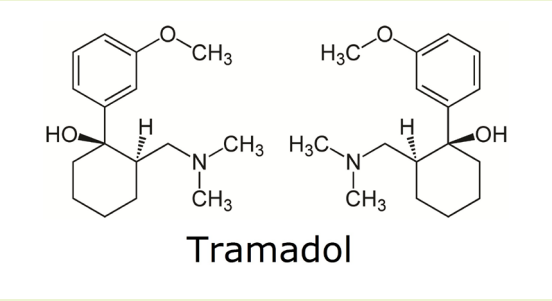
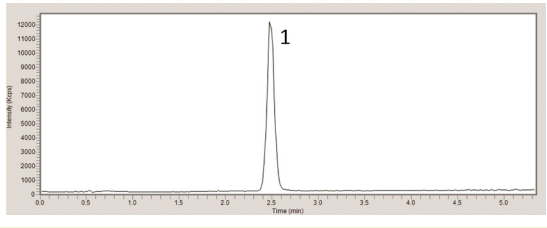
Tramadol

LC-MS Compatible Approach



Tramadol



Notes: Tramadol is an analgesic used to treat moderate to moderately severe pain. It can be used in both human and veterinary applications. It is sold under various formulation types and brand names, including Ryzolt®, Ultracet®, and Ultram®.

Method Conditions

Column: **Cogent Diamond Hydride™**, 4µm, 100Å

Catalog No.: 70000-10P-2

Dimensions: 2.1 x 100 mm

Solvents: A: DI H_2O/ 0.1% formic acid
B: Acetonitrile/ 0.1% formic acid

Gradient:

time (min.)	%B
0	90
5	90
7	30
8	30
10	90

Injection vol.: 1µL

Flow rate: 0.4 mL/min

Detection: ESI – POS - Agilent 6210 MSD TOF mass spectrometer

Sample: Tramadol HCl (50 mg) pill was ground with mortar and pestle into fine powder and was used to prepare 1 mg/mL stock solution in Milli-Q DI H_2O diluent. Then, the sample was sonicated for approximately 5 minutes prior to 0.45 micron membrane syringe filtration

Peak: 1. Tramadol, m/z 264.2 $(M+H)^+$

Discussion

Tramadol can be retained by reversed phase chromatography but some such reported methods use phosphate buffer additives in the mobile phase, which means incompatibility with LC-MS. In contrast, this presented approach featuring the Cogent Diamond Hydride column only uses formic acid as the mobile phase additive. The figure shows how the compound can be retained using this approach with a good peak shape as well.

As a further advantage, methods using this column are superior for LC-MS in terms of enhanced signal-to-noise compared to reversed phase. With the latter, higher water content in the mobile phase is often required for retention. Since water is less volatile than acetonitrile, it is more difficult to remove in LC-MS, hence leading to lower sensitivity. In contrast, this method approach uses a high acetonitrile content in the gradient, meaning you can expect improved sensitivity over an analogous reversed phase method. Another factor that can lead to increased sensitivity is the use of formic acid; under these conditions, the basic analyte is ionized, making it more amenable to MS detection.

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