Astra®
ChromLine

PESTICIDES IN ENVIRONMENTAL MATRICES

ABSTRACT

This application describes a quick and robust LC-MS/MS method for simultaneous analysis of residual concentrations of pesticides in water matrices. The method provides a good separation and quantitative determination of pesticides and their isomers. Micro-Solid-Phase-Extraction (MSPE) has been used for sample clean-up.

INTRODUCTION

Pesticides play a critical role in food protection against pathogens and pests. However, pesticides pose significant risks to non-target organisms, including animals and humans. The number of pesticides is continuously growing as new active substances are being developed. For this reason, a robust and reliable method for simultaneous determination of multiple analytes, is very relevant today. ASTRA® Pesticides column is designed for routine environmental analysis and provides reliable retention under high-aqueous conditions for wide class of compounds including triazines, chlorophenoxy acids, organophosphates, fungicides and herbicide metabolites.

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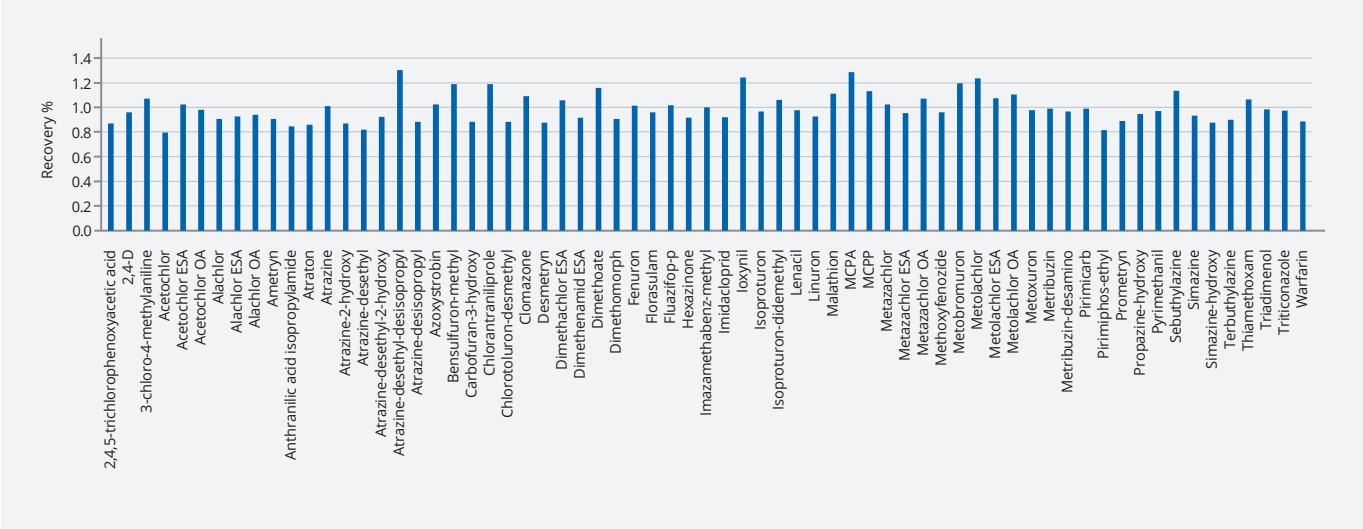
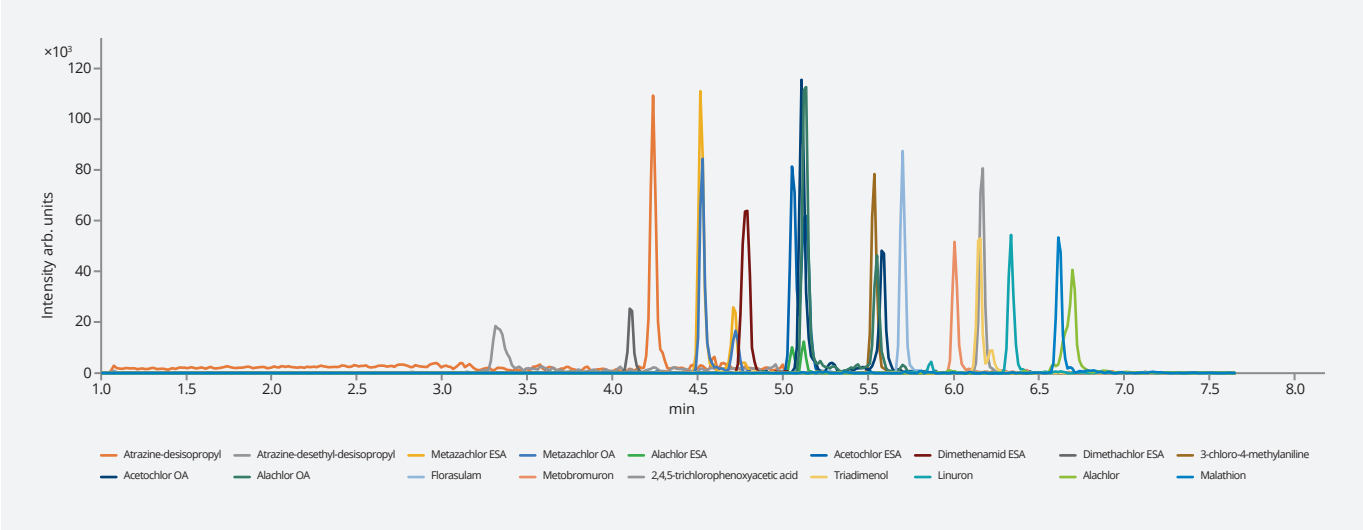
Pesticides in environmental matrices



Recovery results by MSPE method



Test solution 1 on ASTRA® Pesticides column

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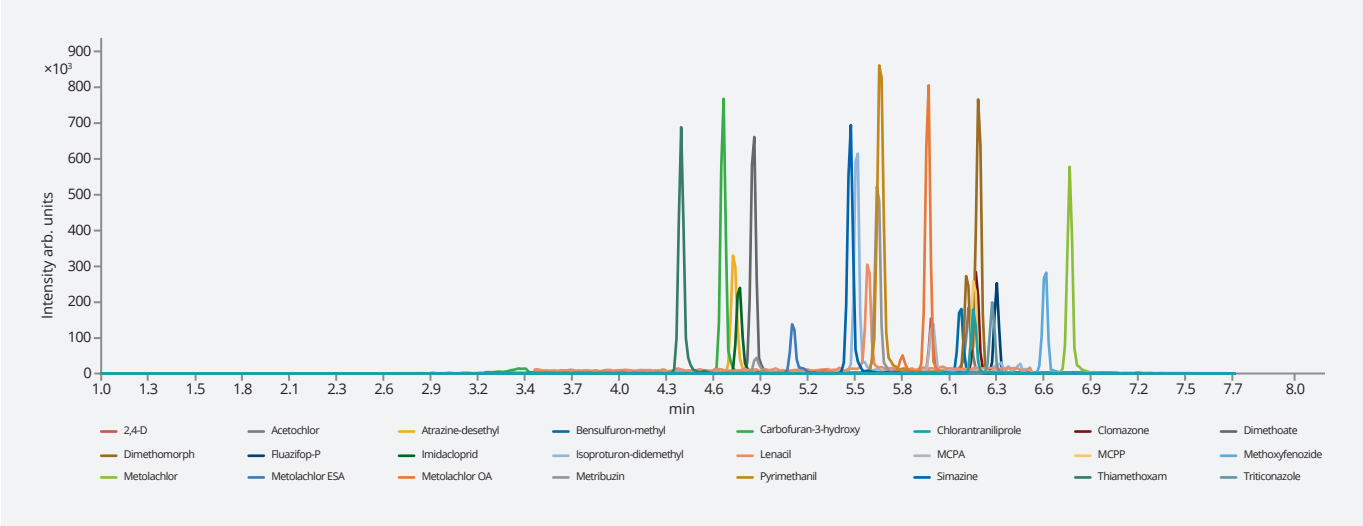
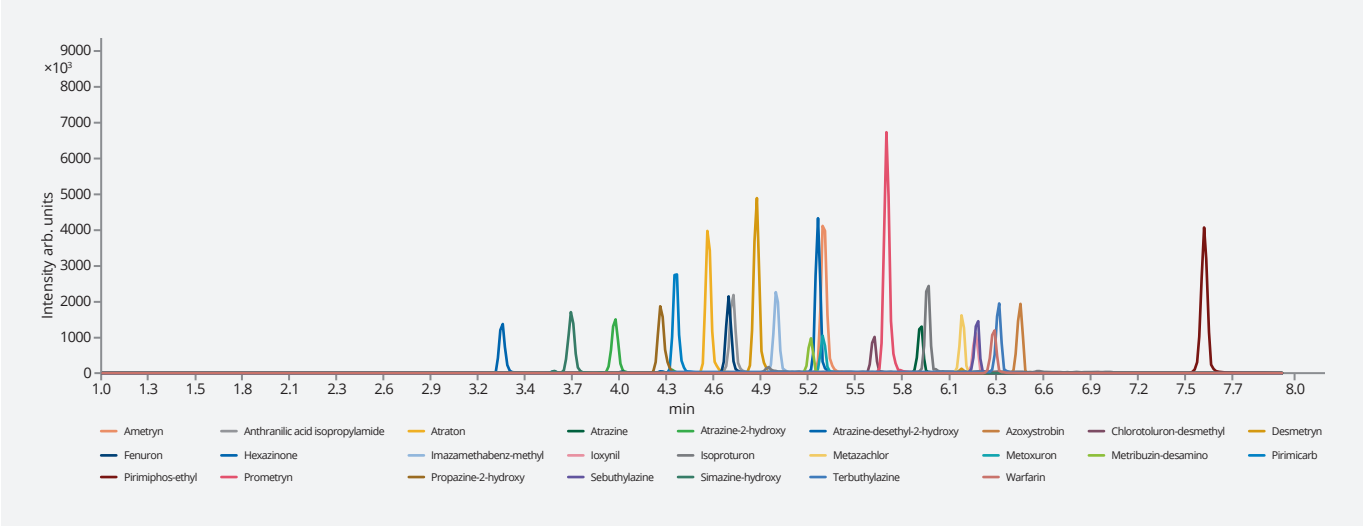
Pesticides in environmental matrices



Test solution 2 on ASTRA® Pesticides column



Test solution 3 on ASTRA® Pesticides column

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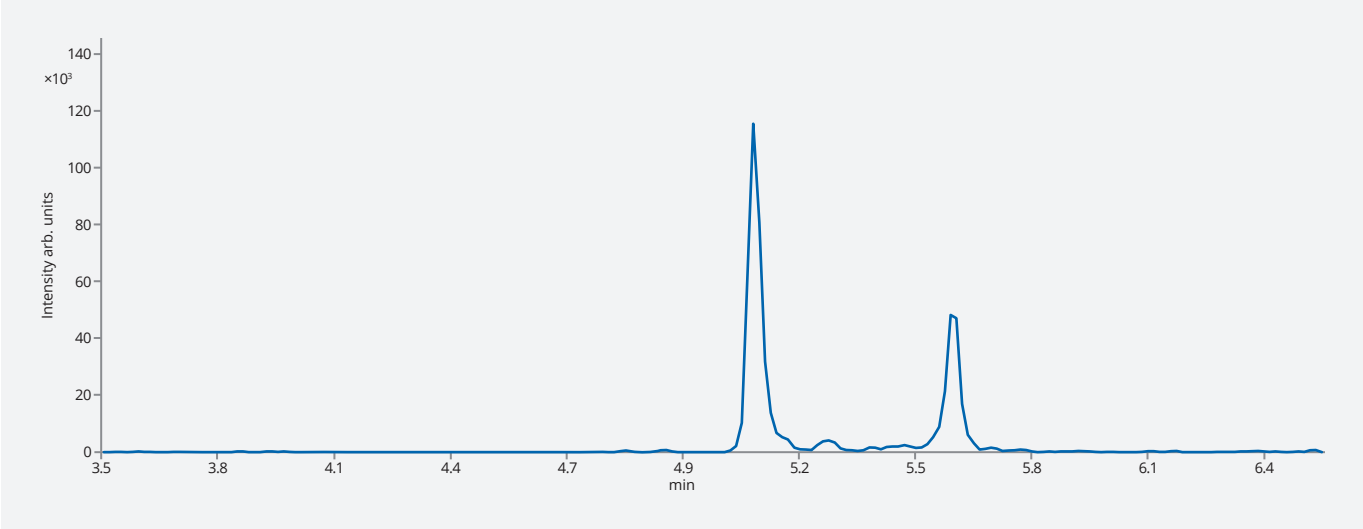
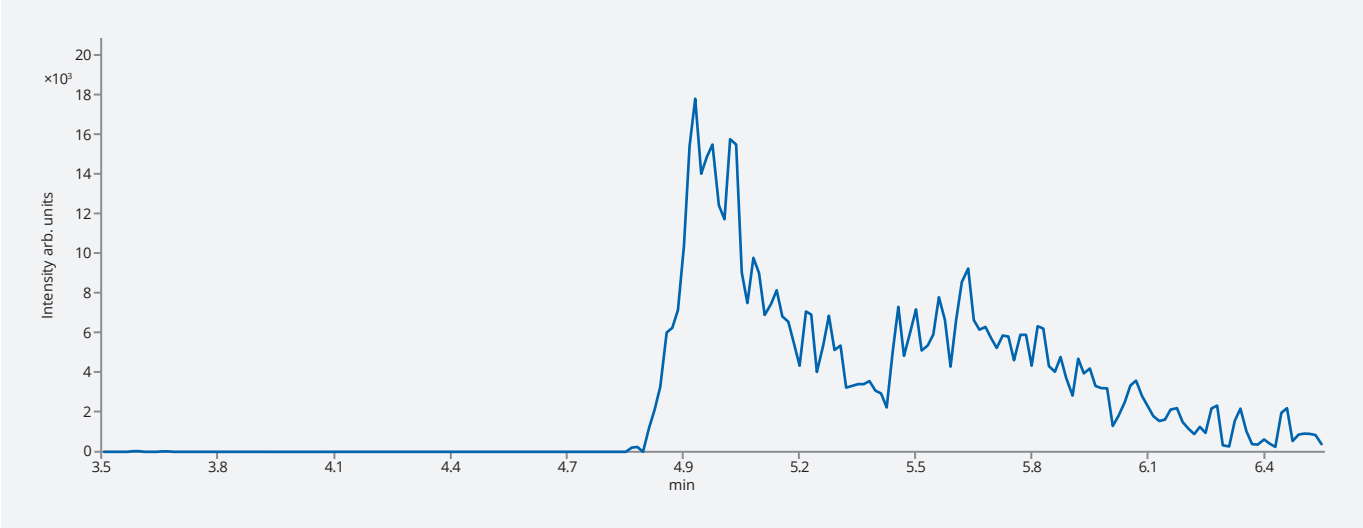
Pesticides in environmental matrices



Acetochlor OA on ASTRA® Pesticides column



Acetochlor OA on Competitive column

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Pesticides in environmental matrices

MSPE Method

MSPE Column	HLB, 0.22 µm PTFE hydrophilic membrane, 15 mg
Part number	MSP-5877-DA07
Equilibration	650 µL of Methanol, 650 µL of UPW
Sample	650 µL of UPW + std 10 ng/mL
Wash	650 µL of UPW
Elution	650 µL of Methanol

Centrifugation in Eppendorf minispin under 6000 rpm for 2 min.

HPLC Method

LC-MS conditions	TSQ Quantiva			
Column	ASTRA® Pesticides, 3 µm			
Dimensions	50 mm × 2.1 mm			
Part number	AST-6015-IG21			
Mobile phase	A: DDW + 0.1% Formic Acid B: ACN + 0.1% Formic Acid			
Gradient elution	Time	A (%)	B (%)	Flow µL/min
	0	100	0	300
	1	100	0	300
	4	60	40	350
	6	20	80	400
	9	0	100	400
	10	0	100	400
	10.1	100	0	300
	13	100	0	300
Temperature	30 °C			
Injection volume	10 µL			
Detection	HESI-MRM positive/negative ion mode			

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Pesticides in environmental matrices

Analytes	Compound	CAS	RT	Chromatogram	Comments
	2,4,5-trichlorophenoxyacetic acid	93-76-5	6.21	Test 1	
	2,4-D	94-75-7	5.91	Test 2	
	3-chloro-4-methylaniline	95-74-9	5.56	Test 1	
	Acetochlor	34256-82-1	6.13	Test 2	
	Acetochlor ESA	187022-11-3	5.06, 5.14	Test 1	2 peaks
	Acetochlor OA	194992-44-4	5.10, 5.60	Test 1	2 peaks
	Alachlor	15972-60-8	6.76	Test 1	
	Alachlor ESA	142363-53-9	5.06, 5.13	Test 1	2 peaks
	Alachlor OA	171262-17-2	5.14, 5.57	Test 1	2 peaks
	Ametryn	834-12-8	5.26	Test 3	
	Anthranilic acid isopropylamide	30391-89-0	4.7	Test 3	
	Atraton	1610-17-9	4.55	Test 3	
	Atrazine	1912-24-9	5.86	Test 3	
	Atrazine-2-hydroxy	2163-68-0	3.99	Test 3	
	Atrazine-desethyl	6190-65-4	4.7	Test 2	
	Atrazine-desethyl-2-hydroxy	19988-24-0	3.3	Test 3	
	Atrazine-desethyl-desisopropyl	3397-62-4	3.26	Test 1	
	Atrazine-desisopropyl	1007-28-9	4.22	Test 1	
	Azoxystrobin	131860-33-8	6.45	Test 3	
	Bensulfuron-methyl	83055-99-6	6.1	Test 2	
	Carbofuran-3-hydroxy	16655-82-6	4.64	Test 2	
	Chlorantraniliprole	500008-45-7	6.17	Test 2	
	Chlorotoluron-desmethyl	22175-22-0	5.56	Test 3	
	Clomazone	81777-89-1	6.18	Test 2	
	Desmetryn	1014-69-3	4.85	Test 3	
	Dimethachlor ESA	1231710-75-0	4.1	Test 1	
	Dimethenamid ESA	205939-58-8	4.78	Test 1	
	Dimethoate	60-51-5	4.83	Test 2	
	Dimethomorph	110488-70-5	6.12, 6.18	Test 2	2 peaks
	Fenuron	101-42-8	4.67	Test 3	
	Florasulam	145701-23-1	5.72	Test 1	
	Fluazifop-P	83066-88-0	6.29	Test 2	

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Analytes	Compound	CAS	RT	Chromatogram	Comments
	Hexazinone	51235-04-2	5.21	Test 3	
	Imazamethabenz-methyl	81405-85-8	4.95	Test 3	
	Imidacloprid	138261-41-3	4.75	Test 2	
	Ioxynil	1689-83-4	6.18	Test 3	
	Isoproturon	34123-59-6	5.87	Test 3	
	Isoproturon-didemethyl	56046-17-4	5.44	Test 2	
	Lenacil	2164-08-1	5.53	Test 2	
	Linuron	330-55-2	6.37	Test 1	
	Malathion	121-75-5	6.66	Test 1	
	MCPA	94-74-6	5.93	Test 2	
	MCPP	93-65-2	6.17	Test 2	
	Metazachlor	67129-08-2	6.09	Test 3	
	Metazachlor ESA	172960-62-2	4.51, 4.73	Test 1	2 peaks
	Metazachlor OA	1231244-60-2	4.51, 4.7	Test 1	2 peaks
	Methoxyfenozide	161050-58-4	6.58	Test 2	
	Metobromuron	3060-89-7	6.05	Test 1	
	Metolachlor	51218-45-2	6.73	Test 2	
	Metolachlor ESA	171118-09-5	5.05	Test 2	
	Metolachlor OA	152019-73-3	5.89	Test 3	
	Metoxuron	19937-59-8	5.25	Test 3	
	Metribuzin	52485-79-7	5.59	Test 2	
	Metribuzin-desamino	35045-02-4	5.17	Test 3	
	Pirimicarb	23103-98-2	4.35	Test 3	
	Pirimiphos-ethyl	23505-41-1	7.58	Test 3	
	Prometryn	7287-19-6	5.63	Test 3	
	Propazine-2-hydroxy	7374-53-0	4.26	Test 3	
	Pyrimethanil	53112-28-0	5.6	Test 2	
	Sebuthylazine	7286-69-3	6.19	Test 3	
	Simazine	122-34-9	5.42	Test 2	
	Simazine-hydroxy	2599-11-3	3.72	Test 3	
	Terbuthylazine	5915-41-3	6.32	Test 3	
	Thiamethoxam	153719-23-4	4.38	Test 2	
	Triadimenol	55219-65-3	6.19	Test 1	
	Triticonazole	131983-72-7	6.26	Test 2	
	Warfarin	81-81-2	6.28	Test 3	

Notes: OA – oxanilic acid, ESA – ethanesulfonic acid

ChromLine

The premium product brand of Chromservis s.r.o.

This application was developed in collaboration with Research Institute of Fish Culture and Hydrobiology, The Czech Republic

University of South Bohemia in České Budějovice
Faculty of Fisheries and Protection of Waters

CHROMSERVIS

Jakobiho 327/3 | 109 00 Praha 10 – Petrovice | Czech Republic | www.chromline.eu