APPLICATION BRIEF

Environmental

Analysis of Synthetic Steroids by UHPLC/SQ MS

Synthetic steroids and naturally occurring hormones are potent endocrine disruptors that may cause an adverse effect on aquatic species once they enter the environment through water systems. We present a UHPLC/SQ MS method for separating and detecting these compounds.

Experimental Conditions

Target Analytes: Norethindrone, d_6-norethindrone, tiblone, drospirenone, norgestrel, medroxyprogesterone, dehydrogesterone, cyproterone-acetate, progesterone, d_9-progesterone and medroxyprogesterone-acetate

Liquid Chromatography Conditions

Pump Type:	PerkinElmer® Flexar™ FX-15
Column:	PerkinElmer Brownlee™ HRes C18 column (2.1 mm x 50 mm, 1.9 µm)
Mobile Phase:	A: water with 0.1% acetic acid B: acetonitrile with 0.1% acetic acid
Flow Rate:	0.5 mL/min
Injection Volume:	2 µL in partial fill mode

Gradient:

Time (min)	%A	%B
0	60	40
2.9	54	46
2	54	46
1	40	60

Mass Spectrometer Conditions

Ionization:	Ultraspray™ ESI – Negative mode

The $[M-H]^-$ ions of each of the steroids were measured in three different time periods:

Time Period 1:	(0.0-2.0 min) SIM ions 299.2, 305.4, 313.2 for norethindrone, d_6-norethindrone and tiblone respectively; dwell time of 200 ms each
Time Period 2:	(2.0-3.5 min) SIM ions 313.2 for norgestrel and dehydrogesterone, 345.26 and 367.2 for medroxyprogesterone and drospirenone respectively; dwell time of 200 ms each
Time Period 3:	(3.5-5.9 min) SIM ions 315.21, 324.3, 387.28, 417.22 for progesterone, d_9-progesterone, medroxyprogesterone-acetate and cyproterone-acetate respectively; dwell time of 150 ms each
Capillary Exit Voltage:	100 V

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Results

To obtain optimal sensitivity the $[M-H]^-$ ions were monitored in SIM mode in three different time periods (Figure 1). The detection limits were in the range of 2.5 ng/mL for majority of the analytes (S/N >3).

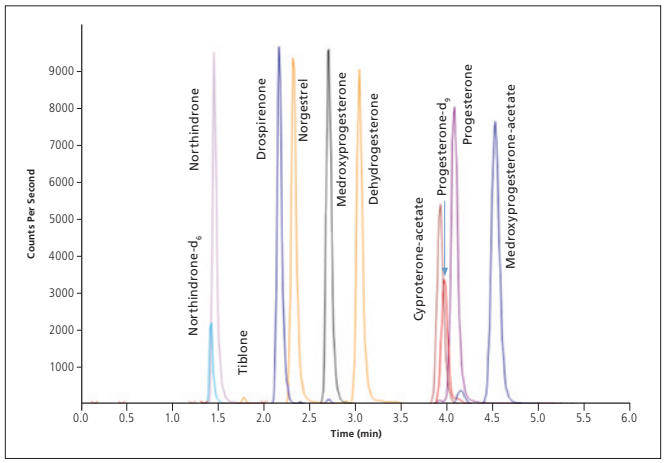

Figure 1. Overlaid chromatograms of $[M-H]^-$ ions for each of the steroids in SIM mode measured in three different time periods.

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