

METHOD STATEMENT

Determinand:

Substituted Urea Herbicides and Triazines

Matrix:

Surface waters, effluents and leachates

Principle of Method:

Substituted urea herbicides are isolated from aqueous solution using solid phase extraction. The compounds are eluted from the cartridges with ethyl acetate, which is then evaporated off and are re-dissolved in a suitable liquid chromatographic mobile phase.

The compounds are quantified by liquid chromatography with ultra violet diode array detection (UV-DAD). Confidence in the final analytical result is improved by using UV spectral matching algorithms.

Sampling and Sample Preparation:

Samples should be stored between 2 and 8°C.

Samples are stable for 21 days (in-house data) from sampling.

Interferences:

Any co-extracted material, which has a similar LC retention time and elicits a detector response, will interfere.

Performance of Method:

Range of Application: 50 – 5000 ng/l without dilution

Determinand	CAS Number	LOD	MRL	Low Std		High Std	
		ng/l	ng/l	% Bias	% RSD	% Bias	% RSD
Monuron	150-68-5	16.843	50	2.52	4.96	0.61	8.24
Methabenzthiazuron	18691-97-9	11.390	50	0.06	3.97	-2.94	3.55
Chlortoluron	15545-48-9	18.660	50	1.41	4.79	-1.75	2.69
Isoproturon	34123-59-6	20.603	50	1.18	4.24	-2.08	2.62
Diuron	330-54-1	40.871	50	1.98	4.25	-1.62	2.99
Monlinuron	1746-81-2	34.060	50	-0.84	11.69	-8.94	10.30
Linuron	330-55-2	24.847	50	-0.33	5.82	-3.78	4.06

20% Spiked Sample Recoveries

Determinand	Finham FE		Barston FE		Trade Effluent	
	% Bias	% RSD	% Bias	% Bias	% RSD	% Bias
Monuron	0.45	9.30	-1.21	9.32	-4.26	8.43
Methabenzthiazuron	-2.61	4.98	-3.95	5.41	-3.51	6.00
Chlortoluron	-0.65	5.16	-1.21	5.49	-3.01	6.15
Isoproturon	-3.18	5.70	-4.43	6.71	-2.89	7.17
Diuron	2.54	4.70	-4.25	5.76	-4.27	6.94
Mon linuron	0.04	6.21	-1.58	6.82	-2.09	8.90
Linuron	-7.38	7.64	-6.87	7.71	-7.35	8.61



METHOD STATEMENT



Determinand	Groundwater		Landfill Leachate		Surface Water	
	% Bias	% RSD	% Bias	% Bias	% RSD	% Bias
Monuron	-1.02	10.25	-2.85	10.38	-1.91	8.63
Methabenzthiazuron	0.56	8.00	1.06	7.83	0.23	6.48
Chlortoluron	1.12	7.89	-11.72	8.21	0.50	6.86
Isoproturon	-0.07	8.50	0.02	8.67	-0.53	7.32
Diuron	-0.03	8.63	-0.29	8.81	-0.87	7.55
Monlinuron	-1.17	9.47	-2.98	10.46	-5.25	9.99
Linuron	-0.75	8.86	-0.37	9.13	-1.49	7.37

80% Spiked Sample Recoveries

Determinand	Finham FE		Barston FE		Trade Effluent	
	% Bias	% RSD	% Bias	% RSD	% Bias	% RSD
Monuron	-2.84	10.62	-6.01	9.94	-7.45	7.84
Methabenzthiazuron	-3.71	4.22	-3.48	4.07	-3.75	4.65
Chlortoluron	-3.72	4.04	-3.73	4.00	-4.54	4.74
Isoproturon	-5.41	4.37	-4.98	5.76	-4.59	5.67
Diuron	-5.13	4.21	-5.95	5.44	-5.32	4.47
Monlinuron	-1.91	6.46	-1.96	7.20	-1.44	6.30
Linuron	-6.94	5.39	-6.54	5.95	-6.65	6.10

	Groundwater		Landfill Leachate		Surface Water	
	% Bias	% RSD	% Bias	% RSD	% Bias	% RSD
Monuron	-0.14	6.89	-2.58	8.31	-0.99	7.14
Methabenzthiazuron	1.45	3.09	1.22	3.86	1.31	3.24
Chlortoluron	0.96	3.07	-2.04	3.63	1.15	2.89
Isoproturon	0.02	3.95	0.11	3.94	0.65	4.54
Diuron	0.44	3.26	0.11	3.82	-0.08	2.93
Monlinuron	1.14	7.80	-1.03	11.07	-1.44	9.55
Linuron	0.10	3.73	-0.30	4.77	-0.07	4.19

Uncertainty of Measurement

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

Determinand	Uncertainty of Measurement %
Monuron	20.01
Methabenzthiazuron	10.52
Chlortoluron	16.3
Isoproturon	12.68
Diuron	11.48
Monlinuron	15.99
Linuron	15.17

References:

Phenylurea Herbicides (Urons), Dinocap, Dinoseb, Benomyl, Carbendazim and Metamitron in Waters 1994, HMSO, ISBN 0 11 752928-1.

