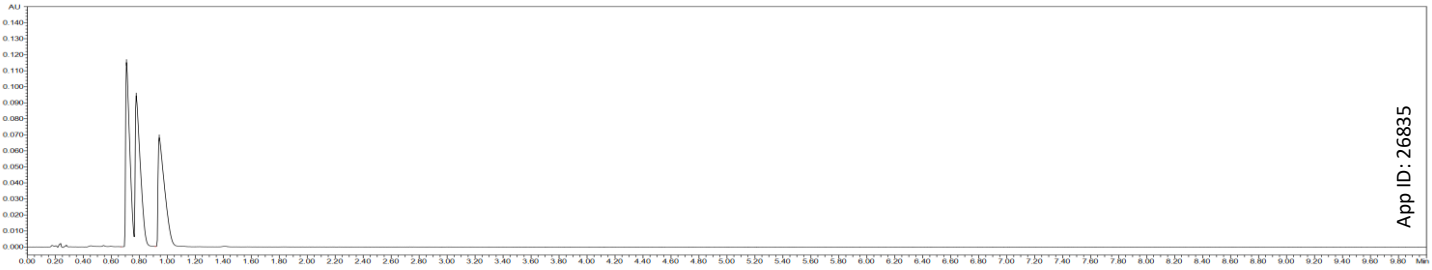
(c). Kinetex® 2.6 µm PS C18



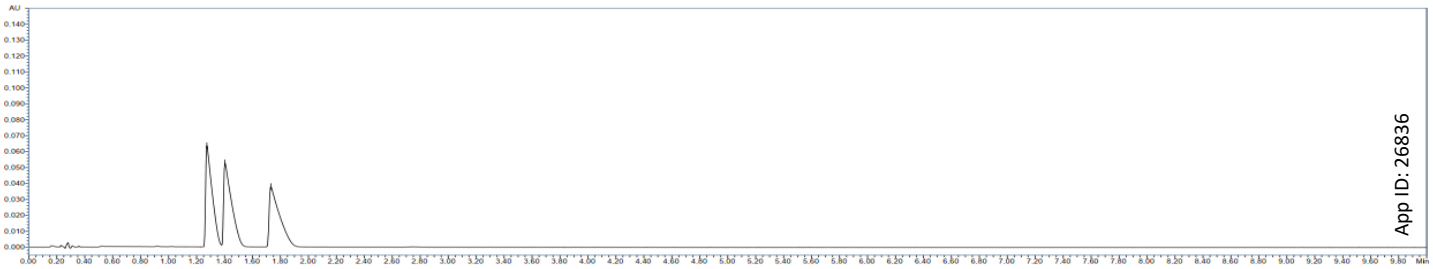
(d). Kinetex 2.6 µm C18



(e). Waters® CORTECS™ 2.7 µm C18+



(f). Waters ACQUITY™ CSH 1.7 µm C18



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