

**Development of a CEN standardised method
for liquid chromatography coupled to
accurate mass spectrometry**

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1. Aim and scope

This report describes validation data of pesticides in LC-QOrbitrap. Validation covered the following matrices: pear, tomato, and orange.

2. Short description

Homogenous sample is extracted with acetonitrile. The obtained extract is analysed by LC-QOrbitrap.

3. Apparatus and consumables

- Automatic pipettes, suitable for handling volumes of 10 μ L to 5000 μ L
- 50 ml PTFE centrifuge tubes
- Vortex
- Automatic axial extractor
- Centrifuge, suitable for the centrifuge tubes employed in the procedure and capable of achieving at least 3300 rpm
- Injection vials, 2 ml, suitable for LC auto-sampler

4. Chemicals

- Acetonitrile ultra-gradient grade
- Methanol LC-MS grade
- Water LC-MS grade
- Formic acid
- Ammonium formate
- Trisodium citrate dihydrate
- Sodium chloride
- Disodium hydrogencitrate sesquihydrate
- Anhydrous magnesium sulphate
- Pesticides standards

5. Procedure

5.1. Sample preparation

Following Document No. SANTE/11813/2017, the sample was perfectly homogenised by grinding.

5.2. Recovery experiments for method validation

The samples employed in validation studies did not contain any of the pesticides analysed.

For spiking, 10 g representative portions of previously homogenised sample were weighed in PTFE tubes, where they were spiked homogeneously with the appropriate amount of the working standard solution.

The validation method was performed at three fortification levels (0.010, 0.02 and 0.100 mg/Kg). Six replicates were analysed at each level.

5.3. Extraction method

1. Weigh 10 g \pm 0.1 g of sample in 50 mL PTFE centrifuge tube.
2. Add 10 mL of acetonitrile and 50 μ L of 10 mg/L of dichlorvos-d₆, carbendazim-d₃ and malathion-d₁₀ (internal surrogate standards)
3. Shake in automatic axial extractor for 4 minutes.
4. Add 4 g of anhydrous magnesium sulphate, 1 g of sodium chloride, 1g of trisodiumcitrate dehydrate and 0.5 g of disodium hydrogencitrate sesquihydrate.
5. Shake in automatic axial extractor for 4 minutes.
6. Centrifuge for 5 min at 3500 rpm.
7. Before injection 100 μ L of extract were diluted with 400 μ L of ultra-pure water containing 0.0625 mg/L of dimethoate-d₆ and 2.4-D-¹³C .

5.4. Measurement

Data were acquired simultaneously in three acquisition modes: full scan MS, data dependent MS₂ and AIF. The masses of the quantifiers and qualifiers are presented in Appendix I.

5.5. Instrumentation and analytical conditions

5.5.1. Dionex Ultimate 3000

- Column: Phenomenex Luna C8 100mm x 2mm x 3 µm
- Mobile phase A: 98 % water, 2% methanol, ammonium formate 5 mM, formic acid 0.1%
- Mobile phase B: 98 % methanol, 2% water, ammonium formate 5 mM, formic acid 0.1%
- Column temperature: 30°C
- Flow rate: 0.35 mL/min
- Injection volume: 10 µL

Mobile phase gradient for positive polarity

Time [min]	Mobile phase A	Mobile phase B
-3	100%	0%
0	100%	0%
1	100%	0%
2	70%	30%
3	50%	50%
11	0%	100%
14	0%	100%

Mobile phase gradient for negative polarity

Time [min]	Mobile phase A	Mobile phase B
-3	70%	30%
0	70%	30%
7	0%	100%
10	0%	100%

5.5.2. QExactive Focus HESI source parameters

- Sheath gas Flow rate (mL/min) 40
- Aux gas Flow rate (mL/min) 5
- Sweep gas Flow rate (mL/min) 1
- Spray voltage (V) 3.00
- Capillary temp (°C) 280
- S-lens RF level 55
- Aux gas heater temp (°C) 350

5.5.3. QExactive Focus data acquisition parameters:

FULL MS

General

Polarity	<u>Positive</u>
dd-MS ²	Confirmation
Resolution	70,000
Scan range	138 to 910 m/z
AGC target	1e6
Maximum IT	auto

dd-MS² Confirmation

Resolution	17,500
Isolation window	1.5 m/z
(N)CE / stepped (N)CE	ce: 30
AGC target	2e5
Maximum IT	auto
Loop count	1
Minimum AGC target	—
Intensity threshold	0.0e0
Apex trigger	2 to 4 s
Dynamic exclusion	auto
Spectrum data type	Profile

AIF

Polarity	Positive
Resolution	70,000
Scan range	50 to 750 m/z
(N)CE / stepped (N)CE	ce: 25
AGC target	1e6
Maximum IT	auto
Microscans	1
Spectrum data type	Profile

FULL MS

General

Polarity	<u>Negative</u>
Resolution	70,000
Scan range	200 to 700 m/z
AGC target	1e6
Maximum IT	auto
Microscans	1
Spectrum data type	Profile

PRM

Resolution	17,500
Isolation window	1.5 m/z

Isolation offset	—
(N)CE / stepped (N)CE	ce: 30
AGC target	1e6
Maximum IT	auto
Microscans	1
Spectrum data type	Profile

6. Validation of the method

Validation was carried out according to SANTE/11813/2017. Validation results are presented in Appendix II.

This report aims to provide information to laboratories that analyse pesticide residues in fruits and vegetables or are interested in it.

7. References

- **Guidance document on analytical quality control and method validation procedures for pesticide residues and analysis in food and feed.** Document N° SANTE/11813/2017.
- <http://www.eurl-pesticides.eu>

APPENDIX I: EXACT MASSES
Table 1. List of quantifiers and qualifiers ions of pesticides included into validation study.

* *low sensitive pesticides have two qualifiers assigned. In case of non-detection of first qualifier the second one is searched.*

Pesticide	Quantifier (MS)	Qualifier (MS2)	Qualifier 2 (MS2)*
2,4-D	218.9621	160.9568	
Abamectin	890.526	567.3316	193.1587
Acephate	142.9928	112.9998	
Acetamiprid	223.0745	126.0106	
Aldicarb	213.0668	89.04195	70.06512
Aldicarb-sulfone	223.0747	86.0599	
Aldicarb-sulfoxide	207.0798	73.06487	89.0426
Azinphos-methyl	318.0131	142.9927	
Azoxystrobin	404.1241	344.1031	
Bitertanol	338.1863	70.03997	
Boscalid	343.0399	307.0634	
Bromuconazole	375.9614	158.9763	
BTS_44595	325.0272	129.1024	
BTS_44596	353.0221	308.001	
BTS-40348	282.0214	86.0965	
Bupirimate	317.1642	166.0978	
Buprofezin	306.1635	116.0529	57.07022
Cadusafos	271.095	158.9699	
Carbaryl	145.0648	115.0544	
Carbendazim	192.0768	160.0506	
Carbofuran	222.1125	123.0599	
Carbofuran. 3OH-	238.1074	181.0861	
Chlorantraniliprole	481.9781	283.9222	
Chlorfenvinphos	358.9768	127.0156	
Chlorpyrifos	349.9336	114.9614	
Clofentezine	303.0199	130.04	
Clothianidin	250.016	131.9967	
Cymoxanil	199.0826	129.0294	
Cyproconazole	292.1211	125.0155	
Cyprodinil	226.1339	93.0573	
Demeton-S-Methyl-Sulfone	263.0171	127.0155	
Demeton-S-methylsulfoxide	247.0222	169.0083	

Diazinon	305.1083	169.7972	
Dichlorvos	220.9532	127.0154	
Difenoconazole	406.027	251.0026	
Diflubenzuron	311.0393	141.0147	
Dimethoate	230.0069	198.9649	
Dimethomorph	388.131	301.0629	
Diniconazole	326.0821	70.03988	
Epoxiconazole	330.0804	121.0449	
Ethion	384.9949	142.9387	
Ethirimol	210.1601	98.06002	
Ethoprophos	243.0637	172.9855	
Etofenprox	394.2377	177.1274	
Famoxadone	392.1605	93.05731	
Fenamidone	312.1165	92.04947	
Fenamiphos	304.1131	217.0084	
Fenamiphos-sulfone	336.1029	266.0249	
Fenamiphos-sulfoxide	320.108	251.0138	
Fenarimol	331.0399	81.0447	
Fenazaquin	307.1805	161.1325	
Fenbuconazole	337.1215	125.0153	
Fenhexamid	302.0709	97.1013	
Fenoxycarb	302.1387	116.0706	
Fenpropathrin	350.1751	125.0962	
Fenpropidin	274.2529	147.1169	
Fenpropimorph	304.2635	147.117	
Fenpyroximate	422.2074	366.1451	
Fenthion	279.0273	169.0141	
Fenthion-oxon	263.0501	231.0224	
Fenthion-oxon-sulfone	295.04	217.0625	
Fenthion-oxon-sulfoxide	279.0451	104.0622	
Fenthion-sulfone	311.0171	142.9928	
Fenthion-sulfoxide	295.0222	279.9987	
Fipronil	434.9314	329.9597	
Fipronil-sulfone	450.9263	183.0176	
Fonicamid	230.0536	203.043	
Flubendiamide	681.016	271.922	
Fludioxonil	247.0325	180.0329	
Flufenoxuron	489.0435	158.0412	
Fluopyram	397.0537	208.0137	
Fluquinconazole	376.0163	349.0046	

Flusilazole	316.1076	165.0699	
Flutriafol	302.11	70.03997	
Formetanate	222.1237	120.0445	
Fosthiazate	284.0539	227.9915	
Haloxyfop	362.0402	91.05423	
Haloxyfop-2-Ethoxyethyl	434.0977	316.0345	
Haloxyfop-methyl	376.0558	91.05428	
Hexaconazole	314.0821	70.0399	
Hexythiazox	353.1085	228.0246	
Imazalil	297.0556	158.9764	
Imidacloprid	256.0596	209.0588	
Indoxacarb	528.078	218.0428	
Isocarbophos	230.9875	121.0285	
Kresoxim-methyl	314.1387	222.0912	
Linuron	249.0192	159.9719	
Lufenuron	508.9712	338.9747	
Malaoxon	315.0662	99.0077	
Malathion	331.0433	127.039	
Mandipropamid	412.131	328.1101	
Mepanipyrim	224.1182	106.0651	
Metaflumizone	505.1105	302.0911	
Metalaxyl	280.1543	220.1332	
Metconazole	320.1524	70.03998	
Methamidophos	142.0086	112.0158	
Methidathion	145.0066	71.02399	
Methiocarb	226.0896	121.0648	
Methiocarb-sulfone	258.0795	122.0728	
Methiocarb-sulfoxide	242.0845	122.0726	
Methomyl	163.0536	106.0322	88.02159
Methoxyfenozide	369.2173	149.0597	
Monocrotophos	224.0682	127.0156	
Myclobutanil	289.1215	70.0399	
Omethoate	214.0297	142.9926	
Oxadixyl	279.1339	133.0887	
Oxamyl	237.1016	72.0444	
Paclobutrazol	294.1368	70.03998	
Paraoxon methyl	248.0319	127.0155	
Penconazole	284.0716	70.03998	
Pencycuron	329.1415	125.0153	
Pendimethalin	282.1448	212.0666	

Phenthoate	321.0379	247.0013	
Phosalone	367.9941	182.0003	
Phosmet	318.0018	160.0395	
Phosmet oxon	302.0247	160.0393	
Phoxim	299.0614	129.0447	
Pirimicarb	239.1503	72.0444	
Pirimicarb. desmethyl-	225.1346	72.0444	
Pirimiphos-methyl	306.1036	108.0557	
Prochloraz	376.0381	308.0008	
Profenofos	372.9424	302.8644	
Propamocarb	189.1598	102.0549	
Propargite	368.189	231.1745	
Propyzamide	256.0291	189.9822	
Prothioconazole	344.0386	70.03998	
Prothioconazole-Desthio	312.0665	70.03998	
Pyraclostrobin	388.1059	163.0628	
Pyridaben	365.1449	147.117	
Pyrimethanil	200.1182	82.06508	
Pyriproxyfen	322.1438	96.04436	
Quinoxifen	308.004	213.982	
Spinosyn A	732.4681	142.1226	
Spinosyn D	746.4838	142.1227	
Spirodiclofen	411.1124	313.0391	
Spiromesifen	371.2217	273.145	
Spiroxamine	298.2741	144.1384	
Tebuconazole	308.1524	70.03998	
Tebufenozide	353.2224	133.065	
Tebufenpyrad	334.1681	145.0528	
Teflubenzuron	378.967	338.9546	
Terbutylazine	230.1167	174.0543	
Tetraconazole	372.0288	158.9763	
Thiabendazole	202.0433	175.0324	
Thiacloprid	253.0309	126.0105	
Thiamethoxam	292.0266	131.9671	
Thiodicarb	355.0563	88.02159	
Triadimefon	294.1004	197.0728	
Triadimenol	296.116	70.03997	
Triazophos	314.0723	162.0662	
Trifloxystrobin	409.137	186.0527	
Triflumuron	359.0405	156.0212	

Triticonazole	318.1368	70.03998	
Zoxamide	336.0319	186.9715	

APPENDIX II: VALIDATION RESULTS

Pear

Recoveries

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
Abamectin	78.80%	12%	113.90%	8%	109.40%	5%
Acephate	80.60%	6%	91.10%	2%	92.10%	1%
Acetamiprid	89.30%	6%	103.30%	4%	104.90%	0%
Aldicarb-sulfone	88.20%	4%	100.10%	3%	103.10%	2%
Aldicarb-sulfoxide	79.00%	5%	99.90%	4%	95.90%	2%
Azinphos-methyl	90.00%	3%	104.80%	6%	104.20%	3%
Azoxystrobin	88.30%	3%	103.10%	3%	106.30%	1%
Bitertanol	101.70%	6%	119.20%	7%	112.20%	3%
Boscalid	98.80%	4%	115.30%	5%	108.20%	1%
Bromuconazole	85.70%	3%	105.90%	3%	105.10%	2%
BTS_44595	92.30%	3%	112.20%	2%	107.40%	1%
BTS_44596	90.40%	5%	107.60%	2%	106.60%	2%
BTS-40348	87.50%	5%	110.80%	3%	102.50%	1%
Bupirimate	88.70%	5%	105.20%	4%	103.70%	1%
Buprofezin	82.80%	3%	94.30%	4%	100.00%	1%
Cadusafos	89.70%	3%	104.40%	3%	105.50%	2%
Carbaryl	88.60%	4%	103.00%	2%	104.10%	1%
Carbendazim	81.10%	3%	89.60%	2%	95.80%	1%
Carbofuran	88.50%	4%	103.90%	3%	104.40%	1%
Carbofuran. 3OH-	89.80%	4%	102.30%	3%	103.90%	1%
Chlorantraniliprol e	90.10%	5%	104.50%	3%	104.70%	1%
Chlorfenvinphos	89.90%	5%	103.90%	4%	105.60%	2%
Chlorpyrifos	99.20%	6%	110.80%	3%	113.00%	1%
Clofentezine	91.90%	1%	104.90%	5%	107.30%	2%
Clothianidin	85.50%	5%	102.90%	3%	100.90%	2%
Cymoxanil	87.10%	9%	106.00%	6%	107.90%	4%
Cyproconazole	92.60%	3%	110.10%	4%	104.10%	2%

Cyprodinil	86.40%	4%	103.00%	3%	101.70%	1%
Demeton-S-Methyl-Sulfone	85.60%	4%	100.80%	3%	103.80%	2%
Demeton-S-methylsulfoxide	84.40%	4%	100.00%	4%	98.20%	1%
Diazinon	87.40%	4%	103.70%	4%	105.60%	1%
Dichlorvos	86.30%	5%	83.70%	4%	101.00%	1%
Difenoconazole	95.00%	4%	117.60%	4%	109.70%	2%
Diflubenzuron	93.40%	5%	107.40%	3%	105.70%	2%
Dimethoate	88.20%	6%	99.40%	3%	102.60%	1%
Dimethomorph	93.20%	5%	110.90%	3%	111.00%	2%
Diniconazole	91.70%	3%	107.30%	2%	106.60%	1%
Epoxiconazole	89.80%	5%	106.90%	3%	103.20%	1%
Ethion	97.40%	5%	116.30%	3%	117.60%	2%
Ethirimol	82.20%	4%	96.80%	3%	96.80%	1%
Ethoprophos	89.70%	3%	104.90%	3%	104.40%	1%
Famoxadone	95.50%	5%	117.80%	5%	108.90%	2%
Fenamidone	97.70%	6%	115.70%	3%	108.90%	1%
Fenamiphos	87.60%	3%	102.90%	3%	103.90%	1%
Fenamiphos-sulfone	91.70%	6%	105.30%	4%	104.30%	1%
Fenamiphos-sulfoxide	90.20%	4%	105.30%	3%	104.50%	1%
Fenarimol	88.80%	6%	104.70%	4%	104.80%	1%
Fenazaquin	85.60%	4%	105.10%	2%	107.20%	1%
Fenbuconazole	91.60%	3%	108.60%	6%	106.20%	1%
Fenhexamid	89.60%	4%	110.00%	2%	105.50%	2%
Fenoxycarb	88.70%	4%	105.90%	3%	105.90%	2%
Fenpropathrin	101.30%	6%	116.80%	5%	119.90%	2%
Fenpropidin	91.60%	4%	107.40%	4%	106.40%	1%
Fenpropimorph	91.90%	5%	108.20%	4%	108.30%	2%
Fenpyroximate	97.40%	5%	115.70%	3%	114.40%	3%
Fenthion	83.50%	5%	99.40%	4%	99.30%	3%
Fenthion-oxon	86.30%	4%	103.90%	1%	103.30%	1%
Fenthion-oxon-sulfone	89.30%	3%	104.60%	1%	102.80%	1%
Fenthion-oxon-sulfoxide	89.20%	4%	105.10%	2%	102.40%	2%
Fenthion-sulfone	73.50%	12%	90.80%	19%	105.00%	4%
Fenthion-sulfoxide	94.80%	4%	107.40%	2%	112.70%	1%
Fipronil	91.80%	4%	109.00%	7%	99.20%	2%
Fipronil-sulfone	94.30%	3%	108.50%	2%	109.90%	1%

Flonicamid	76.10%	6%	104.20%	6%	95.80%	2%
Flubendiamide	91.80%	5%	111.90%	13%	96.70%	5%
Fludioxonil	91.00%	4%	103.80%	4%	99.70%	3%
Fluopyram	90.10%	4%	104.30%	4%	104.30%	1%
Fluquinconazole	87.50%	9%	99.60%	20%	106.50%	3%
Flusilazole	88.70%	5%	104.90%	2%	105.00%	2%
Flutriafol	87.80%	5%	105.10%	4%	105.40%	1%
Formetanate	80.30%	3%	91.80%	2%	94.50%	2%
Fosthiazate	90.50%	4%	106.80%	3%	104.50%	1%
Haloxyfop	100.80%	7%	115.10%	3%	109.40%	4%
Haloxyfop-2-Ethoxyethyl	91.60%	5%	108.30%	2%	105.30%	0%
Haloxyfop-methyl	91.10%	4%	106.60%	1%	106.30%	1%
Hexaconazole	90.10%	3%	112.70%	4%	108.40%	2%
Hexythiazox	94.40%	4%	112.40%	3%	109.80%	2%
Imazalil	88.60%	3%	100.80%	4%	102.00%	1%
Imidacloprid	85.70%	4%	102.40%	3%	101.60%	1%
Indoxacarb	92.90%	4%	112.20%	3%	108.80%	1%
Isocarbophos	91.60%	4%	106.50%	4%	105.10%	2%
Kresoxim-methyl	87.70%	4%	106.10%	5%	104.70%	2%
Linuron	89.90%	4%	104.00%	3%	105.30%	1%
Lufenuron	115.50%	12%	75.80%	6%	119.40%	3%
Malaoxon	90.50%	4%	114.70%	2%	103.80%	2%
Malathion	90.70%	4%	104.90%	2%	105.30%	1%
Mandipropamid	93.70%	3%	111.50%	3%	108.70%	2%
Mepanipyrim	90.40%	4%	106.60%	4%	105.00%	2%
Metalaxyl	90.10%	5%	105.60%	3%	104.90%	1%
Metconazole	93.90%	4%	119.10%	5%	109.10%	2%
Methamidophos	72.70%	5%	85.60%	3%	85.00%	6%
Methidathion	88.00%	4%	104.40%	6%	104.40%	1%
Methiocarb	89.80%	3%	103.90%	2%	104.30%	1%
Methiocarb-sulfone	88.90%	4%	105.40%	3%	105.00%	2%
Methiocarb-sulfoxide	86.40%	5%	99.70%	4%	100.50%	2%
Methomyl	92.10%	19%	94.20%	13%	95.90%	9%
Methoxyfenozide	87.70%	3%	104.80%	1%	105.70%	1%
Monocrotophos	85.40%	4%	96.70%	4%	99.40%	1%
Myclobutanil	90.50%	5%	106.20%	3%	106.10%	2%
Omethoate	82.80%	4%	96.00%	4%	96.00%	2%
Oxadixyl	97.90%	6%	102.20%	3%	104.80%	3%

Oxamyl	83.90%	6%	99.90%	10%	100.10%	3%
Paclobutrazol	89.80%	5%	108.50%	3%	106.80%	1%
Paraoxon methyl	89.50%	6%	106.80%	2%	104.30%	2%
Penconazole	88.70%	5%	104.70%	4%	104.30%	2%
Pencycuron	90.50%	3%	106.60%	4%	105.20%	2%
Pendimethalin	96.40%	5%	110.90%	3%	111.80%	2%
Phenthoate	89.90%	4%	104.50%	4%	104.50%	2%
Phosalone	93.00%	5%	111.00%	3%	109.80%	2%
Phosmet	91.30%	5%	106.00%	4%	104.60%	1%
Phosmet oxon	95.10%	4%	99.70%	2%	99.90%	2%
Phoxim	90.10%	5%	108.00%	3%	106.90%	1%
Pirimicarb	89.10%	3%	101.60%	2%	103.40%	2%
Pirimicarb. desmethyl-	85.70%	3%	97.20%	2%	98.00%	1%
Pirimiphos-methyl	88.90%	4%	105.60%	4%	106.20%	1%
Prochloraz	73.10%	5%	89.60%	3%	91.20%	3%
Profenofos	92.70%	4%	110.20%	3%	105.90%	2%
Propamocarb	79.10%	5%	95.90%	2%	96.20%	2%
Propargite	98.50%	3%	114.30%	3%	114.70%	2%
Propiconazole	90.70%	3%	108.10%	5%	106.00%	2%
Propyzamide	89.20%	4%	106.60%	2%	104.90%	2%
Prothioconazole-Desthio	90.70%	4%	104.40%	3%	102.20%	1%
Pyraclostrobin	89.00%	3%	106.50%	3%	106.50%	2%
Pyridaben	86.10%	7%	105.90%	3%	106.40%	2%
Pyrimethanil	88.30%	4%	103.50%	3%	103.20%	1%
Pyriproxyfen	92.10%	5%	104.80%	2%	108.20%	2%
Quinoxifen	80.30%	7%	87.80%	5%	99.40%	2%
Spinosad	89.30%	5%	108.80%	4%	104.70%	2%
Spirodiclofen	93.80%	7%	116.50%	5%	112.40%	2%
Spiromesifen	92.70%	4%	111.70%	7%	110.60%	1%
Spiroxamine	92.80%	4%	106.20%	3%	105.10%	2%
Tebuconazole	87.80%	4%	106.50%	4%	104.10%	1%
Tebufenozide	83.00%	6%	99.80%	5%	101.50%	2%
Tebufenpyrad	90.20%	5%	107.50%	3%	104.70%	1%
Teflubenzuron	117.80%	11%	88.20%	7%	118.70%	2%
Terbutylazine	90.90%	3%	105.60%	3%	105.60%	2%
Tetraconazole	89.50%	3%	105.50%	3%	104.80%	1%
Thiabendazole	79.20%	4%	93.80%	2%	92.90%	1%
Thiacloprid	90.40%	4%	103.60%	3%	104.10%	2%
Thiamethoxam	84.10%	5%	98.40%	3%	99.60%	2%

Thiodicarb	88.80%	4%	105.00%	4%	104.00%	1%
Triadimefon	93.20%	4%	106.00%	1%	105.10%	1%
Triadimenol	90.00%	6%	104.80%	4%	101.90%	2%
Triazophos	89.60%	5%	105.70%	3%	106.40%	1%
Trifloxystrobin	90.70%	4%	107.90%	3%	109.50%	2%
Triflumuron	91.60%	6%	112.80%	5%	109.10%	2%
Triticonazole	89.30%	4%	106.00%	4%	103.30%	1%
Zoxamide	90.80%	4%	107.70%	3%	106.00%	2%

Repeatability

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
Abamectin	104.50%	18%	103.80%	19%	98.60%	9%
Acephate	81.80%	1%	87.10%	5%	90.20%	5%
Acetamiprid	90.50%	2%	99.20%	4%	99.60%	4%
Aldicarb-sulfone	88.00%	5%	96.60%	4%	97.00%	5%
Aldicarb-sulfoxide	82.80%	5%	90.50%	6%	92.40%	3%
Azinphos-methyl	93.80%	10%	101.90%	2%	99.80%	4%
Azoxystrobin	91.40%	2%	101.10%	2%	100.90%	4%
Bitertanol	94.20%	6%	104.30%	11%	101.00%	10%
Boscalid	99.30%	2%	106.50%	6%	106.00%	3%
Bromuconazole	91.20%	4%	103.60%	6%	100.90%	4%
BTS_44595	93.20%	6%	103.80%	7%	98.80%	5%
BTS_44596	90.40%	4%	101.70%	6%	99.90%	4%
BTS-40348	86.00%	7%	95.60%	12%	92.80%	10%
Bupirimate	91.00%	3%	100.20%	4%	102.00%	4%
Buprofezin	86.50%	7%	96.70%	3%	94.80%	5%
Cadusafos	91.40%	1%	99.70%	3%	102.00%	3%
Carbaryl	92.80%	3%	99.70%	4%	100.80%	3%
Carbendazim	79.80%	6%	87.90%	7%	88.50%	8%
Carbofuran	91.70%	2%	99.70%	3%	100.70%	4%
Carbofuran. 3OH-	85.40%	5%	99.20%	5%	99.40%	4%
Chlorantraniliprole	93.30%	2%	102.60%	1%	102.80%	2%
Chlorfenvinphos	92.80%	4%	100.70%	4%	100.00%	5%
Chlorpyrifos	96.90%	3%	105.90%	4%	105.50%	5%
Clofentezine	90.10%	4%	106.30%	4%	103.70%	3%
Clothianidin	91.60%	5%	100.90%	3%	99.60%	3%
Cymoxanil	85.90%	10%	100.10%	6%	103.30%	8%
Cyproconazole	95.70%	3%	101.60%	5%	100.60%	4%

Cyprodinil	90.40%	3%	100.00%	3%	99.90%	4%
Demeton-S-Methyl-Sulfone	90.90%	5%	97.70%	3%	98.20%	4%
Demeton-S-methylsulfoxide	88.60%	3%	93.60%	5%	95.50%	5%
Diazinon	91.60%	3%	100.80%	3%	99.80%	4%
Dichlorvos	80.40%	20%	85.30%	6%	100.70%	4%
Difenoconazole	95.90%	4%	105.30%	7%	103.40%	6%
Diflubenzuron	91.10%	4%	101.60%	4%	100.40%	4%
Dimethoate	88.90%	2%	96.60%	4%	98.10%	5%
Dimethomorph	96.90%	4%	103.80%	6%	105.10%	5%
Diniconazole	94.40%	3%	102.80%	4%	102.50%	3%
Epoxiconazole	91.10%	2%	100.50%	4%	100.60%	2%
Ethion	98.10%	1%	104.20%	12%	107.10%	6%
Ethirimol	82.80%	3%	90.90%	5%	93.80%	5%
Ethoprophos	90.70%	1%	100.10%	4%	101.00%	3%
Famoxadone	105.50%	8%	106.20%	7%	105.50%	4%
Fenamidone	97.20%	4%	105.60%	7%	105.30%	5%
Fenamiphos	89.20%	3%	98.20%	4%	99.60%	3%
Fenamiphos-sulfone	91.60%	3%	100.00%	3%	101.60%	3%
Fenamiphos-sulfoxide	93.50%	3%	102.20%	3%	101.10%	3%
Fenarimol	90.90%	7%	97.70%	6%	101.20%	2%
Fenazaquin	93.70%	6%	104.60%	3%	103.50%	3%
Fenbuconazole	90.10%	3%	101.00%	5%	100.70%	4%
Fenhexamid	98.50%	5%	105.50%	3%	103.70%	5%
Fenoxycarb	91.30%	4%	101.20%	3%	101.20%	4%
Fenpropathrin	99.90%	5%	113.40%	4%	110.70%	5%
Fenpropidin	94.40%	3%	104.20%	4%	103.50%	3%
Fenpropimorph	94.60%	4%	104.20%	5%	104.50%	4%
Fenpyroximate	97.20%	3%	109.40%	5%	107.40%	5%
Fenthion	89.20%	6%	97.70%	3%	99.20%	4%
Fenthion-oxon	89.60%	2%	99.80%	2%	100.30%	3%
Fenthion-oxon-sulfone	89.70%	5%	101.00%	5%	97.50%	4%
Fenthion-oxon-sulfoxide	88.40%	4%	101.00%	5%	97.00%	3%
Fenthion-sulfone	91.70%	37%	95.80%	14%	100.40%	4%
Fenthion-sulfoxide	96.00%	3%	105.20%	4%	104.80%	5%
Fipronil	91.10%	1%	103.40%	4%	99.00%	3%
Fipronil-sulfone	92.30%	5%	104.70%	4%	99.50%	7%

Flonicamid	87.70%	9%	101.10%	4%	97.60%	3%
Flubendiamide	90.60%	2%	103.00%	6%	97.30%	3%
Fludioxonil	92.70%	2%	102.10%	4%	99.40%	3%
Fluopyram	91.60%	2%	100.20%	3%	102.60%	3%
Fluquinconazole	95.50%	7%	101.70%	6%	103.30%	2%
Flusilazole	91.70%	2%	101.40%	4%	100.50%	3%
Flutriafol	92.40%	5%	100.20%	4%	101.70%	3%
Formetanate	82.50%	4%	92.10%	7%	88.40%	5%
Fosthiazate	92.30%	2%	99.30%	5%	102.80%	3%
Haloxyfop	97.90%	4%	113.80%	7%	105.90%	5%
Haloxyfop-2-Ethoxyethyl	91.80%	6%	103.10%	3%	100.50%	3%
Haloxyfop-methyl	92.30%	2%	101.80%	3%	100.80%	3%
Hexaconazole	92.30%	7%	103.70%	6%	101.30%	5%
Hexythiazox	94.00%	3%	104.80%	7%	106.00%	4%
Imazalil	92.20%	3%	98.30%	4%	99.90%	4%
Imidacloprid	87.70%	4%	98.20%	3%	98.80%	3%
Indoxacarb	93.30%	3%	104.10%	5%	103.30%	3%
Isocarbophos	90.70%	2%	101.20%	5%	101.70%	4%
Kresoxim-methyl	91.10%	4%	101.70%	5%	100.90%	4%
Linuron	92.70%	2%	101.70%	4%	102.40%	3%
Lufenuron	106.00%	16%	97.00%	19%	118.50%	13%
Malaoxon	91.20%	3%	102.70%	7%	98.70%	3%
Malathion	92.70%	2%	99.90%	6%	101.90%	3%
Mandipropamid	95.00%	3%	101.80%	6%	102.30%	5%
Mepanipyrim	91.20%	2%	100.90%	5%	101.80%	4%
Metalaxyl	92.10%	3%	99.70%	5%	103.30%	4%
Metconazole	92.10%	3%	105.40%	9%	101.00%	6%
Methamidophos	77.70%	4%	84.00%	2%	84.00%	3%
Methidathion	92.10%	3%	96.60%	6%	101.90%	3%
Methiocarb	92.50%	3%	99.90%	4%	102.00%	3%
Methiocarb-sulfone	90.30%	3%	100.00%	3%	100.70%	5%
Methiocarb-sulfoxide	89.80%	3%	98.90%	3%	98.30%	2%
Methomyl	73.90%	18%	109.40%	19%	95.00%	6%
Methoxyfenozide	91.00%	3%	102.80%	6%	100.60%	3%
Monocrotophos	89.50%	3%	96.10%	3%	96.50%	4%
Myclobutanil	92.40%	2%	100.60%	5%	102.40%	3%
Omethoate	85.20%	3%	93.20%	5%	92.00%	4%

Oxadixyl	87.90%	8%	91.00%	11%	93.10%	12%
Oxamyl	90.90%	6%	95.00%	7%	97.80%	3%
Paclobutrazol	91.30%	2%	101.70%	4%	102.00%	4%
Paraoxon methyl	87.40%	8%	100.20%	10%	95.40%	7%
Penconazole	91.80%	3%	101.10%	6%	100.30%	3%
Pencycuron	92.90%	3%	101.50%	5%	101.70%	3%
Pendimethalin	96.90%	2%	97.60%	20%	108.30%	4%
Phenthoate	92.60%	4%	101.00%	3%	101.10%	6%
Phosalone	93.20%	3%	105.30%	5%	102.60%	4%
Phosmet	91.80%	2%	99.70%	5%	102.00%	4%
Phosmet oxon	86.30%	15%	91.10%	12%	91.10%	11%
Phoxim	93.80%	5%	102.10%	4%	100.80%	4%
Pirimicarb	87.80%	5%	96.20%	6%	95.90%	7%
Pirimicarb. desmethyl-	86.00%	1%	92.50%	4%	96.00%	4%
Pirimiphos-methyl	91.80%	4%	101.10%	5%	100.20%	4%
Prochloraz	82.30%	7%	90.50%	3%	92.70%	5%
Profenofos	93.30%	4%	103.50%	5%	102.90%	3%
Propamocarb	84.80%	6%	93.80%	5%	95.10%	3%
Propargite	98.50%	2%	107.30%	7%	107.10%	5%
Propiconazole	93.60%	4%	101.20%	6%	101.50%	5%
Propyzamide	92.50%	3%	101.40%	4%	100.80%	3%
Prothioconazole-Desthio	91.10%	2%	100.50%	3%	99.30%	2%
Pyraclostrobin	90.60%	2%	103.10%	2%	102.20%	5%
Pyridaben	93.60%	7%	104.90%	6%	103.20%	4%
Pyrimethanil	92.10%	2%	99.80%	4%	100.70%	3%
Pyriproxyfen	93.20%	3%	102.90%	3%	102.30%	4%
Quinoxifen	85.10%	11%	93.70%	6%	93.90%	6%
Spinosad	92.80%	2%	103.60%	5%	101.70%	3%
Spirodiclofen	98.00%	3%	110.10%	7%	104.90%	5%
Spiromesifen	94.50%	7%	106.70%	4%	107.20%	5%
Spiroxamine	96.50%	3%	103.70%	3%	104.50%	3%
Tebuconazole	90.50%	3%	100.00%	7%	101.30%	6%
Tebufenozide	89.50%	6%	99.40%	3%	101.00%	7%
Tebufenpyrad	92.10%	1%	102.20%	4%	101.50%	3%
Teflubenzuron	99.70%	12%	102.40%	13%	108.40%	7%
Terbutylazine	94.30%	2%	100.10%	4%	102.50%	3%
Tetraconazole	91.30%	3%	100.10%	4%	101.70%	3%
Thiabendazole	82.10%	2%	90.00%	3%	91.00%	5%

Thiacloprid	93.20%	3%	98.80%	5%	100.80%	3%
Thiamethoxam	89.70%	4%	97.10%	4%	98.20%	2%
Thiodicarb	92.20%	5%	101.90%	4%	101.80%	2%
Triadimefon	92.80%	3%	102.20%	4%	99.00%	4%
Triadimenol	95.30%	17%	100.20%	7%	100.50%	5%
Triazophos	93.30%	3%	101.10%	6%	102.20%	4%
Trifloxystrobin	93.30%	2%	101.80%	4%	103.50%	4%
Triflumuron	92.70%	7%	102.20%	7%	101.40%	5%
Triticonazole	91.10%	3%	101.30%	3%	100.20%	5%
Zoxamide	91.80%	3%	100.80%	5%	100.70%	4%

Linearity

Compound	Min [mg/kg]	Max [mg/kg]
Abamectin	0.005	0.2
Acephate	0.005	0.2
Acetamiprid	0.005	0.5
Aldicarb-sulfone	0.005	0.5
Aldicarb-sulfoxide	0.005	0.2
Azinphos-methyl	0.005	0.5
Azoxystrobin	0.005	0.5
Bitertanol	0.005	0.5
Boscalid	0.005	0.5
Bromuconazole	0.005	0.5
BTS_44595	0.005	0.5
BTS_44596	0.005	0.5
BTS-40348	0.005	0.5
Bupirimate	0.005	0.5
Buprofezin	0.005	0.5
Cadusafos	0.005	0.5
Carbaryl	0.005	0.5
Carbendazim	0.005	0.5
Carbofuran	0.005	0.5
Carbofuran. 3OH-	0.005	0.5
Chlorantraniliprole	0.005	0.5
Chlorfenvinphos	0.005	0.2
Chlorpyrifos	0.005	0.5
Clofentezine	0.005	0.2
Clothianidin	0.005	0.5
Cymoxanil	0.005	0.5

Cyproconazole	0.005	0.5
Cyprodinil	0.005	0.5
Demeton-S-Methyl-Sulfone	0.005	0.5
Demeton-S-methylsulfoxide	0.005	0.2
Diazinon	0.005	0.5
Dichlorvos	0.005	0.5
Difenoconazole	0.005	0.5
Diflubenzuron	0.005	0.2
Dimethoate	0.005	0.5
Dimethomorph	0.005	0.5
Diniconazole	0.005	0.5
Epoxiconazole	0.005	0.5
Ethion	0.005	0.5
Ethirimol	0.005	0.5
Ethoprophos	0.005	0.5
Famoxadone	0.005	0.5
Fenamidone	0.005	0.5
Fenamiphos	0.005	0.5
Fenamiphos-sulfone	0.005	0.5
Fenamiphos-sulfoxide	0.005	0.5
Fenarimol	0.005	0.5
Fenazaquin	0.005	0.5
Fenbuconazole	0.005	0.5
Fenhexamid	0.005	0.5
Fenoxycarb	0.005	0.2
Fenpropathrin	0.005	0.5
Fenpropimorph	0.005	0.5
Fenpyroximate	0.005	0.5
Fenthion	0.005	0.5
Fenthion-oxon	0.005	0.5
Fenthion-oxon-sulfone	0.005	0.5
Fenthion-oxon-sulfoxide	0.005	0.5
Fenthion-sulfone	0.01	0.5
Fenthion-sulfoxide	0.005	0.5
Fipronil	0.005	0.2
Fipronil-sulfone	0.005	0.5
Flonicamid	0.005	0.5
Flubendiamide	0.01	0.5
Fludioxonil	0.005	0.5
Flufenoxuron	0.005	0.5

Fluquinconazole	0.005	0.2
Flusilazole	0.005	0.5
Flutriafol	0.005	0.5
Formetanate	0.005	0.5
Fosthiazate	0.005	0.5
Haloxfop	0.005	0.5
Haloxfop-2-Ethoxyethyl	0.005	0.5
Haloxfop-methyl	0.005	0.5
Hexaconazole	0.005	0.5
Hexythiazox	0.005	0.5
Imazalil	0.005	0.5
Imidacloprid	0.005	0.5
Indoxacarb	0.005	0.5
Isocarbophos	0.005	0.5
Kresoxim-methyl	0.005	0.5
Linuron	0.005	0.5
Lufenuron	0.01	0.1
Malaoxon	0.005	0.5
Malathion	0.005	0.5
Mandipropamid	0.005	0.5
Mepanipyrim	0.005	0.5
Metaflumizone	0.01	0.5
Metconazole	0.005	0.5
Methamidophos	0.005	0.5
Methidathion	0.005	0.5
Methiocarb	0.005	0.5
Methiocarb-sulfone	0.005	0.5
Methiocarb-sulfoxide	0.005	0.5
Methomyl	0.01	0.5
Methoxyfenozide	0.005	0.5
Monocrotophos	0.005	0.5
Myclobutanil	0.005	0.5
Omethoate	0.005	0.5
Oxadixyl	0.005	0.5
Oxamyl	0.005	0.5
Paclobutrazol	0.005	0.5
Paraoxon methyl	0.005	0.5
Penconazole	0.005	0.5
Pencycuron	0.005	0.5
Pendimethalin	0.005	0.5

Phenthoate	0.005	0.5
Phosalone	0.005	0.5
Phosmet	0.005	0.5
Phosmet oxon	0.005	0.5
Phoxim	0.005	0.5
Pirimicarb	0.005	0.5
Pirimicarb. desmethyl-	0.005	0.5
Pirimiphos-methyl	0.005	0.5
Prochloraz	0.005	0.5
Profenofos	0.005	0.5
Propamocarb	0.005	0.5
Propargite	0.005	0.5
Propiconazole	0.005	0.5
Propyzamide	0.005	0.2
Prothioconazole	0	0
Pymetrozine	0.005	0.2
Pyridaben	0.005	0.5
Pyrimethanil	0.005	0.5
Pyriproxyfen	0.005	0.5
Quinoxifen	0.005	0.5
Spinosyn A	0.005	0.5
Spinosyn D	0.005	0.5
Spirodiclofen	0.005	0.5
Spiromesifen	0.005	0.5
Spiroxamine	0.005	0.5
Tebuconazole	0.005	0.5
Tebufenozide	0.005	0.5
Tebufenpyrad	0.005	0.5
Teflubenzuron	0.01	0.1
Terbutylazine	0.005	0.5
Tetraconazole	0.005	0.5
Thiabendazole	0.005	0.5
Thiacloprid	0.005	0.5
Thiamethoxam	0.005	0.5
Thiodicarb	0.005	0.5
Triadimefon	0.005	0.5
Triadimenol	0.005	0.5
Triazophos	0.005	0.5
Trifloxystrobin	0.005	0.5
Triflumuron	0.005	0.2

Triticonazole	0.005	0.5
Zoxamide	0.005	0.2

Orange

Recoveries

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
2.4-D	114.30%	6%	111.00%	7%	99.10%	4%
Acephate	87.50%	4%	90.20%	2%	83.10%	4%
Acetamiprid	92.30%	6%	89.00%	1%	86.70%	3%
Aldicarb-sulfone	86.40%	8%	90.60%	6%	84.10%	6%
Azoxystrobin	88.30%	5%	91.10%	3%	84.40%	3%
Bitertanol	88.80%	7%	98.10%	5%	90.70%	7%
Bromuconazole	87.40%	13%	95.20%	5%	86.30%	4%
BTS_44595	80.50%	9%	95.50%	1%	93.80%	3%
BTS_44596	82.80%	10%	96.90%	3%	93.00%	1%
BTS-40348	78.40%	9%	102.90%	9%	96.10%	3%
Bupirimate	86.10%	8%	90.90%	2%	83.90%	2%
Buprofezin	85.80%	4%	89.00%	2%	86.10%	3%
Cadusafos	87.30%	4%	90.60%	1%	89.00%	3%
Carbendazim	72.40%	8%	88.70%	6%	84.10%	3%
Carbofuran	87.40%	6%	93.60%	2%	90.10%	3%
Carbofuran. 3OH-	81.10%	14%	99.30%	7%	94.90%	2%
Chlorfenvinphos	89.00%	5%	90.80%	1%	87.70%	2%
Chlorpyrifos	88.30%	3%	93.90%	4%	94.40%	4%
Clofentezine	88.20%	7%	102.00%	3%	93.50%	4%
Clothianidin	92.90%	9%	101.80%	8%	91.00%	7%
Cyproconazole	84.60%	4%	91.60%	4%	86.30%	2%
Cyprodinil	82.80%	6%	87.10%	3%	85.60%	2%
Demeton-S- Methyl-Sulfone	89.70%	4%	89.10%	3%	87.20%	4%
Demeton-S- methylsulfoxide	85.70%	5%	86.00%	8%	82.80%	5%
Diazinon	91.60%	6%	90.30%	3%	89.90%	3%
Difenoconazole	88.50%	9%	86.30%	3%	85.20%	3%
Diflubenzuron	83.60%	7%	89.30%	2%	88.30%	2%
Diniconazole	87.20%	5%	94.60%	1%	89.40%	2%
Ethion	86.00%	3%	93.10%	3%	97.00%	4%
Ethirimol	85.80%	4%	87.70%	5%	86.40%	4%
Ethoprophos	88.00%	3%	90.10%	2%	87.80%	3%

Etofenprox	76.10%	12%	95.60%	2%	90.10%	5%
Famoxadone	84.10%	4%	95.00%	5%	89.20%	2%
Fenamiphos	87.90%	5%	91.80%	2%	89.70%	2%
Fenamiphos-sulfone	90.50%	4%	94.90%	1%	88.40%	3%
Fenamiphos-sulfoxide	88.30%	3%	97.90%	2%	89.40%	3%
Fenarimol	73.30%	14%	93.30%	8%	85.20%	5%
Fenazaquin	86.30%	5%	93.70%	2%	93.70%	2%
Fenbuconazole	88.30%	4%	90.30%	3%	88.80%	2%
Fenhexamid	88.10%	8%	95.10%	6%	88.40%	2%
Fenoxycarb	87.00%	2%	90.90%	3%	89.00%	3%
Fenpropathrin	92.80%	7%	101.00%	3%	104.50%	3%
Fenpropidin	89.00%	4%	92.10%	2%	92.10%	2%
Fenpropimorph	92.50%	4%	92.80%	2%	90.30%	3%
Fenpyroximate	92.40%	4%	97.40%	2%	100.30%	3%
Fenthion	85.70%	4%	89.20%	3%	89.60%	4%
Fenthion-oxon	80.20%	9%	99.40%	4%	89.10%	3%
Fenthion-oxon-sulfone	61.90%	10%	81.50%	4%	77.70%	2%
Fenthion-oxon-sulfoxide	81.00%	7%	97.00%	2%	91.30%	4%
Fenthion-sulfoxide	89.40%	5%	94.00%	4%	90.40%	3%
Fipronil	91.40%	5%	91.50%	2%	94.30%	2%
Fipronil-sulfone	84.00%	10%	97.20%	1%	100.00%	2%
Flonicamid	89.50%	9%	90.30%	6%	86.50%	8%
Flubendiamide	91.90%	6%	90.30%	3%	96.10%	5%
Fludioxonil	89.90%	4%	92.30%	2%	89.10%	2%
Flufenoxuron	93.30%	5%	96.80%	2%	106.60%	3%
Fluopyram	80.30%	7%	91.80%	5%	82.40%	3%
Fluquinconazole	91.80%	13%	94.30%	8%	85.10%	3%
Flusilazole	90.20%	3%	91.10%	2%	87.80%	4%
Flutriafol	88.60%	4%	94.70%	3%	89.70%	2%
Formetanate	71.30%	8%	88.30%	1%	80.90%	4%
Fosthiazate	86.70%	6%	95.40%	2%	89.80%	3%
Haloxypop	91.90%	8%	112.60%	6%	97.80%	3%
Haloxypop-2-Ethoxyethyl	81.40%	7%	93.80%	3%	94.80%	2%
Haloxypop-methyl	79.60%	8%	96.60%	3%	92.00%	3%
Hexaconazole	86.40%	10%	91.80%	5%	82.40%	5%
Hexythiazox	91.20%	6%	93.20%	2%	91.60%	1%

Imazalil	77.00%	15%	76.70%	8%	91.10%	2%
Imidacloprid	100.10%	16%	97.50%	12%	89.80%	7%
Indoxacarb	91.80%	6%	91.70%	3%	98.70%	3%
Isocarbophos	88.20%	5%	94.20%	3%	87.80%	4%
Kresoxim-methyl	83.40%	3%	89.40%	3%	86.20%	3%
Linuron	88.50%	5%	91.60%	4%	81.90%	4%
Lufenuron	94.80%	6%	101.20%	5%	103.10%	3%
Malaoxon	81.30%	6%	97.50%	4%	94.20%	3%
Malathion	87.40%	6%	89.80%	2%	87.90%	2%
Mepanipyrim	86.80%	4%	90.20%	1%	89.70%	2%
Metalaxyl	91.80%	6%	96.80%	2%	88.70%	3%
Metconazole	90.20%	8%	91.00%	6%	86.00%	3%
Methamidophos	73.20%	4%	79.90%	2%	75.50%	2%
Methidathion	86.60%	19%	87.10%	3%	85.90%	3%
Methiocarb-sulfoxide	86.90%	6%	97.00%	3%	89.90%	3%
Methoxyfenozide	80.50%	13%	95.50%	4%	90.10%	2%
Monocrotophos	82.30%	5%	88.10%	7%	86.80%	2%
Myclobutanil	87.10%	4%	92.00%	3%	88.00%	2%
Omethoate	84.60%	3%	81.40%	2%	81.40%	5%
Oxadixyl	89.80%	10%	95.70%	4%	92.20%	6%
Oxamyl	77.30%	16%	88.50%	18%	80.50%	8%
Paraoxon methyl	81.40%	11%	108.40%	7%	99.10%	4%
Penconazole	89.60%	6%	94.00%	2%	88.70%	2%
Pencycuron	87.50%	5%	90.60%	1%	88.60%	3%
Pendimethalin	83.70%	6%	89.60%	4%	94.90%	3%
Phenthoate	92.20%	7%	89.70%	3%	86.30%	3%
Phosalone	78.20%	6%	86.00%	6%	84.40%	3%
Phosmet	91.50%	6%	92.90%	2%	85.20%	2%
Phosmet oxon	37.40%	11%	96.40%	4%	95.50%	5%
Phoxim	83.60%	5%	91.40%	4%	87.70%	2%
Pirimicarb	87.30%	4%	97.90%	6%	89.10%	4%
Pirimicarb-desmethyl-	79.50%	6%	94.00%	4%	83.50%	5%
Pirimiphos-methyl	90.00%	6%	90.60%	2%	89.20%	3%
Prochloraz	86.90%	4%	89.00%	3%	88.80%	3%
Profenofos	86.80%	4%	91.30%	1%	92.10%	3%
Propamocarb	84.30%	4%	84.80%	2%	80.20%	2%

Propargite	88.10%	4%	95.00%	2%	97.70%	4%
Propiconazole	90.40%	5%	91.50%	3%	89.60%	2%
Propyzamide	86.50%	4%	93.80%	4%	86.80%	3%
Prothioconazole -Desthio	77.50%	6%	92.10%	3%	88.30%	3%
Pyraclostrobin	90.50%	3%	90.40%	1%	89.30%	4%
Pyridaben	86.60%	4%	94.80%	2%	95.50%	2%
Pyrimethanil	73.40%	27%	95.40%	7%	81.40%	6%
Pyriproxyfen	87.60%	5%	93.80%	2%	95.20%	3%
Quinoxifen	84.00%	6%	90.60%	2%	88.10%	2%
Spinosad	89.10%	6%	91.50%	2%	91.30%	4%
Spiromesifen	85.30%	7%	87.20%	4%	96.00%	2%
Spiroxamine	93.00%	7%	99.90%	4%	88.00%	3%
Tebuconazole	89.20%	4%	90.20%	2%	90.30%	2%
Tebufenozide	93.50%	11%	78.60%	10%	85.00%	2%
Tebufenpyrad	89.50%	4%	94.70%	2%	92.70%	3%
Teflubenzuron	96.20%	5%	95.20%	4%	100.70%	2%
Tetraconazole	84.10%	6%	92.00%	3%	84.20%	2%
Thiabendazole	77.50%	6%	88.90%	4%	79.70%	6%
Thiacloprid	88.30%	9%	95.00%	4%	89.10%	5%
Thiamethoxam	88.00%	7%	88.20%	8%	82.20%	5%
Thiodicarb	71.10%	5%	90.80%	2%	83.00%	4%
Triadimefon	79.00%	8%	94.60%	2%	93.50%	2%
Triazophos	87.80%	5%	89.60%	2%	86.80%	2%
Trifloxystrobin	87.40%	4%	89.60%	2%	92.30%	3%
Triflumuron	84.50%	8%	90.90%	2%	82.90%	3%
Triticonazole	89.70%	9%	96.00%	11%	86.00%	2%
Zoxamide	87.30%	5%	91.90%	3%	87.80%	2%

Repeatability

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
2.4-D	110.90%	7%	116.90%	10%	109.00%	6%
Acephate	96.20%	5%	103.20%	8%	96.70%	9%
Acetamiprid	107.90%	10%	106.70%	12%	103.70%	12%
Aldicarb-sulfone	97.30%	8%	110.70%	13%	101.50%	11%
Azoxystrobin	104.00%	9%	112.20%	12%	100.90%	12%
Bitertanol	92.70%	4%	105.30%	4%	100.60%	7%
Bromuconazole	103.60%	13%	110.50%	12%	98.60%	8%
BTS_44595	95.40%	20%	99.00%	8%	92.60%	9%

BTS_44596	88.00%	4%	98.60%	8%	91.50%	11%
BTS-40348	93.30%	15%	108.50%	6%	95.60%	6%
Bupirimate	97.10%	7%	106.40%	9%	101.30%	10%
Buprofezin	95.30%	6%	104.40%	8%	98.10%	8%
Cadusafos	97.30%	6%	103.90%	8%	101.50%	8%
Carbendazim	81.30%	6%	98.60%	7%	90.40%	5%
Carbofuran	101.70%	9%	108.70%	8%	103.30%	9%
Carbofuran. 3OH-	86.40%	20%	100.90%	16%	96.40%	6%
Chlorfenvinphos	93.60%	8%	106.70%	9%	101.30%	9%
Chlorpyrifos	105.00%	12%	109.70%	11%	104.90%	8%
Clofentezine	99.90%	16%	119.60%	12%	105.50%	9%
Clothianidin	107.70%	39%	107.60%	8%	106.50%	14%
Cyproconazole	97.80%	8%	107.80%	9%	98.50%	8%
Cyprodinil	95.90%	11%	105.50%	11%	101.20%	9%
Demeton-S- Methyl-Sulfone	100.10%	7%	106.90%	10%	101.00%	9%
Demeton-S- methylsulfoxide	91.30%	4%	97.90%	12%	95.20%	10%
Diazinon	94.40%	3%	107.00%	10%	102.10%	8%
Difenoconazole	102.30%	8%	108.90%	12%	103.70%	13%
Diflubenzuron	99.80%	12%	107.60%	11%	102.80%	8%
Diniconazole	96.50%	7%	105.70%	9%	103.10%	8%
Ethion	101.60%	10%	111.70%	12%	106.80%	8%
Ethirimol	104.10%	14%	101.70%	15%	98.50%	14%
Ethoprophos	96.50%	5%	104.00%	8%	100.90%	8%
Etofenprox	91.50%	9%	113.40%	12%	103.50%	9%
Famoxadone	90.20%	19%	116.10%	13%	108.70%	12%
Fenamiphos	99.20%	7%	107.00%	8%	103.40%	8%
Fenamiphos- sulfone	97.90%	7%	110.40%	9%	101.80%	9%
Fenamiphos- sulfoxide	96.90%	9%	109.10%	7%	102.60%	9%
Fenarimol	88.30%	30%	103.90%	18%	100.80%	10%
Fenazaquin	94.50%	7%	106.30%	9%	102.40%	6%
Fenbuconazole	96.40%	6%	106.10%	9%	102.60%	8%
Fenhexamid	107.40%	12%	113.40%	11%	102.70%	9%
Fenoxycarb	101.40%	9%	109.40%	11%	102.00%	9%
Fenpropathrin	99.20%	8%	107.60%	5%	111.40%	6%
Fenpropidin	94.60%	8%	105.80%	9%	101.60%	7%
Fenpropimorph	95.40%	3%	104.80%	7%	102.70%	8%
Fenpyroximate	100.50%	7%	109.50%	8%	110.20%	7%

Fenthion	100.40%	9%	115.90%	16%	101.80%	10%
Fenthion-oxon	92.00%	12%	107.50%	6%	96.20%	5%
Fenthion-oxon-sulfone	89.40%	21%	107.10%	15%	94.70%	14%
Fenthion-oxon-sulfoxide	86.10%	9%	105.20%	7%	94.50%	5%
Fenthion-sulfoxide	98.00%	6%	108.40%	8%	103.80%	8%
Fipronil	92.80%	8%	101.70%	8%	100.80%	5%
Fipronil-sulfone	87.60%	6%	97.30%	13%	92.00%	17%
Flonicamid	87.90%	8%	113.90%	16%	103.10%	15%
Flubendiamide	97.90%	6%	105.00%	9%	104.40%	5%
Fludioxonil	99.80%	7%	107.60%	9%	104.20%	8%
Flufenoxuron	101.50%	6%	111.40%	10%	115.00%	7%
Fluopyram	105.70%	23%	113.20%	14%	101.00%	11%
Fluquinconazole	105.30%	18%	110.40%	14%	99.30%	11%
Flusilazole	99.40%	6%	106.50%	9%	101.20%	8%
Flutriafol	94.90%	10%	111.50%	9%	100.10%	8%
Formetanate	85.80%	11%	98.60%	6%	86.90%	9%
Fosthiazate	94.30%	7%	110.00%	8%	100.10%	7%
Haloxypop	117.00%	18%	116.60%	17%	111.40%	9%
Haloxypop-2-Ethoxyethyl	87.60%	7%	91.90%	17%	89.90%	15%
Haloxypop-methyl	86.70%	9%	92.80%	18%	89.10%	15%
Hexaconazole	104.30%	19%	111.70%	13%	99.20%	10%
Hexythiazox	101.10%	10%	109.90%	10%	105.40%	8%
Imazalil	92.00%	12%	108.40%	18%	99.90%	7%
Imidacloprid	106.60%	15%	105.70%	13%	99.80%	15%
Indoxacarb	96.00%	6%	106.10%	10%	107.80%	7%
Isocarboxiphenoxim	100.50%	8%	106.60%	9%	100.30%	8%
Kresoxim-methyl	103.70%	11%	107.10%	12%	99.80%	9%
Linuron	108.50%	11%	110.60%	11%	99.00%	11%
Lufenuron	108.20%	10%	116.30%	8%	113.60%	8%
Malaoxon	88.40%	6%	104.40%	6%	97.80%	6%
Malathion	96.60%	6%	107.50%	10%	99.30%	8%
Mepanipyrim	97.20%	6%	105.70%	10%	100.30%	7%
Metalaxyl	99.90%	8%	107.50%	7%	101.40%	8%
Metconazole	97.30%	6%	106.10%	9%	100.60%	9%
Methamidophos	88.50%	16%	87.80%	7%	86.40%	8%
Methidathion	91.20%	15%	114.50%	19%	100.70%	10%

Methiocarb-sulfoxide	94.20%	6%	107.90%	8%	103.30%	9%
Methoxyfenozide	90.50%	8%	113.30%	10%	96.40%	7%
Monocrotophos	96.40%	11%	102.50%	11%	99.80%	9%
Myclobutanil	98.90%	8%	104.00%	7%	100.00%	7%
Omethoate	95.00%	7%	97.90%	12%	95.00%	10%
Oxadixyl	98.70%	7%	103.80%	6%	101.30%	5%
Oxamyl	113.40%	42%	107.10%	14%	100.00%	13%
Paraoxon methyl	94.30%	27%	114.90%	12%	100.60%	5%
Penconazole	96.40%	4%	107.70%	8%	101.70%	8%
Pencycuron	97.50%	8%	106.70%	9%	101.90%	8%
Pendimethalin	99.40%	11%	109.90%	12%	105.50%	7%
Phenthoate	98.20%	7%	106.10%	10%	101.40%	10%
Phosalone	102.60%	14%	110.70%	16%	102.10%	11%
Phosmet	99.00%	6%	117.90%	14%	101.80%	10%
Phosmet oxon	91.90%	35%	106.00%	9%	105.00%	8%
Phoxim	100.20%	13%	116.00%	14%	103.60%	9%
Pirimicarb	88.90%	10%	100.20%	5%	99.40%	8%
Pirimicarb. desmethyl-	95.30%	13%	105.50%	10%	97.50%	9%
Pirimiphos-methyl	94.40%	5%	104.10%	10%	102.90%	8%
Prochloraz	96.20%	7%	103.00%	9%	102.60%	8%
Profenofos	94.70%	6%	108.00%	9%	104.20%	9%
Propamocarb	96.00%	8%	100.20%	10%	95.70%	10%
Propargite	101.60%	8%	113.10%	11%	107.30%	7%
Propiconazole	98.40%	5%	106.20%	9%	101.70%	7%
Propyzamide	98.60%	11%	109.40%	8%	99.60%	10%
Prothioconazole -Desthio	89.60%	13%	102.30%	8%	92.70%	6%
Pyraclostrobin	99.30%	8%	104.20%	9%	103.40%	9%
Pyridaben	97.10%	7%	109.60%	9%	106.10%	7%
Pyrimethanil	107.20%	18%	112.50%	12%	104.20%	13%
Pyriproxyfen	100.30%	8%	112.00%	10%	105.00%	6%
Quinoxifen	96.20%	8%	109.70%	11%	100.80%	9%
Spinosad	105.10%	10%	106.30%	9%	102.60%	8%
Spiromesifen	86.50%	14%	105.60%	11%	106.10%	8%
Spiroxamine	90.80%	10%	115.00%	14%	104.30%	10%
Tebuconazole	98.50%	8%	104.70%	9%	101.20%	7%
Tebufenozide	106.10%	16%	104.70%	15%	102.20%	10%

Tebufenpyrad	98.80%	8%	108.50%	8%	105.40%	9%
Teflubenzuron	101.00%	6%	113.90%	9%	109.40%	7%
Tetraconazole	102.20%	12%	107.30%	10%	101.20%	10%
Thiabendazole	94.30%	13%	97.80%	11%	86.30%	9%
Thiacloprid	101.30%	9%	108.00%	8%	102.70%	12%
Thiamethoxam	95.60%	8%	105.90%	13%	100.00%	16%
Thiodicarb	77.50%	7%	101.20%	7%	93.40%	9%
Triadimefon	85.50%	8%	102.40%	4%	94.00%	6%
Triazophos	96.00%	6%	107.50%	10%	99.60%	8%
Trifloxystrobin	95.20%	5%	108.20%	12%	104.70%	9%
Triflumuron	102.90%	14%	108.30%	15%	103.40%	14%
Triticonazole	101.00%	11%	112.80%	12%	101.50%	9%
Zoxamide	104.00%	10%	104.00%	8%	102.20%	9%

Linearity

Compound	Min [mg/kg]	Max [mg/kg]
2.4-D	0.005	0.5
Acephate	0.005	0.5
Acetamiprid	0.005	0.5
Aldicarb-sulfone	0.005	0.5
Azoxystrobin	0.005	0.5
Bitertanol	0.005	0.5
Bromuconazole	0.005	0.5
BTS_44595	0.005	0.5
BTS_44596	0.005	0.5
BTS-40348	0.005	0.5
Bupirimate	0.005	0.5
Buprofezin	0.005	0.5
Cadusafos	0.005	0.5
Carbendazim	0.005	0.5
Carbofuran	0.005	0.5
Carbofuran. 3OH-	0.005	0.5
Chlorfenvinphos	0.005	0.5
Chlorpyrifos	0.005	0.5
Clofentezine	0.005	0.5
Clothianidin	0.005	0.5
Cyproconazole	0.005	0.5
Cyprodinil	0.005	0.5

Demeton-S-Methyl-Sulfone	0.005	0.5
Demeton-S-methylsulfoxide	0.005	0.5
Diazinon	0.005	0.5
Difenoconazole	0.005	0.5
Diflubenzuron	0.005	0.5
Diniconazole	0.005	0.5
Ethion	0.005	0.5
Ethirimol	0.005	0.5
Ethoprophos	0.005	0.5
Etofenprox	0.005	0.5
Famoxadone	0.005	0.5
Fenamiphos	0.005	0.5
Fenamiphos-sulfone	0.005	0.5
Fenamiphos-sulfoxide	0.005	0.5
Fenarimol	0.005	0.5
Fenazaquin	0.005	0.5
Fenbuconazole	0.005	0.5
Fenhexamid	0.005	0.5
Fenoxycarb	0.005	0.5
Fenpropathrin	0.005	0.5
Fenpropidin	0.005	0.5
Fenpropimorph	0.005	0.5
Fenpyroximate	0.005	0.5
Fenthion	0.005	0.5
Fenthion-oxon	0.005	0.5
Fenthion-oxon-sulfone	0.005	0.5
Fenthion-oxon-sulfoxide	0.005	0.5
Fenthion-sulfoxide	0.005	0.5
Fipronil	0.005	0.5
Fipronil-sulfone	0.005	0.5
Flonicamid	0.005	0.5
Flubendiamide	0.005	0.2
Fludioxonil	0.005	0.5
Flufenoxuron	0.005	0.5
Fluopyram	0.005	0.5
Fluquinconazole	0.005	0.5

Flusilazole	0.005	0.5
Flutriafol	0.005	0.5
Formetanate	0.005	0.5
Fosthiazate	0.005	0.5
Haloxyfop	0.005	0.5
Haloxyfop-2-Ethoxyethyl	0.005	0.5
Haloxyfop-methyl	0.005	0.5
Hexaconazole	0.005	0.5
Hexythiazox	0.005	0.5
Imazalil	0.01	0.5
Imidacloprid	0.005	0.5
Indoxacarb	0.005	0.5
Isocarbophos	0.005	0.5
Kresoxim-methyl	0.005	0.5
Linuron	0.005	0.5
Lufenuron	0.005	0.2
Malaoxon	0.005	0.5
Malathion	0.005	0.5
Mepanipyrim	0.005	0.5
Metalaxyl	0.005	0.5
Metconazole	0.005	0.5
Methamidophos	0.005	0.5
Methidathion	0.005	0.5
Methiocarb-sulfoxide	0.005	0.5
Methoxyfenozide	0.005	0.5
Monocrotophos	0.005	0.5
Myclobutanil	0.005	0.5
Omethoate	0.005	0.5
Oxadixyl	0.005	0.5
Oxamyl	0.01	0.2
Paraoxon methyl	0.005	0.5
Penconazole	0.005	0.5
Pencycuron	0.005	0.5
Pendimethalin	0.005	0.5
Phenthoate	0.005	0.5
Phosalone	0.005	0.5
Phosmet	0.005	0.5
Phosmet oxon	0.005	0.5

Phoxim	0.005	0.5
Pirimicarb	0.005	0.5
Pirimicarb. desmethyl-	0.005	0.5
Pirimiphos- methyl	0.005	0.5
Prochloraz	0.005	0.5
Profenofos	0.005	0.5
Propamocarb	0.005	0.5
Propargite	0.005	0.5
Propiconazole	0.005	0.5
Propyzamide	0.005	0.5
Prothioconazole- Desthio	0.005	0.5
Pyraclostrobin	0.005	0.5
Pyridaben	0.005	0.5
Pyrimethanil	0.005	0.5
Pyriproxyfen	0.005	0.5
Quinoxifen	0.005	0.5
Spinosad	0.005	0.5
Spiromesifen	0.005	0.5
Spiroxamine	0.005	0.5
Tebuconazole	0.005	0.5
Tebufenozide	0.005	0.5
Tebufenpyrad	0.004	0.5
Teflubenzuron	0.005	0.2
Tetraconazole	0.005	0.5
Thiabendazole	0.005	0.5
Thiacloprid	0.005	0.5
Thiamethoxam	0.005	0.5
Thiodicarb	0.005	0.5
Triadimefon	0.005	0.5
Triazophos	0.005	0.5
Trifloxystrobin	0.005	0.5
Triflumuron	0.005	0.5
Triticonazole	0.005	0.5
Zoxamide	0.005	0.5

Tomato

Recoveries

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
2,4-D	106.00%	3%	112.30%	8%	101.30%	2%
Abamectin	83.60%	13%	97.70%	15%	97.20%	3%
Acephate	92.60%	5%	83.40%	5%	90.20%	1%
Acetamiprid	97.10%	3%	94.10%	6%	95.90%	1%
Aldicarb	99.60%	16%	85.00%	10%	104.10%	6%
Aldicarb-sulfone	98.80%	4%	91.30%	7%	95.20%	1%
Aldicarb-sulfoxide	107.80%	7%	82.10%	7%	92.80%	3%
Azinphos-methyl	100.40%	7%	85.20%	11%	95.70%	3%
Azoxystrobin	96.70%	5%	91.00%	4%	96.00%	2%
Bitertanol	94.70%	7%	91.30%	5%	97.10%	1%
Boscalid	97.90%	2%	92.60%	5%	97.60%	2%
Bromuconazole	95.90%	8%	93.90%	7%	96.40%	1%
BTS_44595	102.70%	4%	96.70%	3%	96.90%	5%
BTS_44596	108.50%	4%	102.50%	4%	97.50%	6%
BTS-40348	104.60%	3%	98.70%	3%	94.40%	5%
Bupirimate	99.90%	3%	92.90%	6%	95.50%	2%
Buprofezin	95.90%	4%	91.50%	6%	97.00%	1%
Cadusafos	98.90%	3%	92.70%	4%	96.10%	1%
Carbaryl	100.60%	3%	93.00%	6%	93.90%	1%
Carbendazim	77.70%	4%	79.70%	3%	90.70%	5%
Carbofuran	99.20%	4%	93.40%	5%	95.80%	2%
Carbofuran. 3OH-	101.60%	3%	98.90%	6%	95.20%	5%
Chlorantraniliprole	93.90%	2%	89.60%	5%	96.30%	2%
Chlorfenvinphos	98.80%	5%	93.60%	6%	96.80%	2%
Chlorpyrifos	96.20%	12%	93.30%	8%	96.70%	1%
Clofentezine	95.70%	4%	105.00%	8%	93.60%	3%
Clothianidin	100.00%	6%	94.60%	2%	97.10%	1%
Cymoxanil	95.80%	18%	97.80%	15%	96.40%	3%
Cyproconazole	98.70%	3%	96.50%	7%	96.10%	2%
Cyprodinil	94.20%	3%	90.50%	6%	93.30%	1%
Demeton-S-Methyl-Sulfone	100.30%	2%	93.00%	5%	93.80%	1%
Demeton-S-methylsulfoxide	95.30%	5%	90.90%	6%	95.80%	2%

Diazinon	98.20%	4%	93.60%	5%	95.90%	2%
Dichlorvos	66.80%	3%	78.50%	6%	94.10%	1%
Difenoconazole	100.40%	3%	98.80%	4%	99.40%	2%
Diflubenzuron	96.80%	2%	91.80%	5%	94.90%	2%
Dimethoate	98.60%	2%	91.70%	4%	95.90%	1%
Dimethomorph	95.40%	6%	89.30%	8%	94.90%	2%
Diniconazole	100.20%	4%	92.00%	5%	96.40%	2%
Epoxiconazole	97.40%	4%	90.70%	5%	95.00%	1%
Ethion	98.10%	5%	88.10%	7%	97.80%	2%
Ethirimol	95.10%	3%	89.50%	5%	94.40%	1%
Ethoprophos	97.90%	4%	92.60%	5%	96.30%	1%
Etofenprox	99.90%	3%	90.80%	6%	97.70%	1%
Famoxadone	101.60%	5%	91.80%	7%	96.50%	2%
Fenamidone	98.20%	3%	92.40%	5%	95.70%	1%
Fenamiphos	98.80%	4%	89.70%	6%	94.60%	2%
Fenamiphos-sulfone	96.00%	4%	92.20%	5%	92.50%	1%
Fenamiphos-sulfoxide	100.90%	4%	95.80%	5%	99.10%	2%
Fenarimol	98.40%	7%	94.10%	6%	96.00%	2%
Fenazaquin	97.90%	3%	92.00%	4%	97.70%	2%
Fenbuconazole	97.40%	4%	90.30%	6%	94.80%	2%
Fenhexamid	107.50%	5%	95.80%	5%	95.20%	2%
Fenoxycarb	97.60%	6%	92.10%	7%	96.90%	2%
Fenpropathrin	95.90%	5%	95.20%	8%	100.40%	2%
Fenpropidin	98.90%	2%	92.50%	6%	98.40%	1%
Fenpropimorph	99.70%	4%	94.80%	5%	100.80%	1%
Fenpyroximate	95.50%	3%	91.40%	5%	96.60%	2%
Fenthion	95.70%	2%	83.90%	6%	89.90%	3%
Fenthion-oxon	103.20%	4%	96.90%	3%	97.30%	5%
Fenthion-oxon-sulfone	106.80%	4%	100.10%	3%	96.10%	5%
Fenthion-oxon-sulfoxide	103.20%	3%	99.80%	3%	98.00%	5%
Fenthion-sulfone	100.60%	2%	93.40%	7%	97.00%	1%
Fenthion-sulfoxide	98.80%	3%	100.10%	5%	102.20%	2%
Fipronil	100.00%	4%	99.80%	6%	98.20%	3%
Fipronil-sulfone	103.70%	4%	100.30%	3%	100.60%	5%
Fonicamid	101.20%	6%	95.40%	6%	94.90%	2%
Flubendiamide	99.60%	3%	99.70%	6%	97.40%	1%
Fludioxonil	99.00%	4%	96.30%	5%	97.60%	3%

Flufenoxuron	100.30%	5%	94.50%	8%	97.60%	2%
Fluopyram	98.10%	3%	93.20%	6%	96.20%	1%
Fluquinconazole	103.70%	6%	99.40%	10%	91.90%	4%
Flusilazole	98.20%	3%	93.20%	5%	96.50%	2%
Flutriafol	96.40%	3%	93.70%	6%	95.10%	1%
Formetanate	99.30%	3%	91.80%	4%	93.20%	5%
Fosthiazate	99.70%	3%	92.20%	6%	96.40%	1%
Haloxyfop	112.00%	5%	116.30%	4%	107.50%	2%
Haloxyfop-2-Ethoxyethyl	104.10%	4%	99.80%	2%	96.70%	5%
Haloxyfop-methyl	100.90%	3%	98.80%	3%	98.50%	5%
Hexaconazole	99.70%	5%	94.00%	4%	97.40%	2%
Hexythiazox	102.20%	4%	92.80%	7%	100.20%	2%
Imazalil	97.20%	3%	89.00%	5%	92.30%	2%
Imidacloprid	98.80%	4%	92.90%	6%	93.90%	2%
Indoxacarb	98.10%	4%	92.40%	4%	96.40%	2%
Isocarbophos	97.40%	2%	92.40%	6%	95.50%	2%
Kresoxim-methyl	99.30%	4%	90.20%	7%	97.70%	2%
Linuron	98.20%	4%	91.40%	5%	96.00%	1%
Lufenuron	98.40%	5%	93.70%	8%	103.30%	3%
Malaoxon	104.50%	4%	101.20%	3%	97.80%	5%
Malathion	100.10%	4%	91.50%	6%	96.90%	1%
Mandipropamid	100.90%	5%	91.20%	5%	96.20%	1%
Mepanipyrim	97.70%	4%	94.20%	6%	96.20%	1%
Metaflumizone	99.00%	4%	96.30%	6%	96.70%	1%
Metalaxyl	101.30%	4%	95.50%	5%	99.20%	1%
Metconazole	103.50%	6%	95.70%	5%	97.40%	2%
Methamidophos	86.30%	4%	78.30%	6%	85.50%	1%
Methidathion	93.10%	4%	87.90%	12%	96.90%	3%
Methiocarb	102.40%	2%	89.50%	6%	96.30%	2%
Methiocarb-sulfone	101.80%	4%	93.20%	6%	96.70%	2%
Methiocarb-sulfoxide	99.80%	5%	92.10%	5%	96.40%	2%
Methoxyfenozide	81.10%	6%	88.30%	3%	94.50%	5%
Monocrotophos	98.30%	4%	92.30%	5%	95.30%	2%
Myclobutanil	99.30%	4%	94.50%	6%	97.30%	2%
Omethoate	95.50%	4%	89.70%	6%	92.90%	1%
Oxadixyl	98.80%	6%	95.00%	9%	97.80%	1%
Oxamyl	94.60%	8%	89.30%	6%	98.40%	2%
Paclobutrazol	98.70%	2%	94.20%	5%	95.40%	2%

Paraoxon methyl	105.90%	5%	99.90%	4%	100.20%	9%
Penconazole	101.40%	4%	93.30%	6%	95.90%	2%
Pencycuron	95.40%	2%	93.10%	6%	95.70%	1%
Pendimethalin	105.40%	6%	90.40%	3%	98.10%	3%
Phenthoate	97.10%	3%	93.00%	5%	96.90%	1%
Phosalone	99.20%	4%	96.20%	6%	96.70%	2%
Phosmet	95.00%	3%	91.00%	4%	96.50%	2%
Phosmet oxon	93.40%	3%	98.30%	2%	105.30%	3%
Phoxim	95.30%	4%	89.00%	4%	93.70%	2%
Pirimicarb	100.90%	2%	92.00%	6%	97.10%	1%
Pirimicarb. desmethyl-	99.30%	3%	94.60%	7%	96.10%	1%
Pirimiphos-methyl	97.90%	3%	92.80%	4%	96.70%	1%
Prochloraz	94.70%	4%	87.40%	6%	88.90%	2%
Profenofos	96.20%	2%	93.50%	6%	94.70%	2%
Propamocarb	94.60%	3%	88.70%	7%	96.40%	2%
Propargite	98.80%	3%	91.60%	5%	97.70%	1%
Propiconazole	99.10%	4%	94.10%	6%	96.00%	1%
Propyzamide	98.50%	4%	95.70%	5%	95.20%	1%
Prothioconazole-Desthio	105.30%	5%	100.30%	3%	97.80%	5%
Pyraclostrobin	100.10%	5%	93.50%	6%	95.20%	1%
Pyridaben	93.70%	4%	94.00%	4%	99.50%	1%
Pyrimethanil	99.10%	5%	90.10%	6%	95.20%	1%
Pyriproxyfen	99.70%	3%	93.80%	6%	97.40%	1%
Quinoxifen	97.90%	4%	91.30%	7%	96.90%	2%
Spinosad	100.80%	3%	92.30%	5%	97.90%	2%
Spirodiclofen	98.90%	3%	91.30%	6%	97.40%	1%
Spiromesifen	94.70%	3%	88.30%	5%	97.60%	2%
Spiroxamine	99.30%	2%	89.60%	6%	98.20%	2%
Tebuconazole	102.10%	5%	93.00%	6%	96.80%	2%
Tebufenpyrad	98.40%	2%	94.40%	5%	95.90%	1%
Teflubenzuron	99.10%	4%	93.00%	8%	97.10%	2%
Terbuthylazine	96.00%	6%	90.20%	6%	96.80%	1%
Tetraconazole	98.40%	2%	91.70%	5%	97.10%	2%
Thiabendazole	96.90%	4%	90.30%	5%	92.10%	2%
Thiacloprid	97.50%	1%	93.60%	4%	96.90%	1%
Thiamethoxam	96.70%	3%	93.10%	6%	94.50%	2%
Thiodicarb	107.70%	3%	102.10%	4%	96.80%	5%
Triadimefon	106.30%	3%	103.80%	3%	99.40%	5%

Triadimenol	102.20%	4%	88.00%	7%	94.00%	2%
Triazophos	100.40%	3%	93.60%	6%	95.70%	1%
Trifloxystrobin	97.20%	3%	93.50%	4%	96.60%	1%
Triflumuron	98.90%	2%	97.60%	4%	97.20%	1%
Triticonazole	100.80%	4%	91.80%	5%	95.20%	2%
Zoxamide	96.40%	3%	92.00%	6%	97.00%	1%

Repeatability

Compound	10 ppb		20 ppb		100 ppb	
	Recup (%)	RSD (%)	Recup (%)	RSD (%)	Recup (%)	RSD (%)
2,4-D	108.70%	4%	107.70%	4%	103.50%	2%
Abamectin	82.40%	8%	97.50%	4%	97.20%	4%
Acephate	93.60%	9%	94.50%	10%	94.20%	5%
Acetamiprid	94.60%	4%	95.80%	5%	95.50%	2%
Aldicarb	104.00%	18%	99.80%	10%	99.90%	11%
Aldicarb-sulfone	95.90%	8%	97.50%	7%	96.80%	3%
Aldicarb-sulfoxide	100.50%	16%	89.70%	16%	93.30%	5%
Azinphos-methyl	88.10%	10%	98.70%	13%	100.30%	4%
Azoxystrobin	96.10%	7%	94.80%	4%	97.70%	2%
Bitertanol	96.70%	9%	98.50%	9%	95.70%	4%
Boscalid	95.40%	5%	95.40%	4%	96.20%	3%
Bromuconazole	95.10%	9%	94.60%	7%	96.50%	3%
BTS_44595	93.60%	8%	97.10%	4%	95.00%	3%
BTS_44596	97.90%	9%	95.90%	5%	96.40%	4%
BTS-40348	94.80%	7%	97.10%	4%	94.90%	5%
Bupirimate	95.80%	6%	95.30%	3%	95.90%	1%
Buprofezin	94.20%	4%	93.20%	4%	95.80%	2%
Cadusafos	95.10%	7%	96.70%	4%	96.30%	1%
Carbaryl	97.90%	6%	96.80%	4%	97.60%	4%
Carbendazim	90.90%	11%	90.90%	8%	92.00%	1%
Carbofuran	96.00%	7%	96.10%	4%	97.20%	2%
Carbofuran, 3OH-	91.50%	8%	94.30%	4%	93.00%	6%
Chlorantraniliprole	97.60%	7%	95.00%	6%	98.70%	6%
Chlorfenvinphos	97.20%	5%	96.50%	5%	97.40%	3%
Chlorpyrifos	91.30%	15%	92.40%	5%	95.70%	1%
Clofentezine	106.50%	17%	94.00%	18%	99.60%	5%
Clothianidin	95.70%	5%	95.30%	7%	96.90%	2%

Cymoxanil	81.50%	14%	99.20%	18%	94.10%	6%
Cyproconazole	97.20%	6%	96.40%	4%	95.50%	2%
Cyprodinil	91.30%	6%	90.80%	2%	93.00%	2%
Demeton-S-Methyl-Sulfone	95.50%	8%	95.40%	2%	95.90%	3%
Demeton-S-methylsulfoxide	94.70%	8%	94.60%	4%	94.40%	3%
Diazinon	96.40%	4%	95.50%	3%	96.80%	2%
Dichlorvos	73.40%	12%	79.40%	8%	95.10%	2%
Difenoconazole	98.40%	10%	100.00%	4%	99.30%	3%
Diflubenzuron	95.00%	6%	95.30%	6%	96.60%	4%
Dimethoate	97.60%	10%	95.20%	4%	96.20%	2%
Dimethomorph	92.70%	8%	95.10%	5%	95.60%	3%
Diniconazole	95.60%	8%	94.50%	3%	97.10%	3%
Epoxiconazole	96.20%	8%	95.10%	3%	96.40%	3%
Ethion	89.90%	11%	93.70%	6%	94.40%	2%
Ethirimol	94.60%	7%	94.00%	3%	95.00%	1%
Ethoprophos	97.20%	5%	95.70%	4%	96.90%	3%
Etofenprox	89.90%	8%	92.70%	5%	97.10%	3%
Famoxadone	93.50%	9%	94.90%	9%	97.90%	3%
Fenamidone	95.70%	5%	95.80%	3%	96.70%	3%
Fenamiphos	96.90%	6%	95.10%	4%	96.40%	4%
Fenamiphos-sulfone	91.40%	5%	91.80%	2%	92.40%	2%
Fenamiphos-sulfoxide	97.70%	5%	97.10%	3%	96.40%	3%
Fenarimol	97.20%	12%	95.70%	7%	95.60%	3%
Fenazaquin	92.50%	6%	93.20%	2%	96.40%	3%
Fenbuconazole	98.70%	9%	94.40%	5%	96.20%	3%
Fenhexamid	97.80%	9%	100.10%	5%	95.50%	3%
Fenoxycarb	94.50%	5%	93.90%	4%	96.10%	2%
Fenpropathrin	90.10%	12%	96.10%	3%	95.30%	4%
Fenpropidin	98.70%	6%	97.70%	3%	97.60%	3%
Fenpropimorph	99.30%	5%	97.80%	3%	98.10%	2%
Fenpyroximate	92.20%	10%	94.40%	5%	96.80%	5%
Fenthion	92.00%	11%	93.90%	7%	93.00%	4%
Fenthion-oxon	93.00%	7%	94.50%	2%	94.00%	5%
Fenthion-oxon-sulfone	93.10%	10%	93.70%	4%	93.80%	5%
Fenthion-oxon-sulfoxide	92.70%	8%	95.60%	4%	94.40%	5%
Fenthion-sulfone	95.90%	5%	95.10%	5%	96.40%	5%

Fenthion-sulfoxide	96.70%	7%	96.80%	4%	98.20%	3%
Fipronil	94.90%	5%	100.20%	5%	99.70%	4%
Fipronil-sulfone	95.70%	6%	99.40%	4%	97.00%	4%
Fonicamid	95.10%	9%	93.60%	2%	93.00%	4%
Flubendiamide	92.80%	5%	99.10%	3%	98.50%	2%
Fludioxonil	93.40%	7%	96.40%	3%	97.30%	2%
Flufenoxuron	95.60%	9%	94.50%	5%	96.80%	2%
Fluopyram	97.40%	6%	95.90%	4%	96.60%	2%
Fluquinconazole	98.10%	8%	94.30%	11%	95.20%	6%
Flusilazole	95.80%	8%	95.10%	3%	97.40%	3%
Flutriafol	95.30%	6%	96.80%	4%	95.70%	2%
Formetanate	93.90%	7%	92.40%	4%	91.70%	3%
Fosthiazate	97.60%	7%	97.40%	6%	97.80%	2%
Haloxyfop	100.60%	14%	109.00%	4%	108.10%	5%
Haloxyfop-2-Ethoxyethyl	94.40%	7%	95.50%	4%	93.70%	4%
Haloxyfop-methyl	94.20%	8%	94.50%	4%	94.90%	5%
Hexaconazole	100.20%	4%	95.50%	5%	98.80%	4%
Hexythiazox	94.60%	7%	94.20%	3%	96.90%	3%
Imazalil	97.70%	7%	94.40%	4%	95.30%	2%
Imidacloprid	94.00%	8%	94.00%	4%	94.50%	1%
Indoxacarb	90.10%	7%	94.70%	4%	95.20%	3%
Isocarbophos	96.20%	6%	96.40%	5%	97.00%	3%
Kresoxim-methyl	95.50%	10%	96.10%	5%	98.40%	4%
Linuron	95.60%	4%	96.40%	4%	96.80%	3%
Lufenuron	87.40%	9%	96.90%	3%	101.00%	2%
Malaoxon	94.00%	7%	97.00%	5%	96.10%	5%
Malathion	94.50%	5%	98.10%	4%	96.20%	3%
Mandipropamid	96.20%	8%	95.10%	3%	96.30%	2%
Mepanipyrim	95.60%	8%	95.80%	4%	95.70%	1%
Metaflumizone	88.10%	10%	97.60%	2%	97.40%	2%
Metalaxyl	98.60%	5%	97.50%	3%	97.40%	2%
Metconazole	100.90%	5%	97.50%	4%	98.00%	4%
Methamidophos	91.00%	12%	90.00%	11%	92.40%	7%
Methidathion	92.80%	8%	93.10%	7%	97.50%	5%
Methiocarb	98.50%	11%	96.10%	7%	96.00%	4%
Methiocarb-sulfone	97.40%	7%	96.40%	3%	96.30%	3%
Methiocarb-sulfoxide	95.20%	5%	95.80%	4%	96.70%	2%

Methoxyfenozid e	77.70%	9%	86.60%	8%	93.80%	2%
Monocrotophos	98.70%	5%	95.70%	4%	96.50%	3%
Myclobutanil	94.00%	6%	94.30%	2%	96.30%	2%
Omethoate	94.60%	8%	93.60%	5%	93.10%	3%
Oxadixyl	96.80%	5%	96.60%	5%	97.30%	3%
Oxamyl	105.50%	20%	92.80%	13%	94.10%	6%
Paclobutrazol	97.20%	5%	95.50%	3%	94.40%	4%
Paraoxon methyl	93.70%	8%	92.00%	7%	94.20%	4%
Penconazole	97.50%	6%	95.90%	4%	95.80%	4%
Pencycuron	93.10%	5%	95.10%	3%	96.70%	3%
Pendimethalin	98.90%	9%	92.60%	2%	95.30%	4%
Phenthoate	92.20%	6%	96.50%	6%	98.20%	4%
Phosalone	95.50%	10%	95.70%	5%	97.30%	3%
Phosmet	96.70%	7%	98.10%	6%	96.60%	3%
Phosmet oxon	95.80%	3%	99.50%	1%	98.00%	5%
Phoxim	90.80%	8%	93.10%	4%	94.70%	3%
Pirimicarb	98.00%	5%	95.50%	4%	97.00%	3%
Pirimicarb, desmethyl-	94.50%	7%	95.00%	2%	94.40%	1%
Pirimiphos-methyl	94.60%	7%	95.60%	4%	95.80%	2%
Prochloraz	94.80%	7%	92.80%	5%	92.20%	3%
Profenofos	91.10%	9%	94.30%	4%	96.10%	1%
Propamocarb	95.10%	9%	94.00%	7%	94.70%	5%
Propargite	93.50%	10%	94.70%	5%	97.40%	3%
Propiconazole	96.10%	9%	97.00%	5%	97.30%	3%
Propyzamide	98.30%	11%	95.90%	4%	95.70%	2%
Prothioconazole-Desthio	93.00%	9%	95.50%	5%	93.60%	4%
Pyraclostrobin	93.50%	11%	96.70%	3%	95.70%	3%
Pyridaben	92.70%	8%	93.00%	2%	97.60%	4%
Pyrimethanil	96.70%	6%	93.20%	3%	95.50%	2%
Pyriproxyfen	93.70%	7%	94.20%	3%	96.40%	2%
Quinoxifen	93.00%	9%	93.00%	2%	94.00%	4%
Spinosad	99.10%	5%	99.50%	5%	98.30%	2%
Spirodiclofen	96.10%	10%	93.10%	5%	97.80%	4%
Spiromesifen	96.00%	6%	95.10%	6%	97.60%	2%
Spiroxamine	97.80%	7%	95.30%	4%	98.70%	3%
Tebuconazole	98.60%	7%	96.30%	3%	97.10%	4%
Tebufenpyrad	94.10%	4%	94.30%	3%	96.10%	2%
Teflubenzuron	90.40%	9%	97.80%	3%	96.00%	1%

Terbutylazine	93.80%	5%	94.60%	5%	96.40%	2%
Tetraconazole	96.40%	6%	95.00%	3%	97.10%	2%
Thiabendazole	93.90%	6%	93.80%	2%	93.60%	3%
Thiacloprid	96.30%	3%	94.40%	4%	96.20%	2%
Thiamethoxam	93.20%	8%	96.30%	4%	95.80%	3%
Thiodicarb	100.30%	6%	99.30%	7%	94.70%	4%
Triadimefon	95.50%	9%	98.00%	5%	96.10%	6%
Triadimenol	97.10%	8%	94.00%	6%	95.40%	5%
Triazophos	96.20%	6%	94.80%	4%	96.30%	3%
Trifloxystrobin	93.30%	10%	95.60%	3%	96.10%	2%
Triflumuron	95.20%	10%	96.30%	6%	96.40%	5%
Triticonazole	96.40%	9%	92.70%	3%	96.00%	3%
Zoxamide	93.50%	6%	95.30%	4%	96.40%	1%

Linearity

Compound	Min [mg/kg]	Max [mg/kg]
2,4-D	0.005	0.5
Abamectin	0.01	0.2
Acephate	0.005	0.5
Acetamiprid	0.005	0.5
Aldicarb	0.01	0.2
Aldicarb-sulfone	0.005	0.5
Aldicarb-sulfoxide	0.01	0.5
Azinphos-methyl	0.01	0.5
Azoxystrobin	0.005	0.5
Bitertanol	0.005	0.5
Boscalid	0.005	0.5
Bromuconazole	0.005	0.5
BTS_44595	0.005	0.5
BTS_44596	0.005	0.5
BTS-40348	0.005	0.5
Bupirimate	0.005	0.5
Buprofezin	0.005	0.5
Cadusafos	0.005	0.5
Carbaryl	0.005	0.5
Carbendazim	0.005	0.5
Carbofuran	0.005	0.5
Carbofuran. 3OH-	0.005	0.5
Chlorantraniliprole	0.005	0.5

Chlorfenvinphos	0.005	0.5
Chlorpyrifos	0.005	0.5
Clofentezine	0.005	0.5
Clothianidin	0.005	0.5
Cymoxanil	0.005	0.5
Cyproconazole	0.005	0.5
Cyprodinil	0.005	0.5
Demeton-S-Methyl-Sulfone	0.005	0.5
Demeton-S-methylsulfoxide	0.005	0.5
Diazinon	0.005	0.5
Dichlorvos	0.005	0.5
Difenoconazole	0.005	0.5
Diffubenzuron	0.005	0.5
Dimethoate	0.005	0.5
Dimethomorph	0.005	0.5
Diniconazole	0.005	0.5
Epoxiconazole	0.005	0.5
Ethion	0.005	0.5
Ethirimol	0.005	0.5
Ethoprophos	0.005	0.5
Etofenprox	0.005	0.5
Famoxadone	0.005	0.5
Fenamidone	0.005	0.5
Fenamiphos	0.005	0.5
Fenamiphos-sulfone	0.005	0.5
Fenamiphos-sulfoxide	0.005	0.5
Fenarimol	0.005	0.5
Fenazaquin	0.005	0.5
Fenbuconazole	0.005	0.5
Fenhexamid	0.005	0.5
Fenoxycarb	0.005	0.5
Fenpropathrin	0.005	0.5
Fenpropidin	0.005	0.5
Fenpropimorph	0.005	0.5
Fenpyroximate	0.005	0.5
Fenthion	0.005	0.5
Fenthion-oxon	0.005	0.5
Fenthion-oxon-	0.005	0.5

sulfone		
Fenthion-oxon-sulfoxide	0.005	0.5
Fenthion-sulfone	0.005	0.5
Fenthion-sulfoxide	0.005	0.5
Fipronil	0.005	0.5
Fipronil-sulfone	0.005	0.5
Flonicamid	0.005	0.5
Flubendiamide	0.005	0.5
Fludioxonil	0.005	0.5
Flufenoxuron	0.005	0.5
Fluopyram	0.005	0.5
Fluquinconazole	0.005	0.5
Flusilazole	0.005	0.5
Flutriafol	0.005	0.5
Formetanate	0.01	0.5
Fosthiazate	0.005	0.5
Haloxyfop	0.01	0.5
Haloxyfop-2-Ethoxyethyl	0.005	0.5
Haloxyfop-methyl	0.005	0.5
Hexaconazole	0.005	0.5
Hexythiazox	0.005	0.5
Imazalil	0.005	0.5
Imidacloprid	0.005	0.5
Indoxacarb	0.005	0.5
Isocarbophos	0.005	0.5
Kresoxim-methyl	0.005	0.5
Linuron	0.005	0.5
Lufenuron	0.005	0.5
Malaoxon	0.005	0.5
Malathion	0.005	0.5
Mandipropamid	0.005	0.5
Mepanipyrim	0.005	0.5
Metaflumizone	0.005	0.5
Metalaxyl	0.005	0.5
Metconazole	0.005	0.5
Methamidophos	0.005	0.5
Methidathion	0.005	0.5
Methiocarb	0.005	0.5
Methiocarb-	0.005	0.5

sulfone		
Methiocarb-sulfoxide	0.005	0.5
Methoxyfenozide	0.005	0.5
Monocrotophos	0.005	0.5
Myclobutanil	0.005	0.5
Omethoate	0.005	0.5
Oxadixyl	0.005	0.5
Oxamyl	0.005	0.5
Paclobutrazol	0.005	0.5
Paraoxon methyl	0.005	0.5
Penconazole	0.005	0.5
Pencycuron	0.005	0.5
Pendimethalin	0.005	0.5
Phenthoate	0.005	0.5
Phosalone	0.005	0.5
Phosmet	0.005	0.5
Phosmet oxon	0.005	0.5
Phoxim	0.005	0.5
Pirimicarb	0.005	0.5
Pirimicarb. desmethyl-	0.005	0.5
Pirimiphos-methyl	0.005	0.5
Prochloraz	0.005	0.5
Profenofos	0.005	0.5
Propamocarb	0.005	0.5
Propargite	0.005	0.5
Propiconazole	0.005	0.5
Propyzamide	0.005	0.5
Prothioconazole-Desthio	0.005	0.5
Pyraclostrobin	0.005	0.5
Pyridaben	0.005	0.5
Pyrimethanil	0.005	0.5
Pyriproxyfen	0.005	0.5
Quinoxifen	0.005	0.5
Spinosad	0.005	0.5
Spirodiclofen	0.005	0.5
Spiromesifen	0.005	0.5
Spiroxamine	0.005	0.5
Tebuconazole	0.005	0.5

Tebufenpyrad	0.005	0.5
Teflubenzuron	0.005	0.5
Terbutylazine	0.005	0.5
Tetraconazole	0.005	0.5
Thiabendazole	0.005	0.5
Thiacloprid	0.005	0.5
Thiamethoxam	0.005	0.5
Thiodicarb	0.005	0.5
Triadimefon	0.005	0.5
Triadimenol	0.005	0.5
Triazophos	0.005	0.5
Trifloxystrobin	0.005	0.5
Triflumuron	0.005	0.5
Triticonazole	0.005	0.5
Zoxamide	0.005	0.5