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National Food Institute
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Validation Report 28

Determination of pesticide residues in hay

by LC-MS/MS and GC-MS/MS

(QuEChERS method)

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CONTENT:

1. Introduction

This report describes the validation of the QuEChERS method combined with GC-MS/MS and LC-MS/MS. The method was validated for 297 pesticides and metabolites on GC-MSMS and 298 on LC-MSMS in rye grass hay. Some of the compounds are represented both in GC-MSMS and the LC-MSMS validation. The QuEChERS method is an extraction method which has been developed to be Quick, Easy, Cheap, Efficient, Rugged and Safe. The method is most commonly used on fruit, vegetables and cereals[1].

2. Principle of analysis

Sample preparation: The sample is milled with a sieve at 1 mm.

Extraction: Only 1 gram samples were extracted because hay and straw matrix swell a lot when water is added to the sample prior to the extraction. Water was added (10 ml) and the samples were shaken to ensure that all the hay is wetted. Then acetonitrile was added and the samples were shaken again. Finally a salt and buffer mixture was added and the samples were shaken.

Clean-up: The supernatant is transferred to a tube containing PSA and $MgSO_4$. An aliquot was withdrawn prior to this clean-up step and analysed by LC-MSMS. After shaking and an additional centrifugation step the final extract is diluted 1:1 with acetonitrile to obtain the same matrix concentration as in the matrix matched calibration standards.

Quantification and qualification: The final extracts was analysed by GC-MS/MS. Crude extract withdrawn before PSA clean-up was analysed by LC-MS/MS.

GC-MS/MS: The pesticide residues were separated on a DB5-MS column and analysed by triple quadrupole operating in the multiple reaction monitoring mode (MRM) with electron energy at 70 eV, source temperature at 180°C and transfer line at 250°C. The injection volume was 1 µl. For each pesticide minimum two sets of precursor and product ions were determined. One for quantification and one for qualification. The MRM transitions for the pesticides and degradation products are given in **Appendix 1a**.

LC-MS/MS: The pesticide residues are separated on a reversed-phase column and detected by tandem mass spectrometry (MS/MS) by electrospray (ESI). The validation includes pesticides determined in positive mode. All pesticides were detected in the MRM mode. For each pesticide or metabolite a precursor ion and 2 product ions were determined. The MRM transitions for the pesticides and degradation products sought validated are given in **Appendix 1b**.

3. Validation design

The method was sought validated for almost 433 pesticides or metabolites in hay, see **Appendix 1a and b**. The validation was performed on 5-6 replicates at each of the three spiking levels; 0.025, 0.05 and 0.5 mg/kg. A blank sample of hay was included.

4. Calibration curves

The calibration curve is determined by the analysis of each of the analysts at least 4 calibration levels within the range of 0.03, 1, 3.3, 10, 33.3 and 100 ng/ml. The calibration curves were in generally best fitted to a linear curve. The quantification was performed from the mean of two bracketing calibration curves. The majority of the correlation coefficients (R) were higher or equal to 0.99.

5. Validation parameters

Precision – repeatability

Repeatability was calculated for all pesticides and degradation products on all three spiking levels (0.025 mg/kg, 0.05 mg/kg and 0.5 mg/kg). Repeatability is given as the relative standard deviation on the result from two or more analysis at the same sample, done by the same technician, on the same instrument and within a short period of time. Repeatability (RSD_r) in this validation was calculated from the 5-6 replicate determinations. Repeatability were calculated as given in ISO 5725-2[2].

Accuracy – Recovery

The accuracy was determined from recovery studies in which samples were spiked at three concentration levels (0.025 mg/kg, 0.05 mg/kg and 0.5 mg/kg) with the relevant pesticides, isomers and degradation products.

Robustness

The QuEChERS method has, in connection with the development of the method, been shown to be robust by Anastassiades et al. 2003[1].

Limit of quantification, LOQ

The quantification limits (LOQ) was determined as the lowest spike level for which the acceptance criteria was meet.

6. Criteria for the acceptance of validation results

For the pesticides to be accepted as validated the following criteria for precision and trueness must to be fulfilled:

1. The relative standard deviation of the repeatability should be ≤20%[3].
2. The average relative recovery must be between 70 and 120%[3].

If the above mentioned criteria have been meet, the quantification limits, LOQs is stated.

The expanded uncertainty is calculated to demonstrate that it is less than 50%. The expanded uncertainty is given by:

$$U = \sqrt{RSD^2 + Bias^2 + (RSD^2/n)} * 2$$

Where RSD in this validation is the repetability uncertainty (RSD_r),
Bias is 100-the recovery,
RSD^2/n is the uncertainty of the bias,
n is the number of recoveries included in the bias and
2 is the coverage factor corresponding to 95% confidence level.

If the expanded uncertainty is higher than 50%, the analytical results must be corrected for recovery and the combined uncertainty is then given by:

$$U_c = \sqrt{RSD^2 + (RSD^2/n)}$$

Where RSD in this validation is the repetability uncertainty (RSD_r),
RSD^2/n is the uncertainty of the bias,
n is the number of recoveries included in the bias and
2 is the coverage factor corresponding to 95% confidence level.

The bias/recovery used for correction will be the bias/recoveries determined for the individual analytes during the initial validation and/or ongoing method validation. However, if it is evaluated that the type of sample being analysed is significantly different from the matrices employed for the method validation it is possible to correct for bias/recoveries based on recovery from spiked samples included in the analytical batch in question. However, minimum of 5 recovery samples must be included then.

The obtained results including recovery, RSD_r, expanded uncertainty (U), combined uncertainty (U_c) and limit of quantification (LOQ) are presented in **Appendix 2**.

7. Results and conclusion

The validation results obtained for the 297 pesticides or metabolites using GC-MSMS are presented in appendix 2. For 223 compounds an LOQ of 0.025 mg/kg, for 40 an LOQ of 0.05 mg/kg and for 34 an LOQ of 0.5 mg/kg was achieved.

The validation results obtained for the 298 pesticides or metabolites using LC-MSMS are also presented in appendix 2. For 215 compounds an LOQ of 0.005 mg/kg, for 58 an LOQ of 0.01 mg/kg and for 25 an LOQ of 0.05 mg/kg was achieved.

Generally the combined uncertainties were lower than 50%, indicating that recovery for correction is not needed. However it has been decided at our laboratory that all results shall be corrected for recovery when possible, regardless of the combined uncertainty.

9. References

1 EN 15662:2008. Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS following acetonitrile extraction/partitioning and clean-up by dispersive SPE - QuEChERS-method

2 ISO 5725-2:1994. Accuracy (trueness and precision) of measurement methods and results – Part2. Basic method for the determination of repeatability and reproducibility of standard measurement method. First edition. December 1994.

3 Guidance document on analytical quality control and method validation procedures for pesticide residues and analysis in food and feed, Document SANTE/11813/2017, 21–22 November 2017 rev.0, European Commission, Brussels, 2017.

Appendix 1a. GCMSMS transitions used for validation of pesticides in Hay

Not all transitions fulfil the +/- 30% ion ratio criteria

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
1,4-dimethylnaphthalene	9.63	115.1	89.1	15
1,4-dimethylnaphthalene	9.63	141.1	115.1	15
1,4-dimethylnaphthalene	9.63	156.1	141.1	15
1-Naphtylacetamide	15	141	115	15
1-Naphtylacetamide	15	185	141	15
2-Phenylphenol	9.42	141	115	15
2-Phenylphenol	9.42	170	115	35
2-Phenylphenol	9.42	170	141	25
2-Phenylphenol	9.42	170	169	10
Acephate	8.69	95.5	65.4	8
Acephate	8.69	136	42.1	8
Acephate	8.69	136	94	12
Aceqinocyl	27.3	188	132	10
Aceqinocyl	27.3	342	188	14
Acetochlor	14.16	131.8	117	14
Acetochlor	14.16	146	117.7	8
Acetochlor	14.16	146	131.1	12
Acibenzolar-S-methyl	14.67	135	62.9	18
Acibenzolar-S-methyl	14.67	135	107	8
Acibenzolar-S-methyl	14.67	182	181	8
Aclonifen	20.12	212	182	10
Aclonifen	20.12	264	194.1	14
Acrinathrin I	23.39	181	152	22
Acrinathrin I	23.39	208.1	180.9	8
Acrinathrin I	23.39	289	93.1	8
Acrinathrin II	23.75	181	152	22
Acrinathrin II	23.75	208.1	180.9	8
Acrinathrin II	23.75	289	93.1	22
Aldrin	14.47	262.7	192.9	32
Aldrin	14.47	292.9	257.9	10
Anthraquinone	15.76	180	152	12
Anthraquinone	15.76	208	151.7	22
Anthraquinone	15.76	208	180	10
Atrazine	11.47	200	122	8
Atrazine	11.47	215	173	10
Atrazine	11.47	215	200	10
Azinphos-ethyl	23.84	132	51	26
Azinphos-ethyl	23.84	132	77	12
Azinphos-ethyl	23.84	160	77	16
Azinphos-methyl	21.37	132	77	12
Azinphos-methyl	21.37	160	50.9	34
Azinphos-methyl	21.37	160	77	22
Azoxystrobin	29.64	344.1	156	34
Azoxystrobin	29.64	344.1	171.9	36

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Azoxystrobin	29.64	344.1	329	14
Azoxystrobin	29.64	388	300.9	20
Azoxystrobin-d4	29.66	348	332	30
Azoxystrobin-d4	30.86	348	332	30
Beflubutamid	16.97	221	193	10
Beflubutamid	16.97	355	176	10
Benalaxyl	20.79	148.1	77	30
Benalaxyl	20.79	234.3	174.2	10
Benalaxyl	20.79	266.4	148.2	10
Bendiocarb	11.51	126	51.9	16
Bendiocarb	11.51	151	43	20
Bendiocarb	11.51	166.1	151.1	10
Benfluralin	11.5	292	159.7	20
Benfluralin	11.5	292	206.1	10
Benfluralin	11.5	292	264	8
Benzovindiflupyr	29.15	239	174	25
Benzovindiflupyr	29.15	369.1	159.1	20
Benzovindiflupyr	29.15	369.1	237.1	10
Bifenazate	23.08	198.9	184.1	12
Bifenazate	23.08	258	196.1	12
Bifenazate	23.08	258	199.1	12
Bifenthrin	21.54	165.1	163.6	24
Bifenthrin	21.54	181	165.9	10
Bifenthrin	21.54	181	179	12
Bifenthrin	21.54	181.1	153.1	10
Bifenthrin	21.54	181.1	166.1	10
Biphenyl	9.1	154.1	115	26
Biphenyl	9.1	154.1	152.1	25
Biphenyl	9.1	154.1	153.1	15
Bitertanol	24.68	170	115.1	34
Bitertanol	24.68	170	141.1	20
Bitertanol	24.68	170	169.1	16
Bixafen	28.6	159	139.1	10
Bixafen	28.6	160.1	140.1	10
Bixafen	28.6	413.1	159.1	10
Boscalid	26.52	139.9	76	22
Boscalid	26.52	139.9	112	10
Boscalid	26.52	167	139	20
Boscalid	26.52	341.8	140.2	15
Boscalid	26.52	343.7	139.9	15
Bromophos-ethyl	16.19	96.9	78.9	12
Bromophos-ethyl	16.19	302.7	284.8	14
Bromophos-ethyl	16.19	358.9	302.9	15
Bromophos-ethyl	16.19	358.9	330.9	10
Bromopropylate	21.57	184.9	75.5	30
Bromopropylate	21.57	340.8	185	14
Bromopropylate	21.57	342.7	185	15

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Bromuconazole I	21.3	172.9	144.9	16
Bromuconazole I	21.3	293	173	10
Bromuconazole I	21.3	295	175	10
Bromuconazole I	22.06	293	173	10
Bromuconazole I	22.06	295	175	10
Bromuconazole II	22.05	172.9	145	16
Bromuconazole II	22.05	293	173	10
Bromuconazole II	22.05	295	175	10
Bupirimate	17.57	208.1	165	12
Bupirimate	17.57	273.1	193.2	8
Bupirimate	17.57	316.2	208.2	10
Buprofezin	17.54	104.8	104.3	10
Buprofezin	17.54	105.1	77	18
Buprofezin	17.54	175	132.1	12
Buprofezin	17.54	248.9	193.2	10
Butralin	16.04	266.1	174.3	22
Butralin	16.04	266.1	190.1	10
Butralin	16.04	266.1	219.9	10
Cadusafos	10.83	159	96.9	16
Cadusafos	10.83	159	130.9	8
Cadusafos	10.83	213	89.1	12
Captan	15.8	149	70	20
Captan	15.8	149	78.8	14
Captan	15.8	149	105	6
Carbaryl	13.37	115	89	16
Carbaryl	13.37	144	115.1	22
Carbaryl	13.37	144	116.1	10
Carbetamide	15.8	91	64	10
Carbetamide	15.8	119	63.8	22
Carbetamide	15.8	119	91	12
Carbofuran	11.31	149.1	77	24
Carbofuran	11.31	149.1	121.1	8
Carbofuran	11.31	164	149.1	8
Carbofuran	11.31	221	164	10
Carbophenothion	20.89	157	45	12
Carbophenothion	20.89	199	142.9	10
Carbophenothion	20.89	342	157	10
Carbosulfan	21.34	160	50.9	34
Carbosulfan	21.34	160	77	22
Carbosulfan	21.34	160	133	10
Carboxin	17.57	87	43	6
Carboxin	17.57	143	43	16
Carboxin	17.57	143	87	8
Carboxin	17.57	235	143	5
Carfentrazon-ethyl	20.74	290	99.9	36
Carfentrazon-ethyl	20.74	311.9	150.7	18
Carfentrazon-ethyl	20.74	340.1	312.1	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Carvone	7.7	82	54	15
Carvone	7.7	108	93	10
Chlorfenapyr	17.8	136.9	102	12
Chlorfenapyr	17.8	247	227	15
Chlorfenapyr	17.8	248.9	112	24
Chlorfenapyr	17.8	248.9	137.1	18
Chlorfenapyr	17.8	328	247	15
Chlorfenson	16.95	174.9	111	10
Chlorfenson	16.95	248	154	10
Chlorfenson	16.95	302	175	10
Chlorfenvinphos	15.51	266.9	159	16
Chlorfenvinphos	15.51	266.9	203	10
Chlorfenvinphos	15.51	269	161	15
Chlorfenvinphos	15.51	323	266.9	14
Chloridazon	21.2	220	165.9	22
Chloridazon	21.2	220	193	16
Chloridazon	21.2	220.9	77	20
Chlormephos	8.77	154	65	16
Chlormephos	8.77	154	121	5
Chlormephos	8.77	234	121.1	10
Chlorobenzilate	18.37	111	75.1	14
Chlorobenzilate	18.37	139	74.9	26
Chlorobenzilate	18.37	139	111	12
Chlorobenzilate	18.37	251	111	15
Chlorobenzilate	18.37	251	139	14
Chlorobenzilate	18.37	253	139	20
Chloropropylate	19.71	251	139	15
Chloropropylate	19.71	253	141	15
Chlorothalonil	12.13	228.8	168	8
Chlorothalonil	12.13	263.9	168	25
Chlorothalonil	12.13	265.8	133	36
Chlorotoluron	16.6	132.1	77.1	16
Chlorotoluron	16.6	167.1	132.1	10
Chlorotoluron	16.6	212.1	72.1	12
Chlorpropham	10.56	171	127	8
Chlorpropham	10.56	213	171	10
Chlorpropham	10.56	264	206	10
Chlorpyrifos	14.3	196.7	107	36
Chlorpyrifos	14.3	196.7	168.9	12
Chlorpyrifos	14.3	313.9	257.9	12
Chlorpyrifos	14.3	316.1	260	15
Chlorpyrifos-d10	14.32	200	109	36
Chlorpyrifos-d10	14.32	200	172	12
Chlorpyrifos-d10	15.55	200	109	36
Chlorpyrifos-d10	15.55	200	172	12
Chlorpyrifos-methyl	13.09	127	99	6
Chlorpyrifos-methyl	13.09	285.9	93	20

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Chlorpyrifos-methyl	13.09	286	271	15
Chlorsulfuron	12.09	175	111	5
Chlorsulfuron	12.09	191	127	5
Chlorthal-dimethyl	15.69	222.7	166.9	20
Chlorthal-dimethyl	15.69	300.7	222.9	22
Chlorthal-dimethyl	15.69	300.7	272.9	12
Chlorthal-dimethyl	15.69	331.9	300.9	10
Cinidon-ethyl	32.42	330	302	15
Cinidon-ethyl	32.42	358	330	10
Clethodim	19	164.1	80.8	16
Clethodim	19	164.1	108.1	8
Clethodim	19	204.9	176.1	12
Clodinafop-propargyl	21.24	238	130	18
Clodinafop-propargyl	21.24	266	91.1	14
Clodinafop-propargyl	21.24	349.1	266.1	8
Clofentezine	24.21	102	50.9	12
Clofentezine	24.21	102	74.9	12
Clofentezine	24.21	137.6	102	12
Clomazone	11.59	125	89	16
Clomazone	11.59	138	74.9	24
Clomazone	11.59	204	107	15
Clopyralid	6.64	112.1	76	15
Clopyralid	6.64	147	112	10
Clopyralid	6.64	149	114	10
Cyflufenamid	19.15	222.8	203	10
Cyflufenamid	19.15	237	188	24
Cyflufenamid	19.15	237	208.1	12
Cyflumetofen	23.95	173	145	10
Cyflumetofen	23.95	174	146	20
Cyflutrin	26.1	206	151	12
Cyflutrin	26.1	226	206	10
Cyhalothrin, lambda R	23.37	180.9	151.9	22
Cyhalothrin, lambda R	23.37	197	141.1	10
Cyhalothrin, lambda R	23.37	208.1	180.9	8
Cyhalothrin, lambda S	23.8	181	151.9	22
Cyhalothrin, lambda S	23.8	208.1	151.8	28
Cyhalothrin, lambda S	23.8	208.1	180.9	8
Cypermethrin	26.79	163	127	10
Cypermethrin	26.79	181	152	20
Cyproconazole	18.13	383	254	20
Cyproconazole	18.13	383	282	20
Cyprodinil	15.25	224.1	196.9	20
Cyprodinil	15.25	224.1	208	18
Cyprodinil	15.25	225.1	209.7	16
Cyprodinil	15.25	226	225	15
Cyromazine	12.62	109.1	81.9	10
Cyromazine	12.62	151.1	109.1	15

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Cyromazine	12.62	166.1	151.2	10
Dazomet	12.33	162	42.5	20
Dazomet	12.33	162	44	18
Dazomet	12.33	162	89	6
Deltamethrin I=II	29.38	181	152.1	22
Deltamethrin I=II	29.38	252.8	92.9	16
Deltamethrin I=II	29.38	252.8	172	8
Demeton-S-methyl	10.23	88	59.8	6
Demeton-S-methyl	10.23	109	79	6
Demeton-S-methyl	10.23	141.9	79	12
Demeton-S-methyl-sulfone	14.32	169	79	18
Demeton-S-methyl-sulfone	14.32	169	109	12
Demeton-S-methyl-sulfone	14.32	169	125	8
Desmedipham	12.08	108.9	80.3	12
Desmedipham	12.08	181.1	109	12
Desmedipham	12.08	181.1	122.1	10
Dialifos	25.44	208	89.1	26
Dialifos	25.44	208	180.9	10
Dialifos	25.44	209.7	182.9	10
Diazinon	11.89	137.1	84.1	12
Diazinon	11.89	199	93	15
Diazinon	11.89	304.1	179.1	10
Dichlobenil	8.73	170.9	99.9	24
Dichlobenil	8.73	170.9	136	14
Dichlobenil	8.73	172.8	99.8	24
Dichlofenthion	14.06	222.9	205	12
Dichlofenthion	14.06	250.9	223	8
Dichlofenthion	14.06	279	223	12
Dichlofluanid	14.06	123	77	18
Dichlofluanid	14.06	223.9	123	10
Dichlofluanid	14.06	226	123	32
Dichlorvos	7.36	109	79	6
Dichlorvos	7.36	185	93	12
Dichlorvos	7.36	220	185	10
Dichlorvos-d6	8	191	99	15
Dichlorvos-d6	8	191	115	20
Dicloran	11.33	160	124.1	8
Dicloran	11.33	176	148	12
Dicloran	11.33	206	176	10
Dicrotophos	11.43	127	94.9	16
Dicrotophos	11.43	127	109	10
Dicrotophos	11.43	192.7	127	8
Dieldrin	17.45	262.8	190.9	30
Dieldrin	17.45	262.8	192.9	30
Dieldrin	17.45	262.8	227.8	16
Dieldrin	17.45	276.9	206.9	20
Dieldrin	17.45	276.9	240.9	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Diethofencarb	15.48	168	96.1	12
Diethofencarb	15.48	196	96	16
Diethofencarb	15.48	225.1	96	24
Difenoconazole I+II	28.92	265	138.9	60
Difenoconazole I+II	28.92	324.9	267	10
Diflubenzuron	7.9	113	63	12
Diflubenzuron	7.9	141	63	26
Diflubenzuron	7.9	141	113	12
Diflufenican	21.82	266	238.1	12
Diflufenican	21.82	266	246.1	10
Diflufenican	21.82	288	245	10
Diflufenican	21.82	330	288	5
Diflufenican	21.82	394	266.1	12
Dimethachlor	14.05	134	77	24
Dimethachlor	14.05	134	105.1	12
Dimethachlor	14.05	197	148.1	10
Dimethenamid	14.08	154.1	111	10
Dimethenamid	14.08	154.1	137	8
Dimethenamid	14.08	230	154.1	10
Dimethoate	11.33	125	79	5
Dimethoate	11.33	176	148	15
Dimethoate	11.33	178	150	15
Dimethoate	11.33	229	87.1	10
Dimethomorph I	29.88	301	139	14
Dimethomorph I	29.88	301	165.1	10
Dimethomorph I	29.88	387.1	301.1	10
Dimethomorph II	30.32	301	139	14
Dimethomorph II	30.32	301	165.1	10
Dimethomorph II	30.32	387.1	301.1	10
Dimoxystrobin	22.66	116.1	62.9	24
Dimoxystrobin	22.66	116.1	89	14
Dimoxystrobin	22.66	205.1	116.1	10
Diniconazole	19.83	232	149	14
Diniconazole	19.83	268	136	34
Diniconazole	19.83	268	232	8
Dioxathion	12.72	96.9	65	16
Dioxathion	12.72	125	97	6
Dioxathion	12.72	153	96.9	10
Diphenylamine	10.35	168.1	139	38
Diphenylamine	10.35	168.1	167.1	14
Diphenylamine	10.35	169.2	167.1	22
Disulfoton	12.18	185.9	96.9	16
Disulfoton	12.18	186	153	5
Disulfoton	12.18	274.1	88.2	10
Ditalimfos	16.6	130	102	14
Ditalimfos	16.6	148	102	22
Ditalimfos	16.6	148	130	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
DNOC	10.71	105	50.9	16
DNOC	10.71	198	121	10
DNOC	10.71	198	168	6
Dodemorph1	16.26	154.1	56.5	16
Dodemorph1	16.26	154.1	81.9	18
Dodemorph1	16.26	154.1	96.6	10
Dodemorph2	16.85	154.1	56.5	16
Dodemorph2	16.85	154.1	82	18
Dodemorph2	16.85	154.1	97.2	10
Endosulfan sulfate	19.68	238.7	203.9	12
Endosulfan sulfate	19.68	271.7	234.9	12
Endosulfan sulfate	19.68	271.7	236.8	12
Endosulfan sulfate	19.68	387	252	10
Endosulfan, -alpha	16.64	158.9	123	12
Endosulfan, -alpha	16.64	194.7	125	22
Endosulfan, -alpha	16.64	194.7	159.4	8
Endosulfan, -alpha	16.64	240.6	205.9	14
Endosulfan, -alpha	16.64	339	159	20
Endosulfan, -beta	18.44	158.9	123	12
Endosulfan, -beta	18.44	194.7	125	22
Endosulfan, -beta	18.44	194.7	159.4	8
Endosulfan, -beta	18.44	240.6	205.9	14
Endosulfan, -beta	18.44	339	159	20
Endrin	18.12	245	173	22
Endrin	18.12	262.8	192.9	30
Endrin	18.12	280.8	245.3	8
EPN	21.48	157	77	22
EPN	21.48	169	77	22
EPN	21.48	169	141	8
Epoxiconazole	20.78	165	138	8
Epoxiconazole	20.78	192	111	22
Epoxiconazole	20.78	192	138	12
Ethalfluralin	11.26	276	202	14
Ethalfluralin	11.26	276	248.1	8
Ethalfluralin	11.26	315.9	276.1	8
Ethiofencarb	12.65	107	77	16
Ethiofencarb	12.65	168	77	30
Ethiofencarb	12.65	168	107	8
Ethion	18.65	153	97	10
Ethion	18.65	230.9	128.9	22
Ethion	18.65	230.9	174.9	12
Ethofumesate	15.07	161.1	77.1	28
Ethofumesate	15.07	161.1	105.1	10
Ethofumesate	15.07	207.1	137.1	10
Ethoprophos	10.35	157.9	96.9	16
Ethoprophos	10.35	157.9	113.9	6
Ethoprophos	10.35	200	158	6

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Ethoxyquin	11.32	174.1	131.2	18
Ethoxyquin	11.32	174.1	146.1	12
Ethoxyquin	11.32	202.1	174.1	14
Etofenprox	27.16	163.1	77.1	32
Etofenprox	27.16	163.1	107.1	16
Etofenprox	27.16	163.1	135.1	10
Etofenprox-d5	27.1	168	108	10
Etofenprox-d5	27.1	168	136	20
Etofenprox-d5	28.43	168	108	10
Etofenprox-d5	28.43	168	136	20
Etoxazole	23.19	140.9	62.9	26
Etoxazole	23.19	140.9	113	14
Etoxazole	23.19	204	176.1	10
Etridiazole	9.59	182.8	139.9	14
Etridiazole	9.59	211	139.9	20
Etridiazole	9.59	211	182.9	10
Etrimfos	9.97	153.1	56	16
Etrimfos	9.97	153.1	98	10
Etrimfos	9.97	167.9	153.1	6
Famoxadone	31.21	224.1	167.2	18
Famoxadone	31.21	224.1	196.1	8
Famoxadone	31.21	329.8	224.1	8
Fenamiphos	16.83	154	139	10
Fenamiphos	16.83	216.9	202	12
Fenamiphos	16.83	303.1	195.2	8
Fenamiphos sulfone	21.11	320	213.9	14
Fenamiphos sulfone	21.11	320	249.1	18
Fenamiphos sulfone	21.11	320	292.1	8
Fenarimol	23.61	139	74.9	26
Fenarimol	23.61	139	111	14
Fenarimol	23.61	219	107	10
Fenazaquin	22.16	145.1	91	24
Fenazaquin	22.16	145.1	117.1	12
Fenazaquin	22.16	160.1	145.1	8
Fenbuconazole	25.73	129	77.8	18
Fenbuconazole	25.73	129	102	14
Fenbuconazole	25.73	198.1	129.1	8
Fenchlorfos	14.69	124.9	47	12
Fenchlorfos	14.69	124.9	79	6
Fenhexamid	19.85	97.1	55.1	10
Fenhexamid	19.85	177	78	22
Fenhexamid	19.85	177	113	14
Fenitrotion	13.88	125	79	8
Fenitrotion	13.88	277	109	16
Fenitrotion	13.88	277	260	6
Fenoxaprop-P	25.75	288	119	5
Fenoxaprop-P	25.75	361	288	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Fenoxycarb	21.64	116	44.1	16
Fenoxycarb	21.64	116	88	8
Fenoxycarb	21.64	255.1	186.1	10
Fenpropathrin	21.85	181	126.8	28
Fenpropathrin	21.85	181	151.9	22
Fenpropathrin	21.85	208	181	5
Fenpropidin	13.76	98.2	41.5	18
Fenpropidin	13.76	98.2	55.1	14
Fenpropidin	13.76	98.2	70	10
Fenpropidin	13.76	99	71	10
Fenpropimorph	14.49	128.1	70.1	12
Fenpropimorph	14.49	128.1	110.1	8
Fenpropimorph	14.49	303	128	5
Fenpyroximate	20.89	153	96.9	10
Fenpyroximate	20.89	230.9	128.9	22
Fenpyroximate	20.89	230.9	174.9	12
Fenson	14.87	141	77	8
Fenson	14.87	268	77	20
Fenson	14.87	268	141	10
Fenthion	14.42	245.3	125	12
Fenthion	14.42	278	109	15
Fenthion	14.42	278	169	10
Fenthion sulfoxide	18.48	109	79	8
Fenthion sulfoxide	18.48	125	47	14
Fenthion sulfoxide	18.48	125	79	8
Fenvalerate I+II	28.38	125	89	18
Fenvalerate I+II	28.38	167	89	32
Fenvalerate I+II	28.38	167	125	10
Fipronil	15.33	366.9	212.9	28
Fipronil	15.33	366.9	244.9	20
Fipronil	15.33	368.8	214.9	30
Flonicamid	10.68	146	126	8
Flonicamid	10.68	174	69	36
Flonicamid	10.68	174	146	10
Fluazifop-P-butyl	18.13	282	91.1	18
Fluazifop-P-butyl	18.13	282	238.1	16
Fluazifop-P-butyl	18.13	383.1	282.1	14
Flucythrinate I	28.22	157	107.1	12
Flucythrinate I	28.22	199	157.1	8
Flucythrinate I	28.22	199.1	107.1	22
Flucythrinate II	28.59	157	107	12
Flucythrinate II	28.59	199	107	22
Flucythrinate II	28.59	199	157.1	8
Fludioxonil	16.94	153.7	127	8
Fludioxonil	16.94	248	127	26
Fludioxonil	16.94	248	153.8	10
Fluensulfone	10.82	108	88	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Fluensulfone	10.82	119	92	10
Fluensulfone	10.82	226	206	15
Flufenacet	15.67	122.7	122	8
Flufenacet	15.67	151.1	95	24
Flufenacet	15.67	151.1	136.1	10
Flufenoxuron	12.09	268	241	15
Flufenoxuron	12.09	331	268	15
Flumetralin	17.74	143	107	25
Flumetralin	17.74	143	108	25
Flumetralin	17.74	143	142.2	30
Flumetralin	17.74	157	129	20
Flumioxazin	29.38	354.1	176.1	16
Flumioxazin	29.38	354.1	312	8
Flumioxazin	29.38	354.1	326.1	8
Fluometuron	11.11	232	72.1	12
Fluometuron	11.11	232	174.1	14
Fluometuron	11.11	232	186.1	12
Fluopicolide	21.3	209	182	17
Fluopicolide	21.3	347	172	25
Fluopyram	16.81	173	145	15
Fluopyram	16.81	396	223	10
Flupyradifurone	7.47	156.1	155.1	15
Flupyradifurone	7.47	206.1	156.1	15
Flupyradifurone	7.47	275.1	206.1	15
Fluquinconazole	25.08	340	108.1	36
Fluquinconazole	25.08	340	298	16
Fluquinconazole	25.08	340	313	14
Flurochloridone	15.93	311	174	15
Flurochloridone	15.93	311	187	15
Flurprimidol	14.11	107	52	18
Flurprimidol	14.11	107	79	8
Flurprimidol	14.11	269	107.1	14
Flurtamone	23.81	157	137	12
Flurtamone	23.81	198.9	157	16
Flurtamone	23.81	333.2	120.1	12
Flusilazole	17.46	206	151.3	14
Flusilazole	17.46	233	151.9	14
Flusilazole	17.46	233	164.9	16
Flutolanil	18.2	173	95	28
Flutolanil	18.2	173	145	14
Flutolanil	18.2	281	173	10
Flutriafol	16.7	123	75	24
Flutriafol	16.7	123	95	12
Flutriafol	16.7	219	123	12
Fluvalinate I +II	28.4	180.8	152.1	22
Fluvalinate I +II	28.4	208	181	15
Fluvalinate I +II	28.4	250	199.9	18

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Fluvalinate II	28.53	180.8	152.1	22
Fluvalinate II	28.53	208	181	15
Fluvalinate II	28.53	250	199.9	18
Folpet	16.63	104	76	10
Folpet	16.63	130	102	14
Folpet	16.63	259.9	130.1	14
Fonofos	12.98	137	109	6
Fonofos	12.98	246	109	14
Fonofos	12.98	246	137	6
Formothion	11.29	125	79	5
Formothion	11.29	170	93	5
Fosthiazate	14.95	194.9	102.9	8
Fosthiazate	14.95	194.9	139	6
Fosthiazate	14.95	283	103	15
Fuberidazol	14.52	184.1	102.7	26
Fuberidazol	14.52	184.1	128.9	20
Fuberidazol	14.52	184.1	156.1	12
Furathiocarb	23.75	135.1	107	12
Furathiocarb	23.75	163.1	107.1	14
Furathiocarb	23.75	163.1	135.1	6
Halosulfuron methyl	14.06	224	148	5
Halosulfuron methyl	14.06	255	197	5
Haloxyfop	17.43	316	91.1	15
Haloxyfop	17.43	375	316.2	10
HCH	alpha	0	182.8	146.7
HCH	alpha	0	218.8	146.6
HCH,-beta	11.56	180.9	145	14
HCH,-beta	11.56	218.7	146.6	18
HCH,-beta	11.56	218.7	183	8
Heptachlor	14.72	99.8	39	26
Heptachlor	14.72	99.8	65	12
Heptachlor	14.72	271.8	236.9	12
Heptenophos	9.79	124	62.9	28
Heptenophos	9.79	124	89	12
Heptenophos	9.79	215	200	10
Heptenophos	9.79	250	124	10
Heptenophos	9.79	250	215	5
Hexaconazole	16.98	213.9	123.5	28
Hexaconazole	16.98	213.9	159	18
Hexaconazole	16.98	231	175	10
Hexythiozox	16.27	184	59	20
Hexythiozox	16.27	184	149	6
Hexythiozox	16.27	227	149.1	8
Imazalil	17.01	172.8	109	26
Imazalil	17.01	174.7	147	16
Imazalil	17.01	215	173	8
Imazaquin	20.78	155	128	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Imazaquin	20.78	224	181	10
Indoxacarb	29.26	133.9	106	15
Indoxacarb	29.26	203	106.1	22
Indoxacarb	29.26	203	134	20
Iodofenfos	16.93	125	47	12
Iodofenfos	16.93	125	79	6
Iodofenfos	16.93	376.8	361.8	16
Iodofenfos	16.93	379	364	20
Ipconazole	24.92	125	89.1	15
Ipconazole	24.92	249.1	125	20
Iprodione	21.19	314	245	10
Iprodione	21.19	315.7	247	10
Iprodione	21.19	315.7	273	8
Iprovalicarb I	17.41	118.9	91	12
Iprovalicarb I	17.41	118.9	117.1	8
Iprovalicarb I	17.41	134.1	42	20
Iprovalicarb II	17.72	118.9	91.1	12
Iprovalicarb II	17.72	118.9	117.1	8
Iprovalicarb II	17.72	134.1	42	20
Isocarbophos	15.84	121.1	65	14
Isocarbophos	15.84	136	69	30
Isocarbophos	15.84	136	108	12
Isofenphos	16.74	185	121	10
Isofenphos	16.74	213	121	14
Isofenphos	16.74	213	185	6
Isofenphos-methyl	15.03	199	65	34
Isofenphos-methyl	15.03	199	121	10
Isofenphos-methyl	15.03	214.1	121.1	20
Isoprocarb	10.23	121.1	77	18
Isoprocarb	10.23	136.1	121.1	8
Isoprothiolane	17.09	204	85	28
Isoprothiolane	17.09	204	118	8
Isoprothiolane	17.09	290	118	12
Isopyrazam	19.86	303	262	10
Isopyrazam	19.86	359	303	5
Isoxaflutole	15.89	160	132	10
Isoxaflutole	15.89	189	161.1	10
Isoxaflutole	15.89	279	252	10
Isoxathion	19.22	105.1	51	28
Isoxathion	19.22	105.1	77	18
Isoxathion	19.22	177	130	8
Kresoxim-methyl	17.59	116	62.9	24
Kresoxim-methyl	17.59	130.9	130.1	10
Kresoxim-methyl	17.59	206	116	4
Kresoxim-methyl	17.59	206	131	10
Lindane	11.77	180.9	109	26
Lindane	11.77	180.9	145	14

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Lindane	11.77	218.7	183	8
Linuron	13.93	159.8	133	12
Linuron	13.93	187	124	20
Linuron	13.93	248	61.1	8
Malathion	14.08	125	79	8
Malathion	14.08	173	127	5
Malathion	14.08	173.1	99	12
Mandestrobin	22.47	160.1	91.1	20
Mandestrobin	22.47	160.1	119.1	5
Mandestrobin	22.47	192.1	160.1	5
Mecarbam	15.55	131	42	12
Mecarbam	15.55	131	86	10
Mecarbam	15.55	159	131	6
Mecarbam	15.55	226	198	5
Mecarbam	15.55	329	131	10
Mepanipyrim	16.68	222	206	26
Mepanipyrim	16.68	222	207.1	14
Mepanipyrim	16.68	223.1	207.4	24
Metalaxyl	13.44	131.9	117	12
Metalaxyl	13.44	160.1	130	18
Metalaxyl	13.44	160.1	144.8	10
Metaldehyde	6.15	89	45	10
Metaldehyde	6.15	117	45	10
Metamitron	19.04	104	50.9	26
Metamitron	19.04	104	77.1	12
Metamitron	19.04	202.1	173.6	8
Metazachlor	16.6	133.1	117.3	22
Metazachlor	16.6	133.1	132.1	12
Metazachlor	16.6	209	132.1	16
Metconazole	22.14	125	89	16
Metconazole	22.14	125	99	18
Metconazole	22.14	127	89	30
Methacrifos	9.14	125	79	8
Methacrifos	9.14	180	93	10
Methacrifos	9.14	240	180	10
Methamidophos	7.26	141	64	18
Methamidophos	7.26	141	79	20
Methamidophos	7.26	141	94.8	8
Methidathion	16.12	145	58	14
Methidathion	16.12	145	85	6
Methidathion	16.12	302	145	5
Methidathion	16.12	302.6	284.9	14
Methiocarb	13.87	153	45	12
Methiocarb	13.87	153	109.1	6
Methiocarb	13.87	168.1	153	10
Methoprene	17.24	235	147	10
Methoprene	17.24	278	191	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Metobromuron	13.84	169.7	91	14
Metobromuron	13.84	171.6	91.1	14
Metobromuron	13.84	258	61.1	8
Metolachlor	15.45	162.1	132.9	14
Metolachlor	15.45	238.1	132.8	26
Metolachlor	15.45	238.1	162.2	10
Metrafenone	25.36	393	346.9	20
Metrafenone	25.36	393	362.7	16
Metrafenone	25.36	393	377.6	10
Metribuzin	13.02	198	82.1	16
Metribuzin	13.02	198	110	10
Metribuzin	13.02	214	198	5
Mevinphos	8.64	127	95	14
Mevinphos	8.64	127	109	10
Mevinphos	8.64	192	127	10
Molinate	10.4	126.1	55.1	12
Molinate	10.4	126.1	83.1	6
Molinate	10.4	187.1	126.1	6
Monocrotophos	10.68	96.9	82	10
Monocrotophos	10.68	127	95	14
Monocrotophos	10.68	127	109	10
Monocrotophos	10.68	192	127	10
Myclobutanil	17.48	179	90	28
Myclobutanil	17.48	179	125	14
Myclobutanil	17.48	179	151.7	8
Napropamide	18.17	100.1	72.1	6
Napropamide	18.17	128.2	72.1	6
Napropamide	18.17	271.1	72.1	14
Nuarimol	20.24	107	79	6
Nuarimol	20.24	139	111	12
Nuarimol	20.24	235	139	14
Ofurace	19.15	131.9	117	16
Ofurace	19.15	232.1	158.1	18
Ofurace	19.15	232.1	186.1	8
Omethoate	10.05	109.8	62.9	24
Omethoate	10.05	109.8	64	16
Oryzalin	25.47	275	194	15
Oryzalin	25.47	317	275	15
Oxadiargyl	19.74	213	150	5
Oxadiargyl	19.74	340	150	15
Oxadixyl	18.53	131.9	117	16
Oxadixyl	18.53	163.1	117	24
Oxadixyl	18.53	163.1	132.1	8
Oxycarboxin	20.57	146.9	43.1	8
Oxycarboxin	20.57	175	43.1	14
Oxycarboxin	20.57	267	175.1	10
Oxyfluorfen	18.77	252	146	30

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Oxyfluorfen	18.77	252	169.8	28
Oxyfluorfen	18.77	252	224	10
Paclobutrazol	16.37	125	89	18
Paclobutrazol	16.37	236	125	12
Paclobutrazol	16.37	236	167	10
Paraoxon-methyl	12.17	95.9	65	12
Paraoxon-methyl	12.17	109	79	6
Paraoxon-methyl	12.17	230	105.9	16
Parathion	14.5	109	81	10
Parathion	14.5	291	81	20
Parathion	14.5	291	109	12
Parathion-methyl	13.24	124.9	47	12
Parathion-methyl	13.24	124.9	79	6
Parathion-methyl	13.24	263	109	12
Penconazole	15.4	158.9	89	28
Penconazole	15.4	248	157	22
Penconazole	15.4	248	192	12
Pencycuron	11.59	125	89	16
Pencycuron	11.59	125	99	16
Pendimethalin	15.23	252.1	161	14
Pendimethalin	15.23	252.1	162	8
Pendimethalin	15.23	252.1	191.3	8
Penflufen	20.34	141	84	10
Penflufen	20.34	274	141	10
Pentachloraniline	13.98	264.9	193.9	20
Pentachloraniline	13.98	266.9	194	20
Penthiopyrad	19.85	177	101	15
Penthiopyrad	19.85	302	177	15
Permethrin I	24.82	163	91	12
Permethrin I	24.82	183.1	153	12
Permethrin I	24.82	183.1	165.1	12
Permethrin I	24.82	183.1	168.1	12
Permethrin II	25.1	163	91	12
Permethrin II	25.1	183.1	153	12
Permethrin II	25.1	183.1	165.1	12
Permethrin II	25.1	183.1	168.1	12
Pethoxamide	17.04	131	91	10
Pethoxamide	17.04	260	147	15
Phenthoate	15.68	121	77	22
Phenthoate	15.68	246	121	8
Phenthoate	15.68	274	121	10
Phorate	11.83	75	47	8
Phorate	11.83	121	65	8
Phorate	11.83	260	75	8
Phosalone	22.62	182	74.8	30
Phosalone	22.62	182	111	14
Phosalone	22.62	367	182	5

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Phosmet	21.34	160	50.9	34
Phosmet	21.34	160	76.9	22
Phosmet	21.34	160	133	10
Phosphamidon	12.79	127	94.9	16
Phosphamidon	12.79	127	109	25
Phosphamidon	12.79	264.1	127	12
Phoxim	16.59	135.2	77.1	14
Phoxim	16.59	135.2	94	8
Phoxim	16.59	135.2	134.5	6
Picolinafen	23.01	145	95	12
Picolinafen	23.01	238	145.1	22
Picolinafen	23.01	376.1	238.7	12
Picoxystrobin	17.88	145.1	102.1	25
Picoxystrobin	17.88	145.1	115.1	15
Picoxystrobin	17.88	145.1	130	15
Piperonyl Butoxide	22.01	176.1	103.1	22
Piperonyl Butoxide	22.01	176.1	117	18
Piperonyl Butoxide	22.01	176.1	131.1	12
Pirimicarb	12.48	166.1	55	18
Pirimicarb	12.48	166.1	96	12
Pirimicarb	12.48	238.1	166.1	10
Pirimicarb desmetyl	12.71	152.1	42	25
Pirimicarb desmetyl	12.71	152.1	96	10
Pirimicarb desmetyl	12.71	224.1	152.1	10
Pirimiphos methyl	13.79	290.1	125	20
Pirimiphos methyl	13.79	290.1	233	8
Pirimiphos methyl	13.79	305.1	180.1	8
Pirimiphos-ethyl	16.1	304	168.1	12
Pirimiphos-ethyl	16.1	318.1	166.1	12
Pirimiphos-ethyl	16.1	318.1	182.1	10
Pirimiphos-ethyl	16.1	333	168	15
Prochloraz	25.19	180.1	138.1	12
Prochloraz	25.19	308	147.1	12
Prochloraz	25.19	310	268	5
Procymidone	15.85	95.9	67.1	8
Procymidone	15.85	283	96.1	8
Procymidone	15.85	283	254	10
Profenofos	17.14	296.7	268.9	10
Profenofos	17.14	336.9	266.9	12
Profenofos	17.14	336.9	308.9	8
Propachlor	11	120	50.9	35
Propachlor	11	120	77	15
Propachlor	11	176.1	57.1	10
Propanil	14.07	160.9	99	24
Propanil	14.07	160.9	125.7	16
Propanil	14.07	217	161	8
Propaquizafop	33.57	299	91	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Propaquizafop	33.57	443	299	15
Propargite	20.44	135.1	77.1	26
Propargite	20.44	135.1	107.1	12
Propargite	20.44	150.1	135.1	8
Propham	9.58	92.9	65.9	12
Propham	9.58	137	93	8
Propham	9.58	179.1	93.1	14
Propiconazole I	19.61	172.9	74	38
Propiconazole I	19.61	172.9	109	26
Propiconazole I	19.61	259	173	15
Propiconazole II	19.81	172.9	74	38
Propiconazole II	19.81	172.9	109	26
Propiconazole II	19.81	259	173	15
Propoxur	10.05	110	62.9	24
Propoxur	10.05	110	64.1	16
Propoxur	10.05	152.1	110	8
Propyzamide	11.87	172.9	74	38
Propyzamide	11.87	172.9	109	26
Propyzamide	11.87	172.9	145	14
Proquinazid	21.88	288	245	15
Proquinazid	21.88	330	288	5
Prosulfocarb	13.7	128.1	43.1	10
Prosulfocarb	13.7	160.1	100.1	10
Prosulfocarb	13.7	251.1	128.1	5
Prothiofos	17.03	266.7	220.9	18
Prothiofos	17.03	266.7	238.9	8
Prothiofos	17.03	308.9	239	14
Pyraclofos	25.6	139.2	96.9	6
Pyraclofos	25.6	194	138	18
Pyraclofos	25.6	360	194.1	12
Pyraclostrobin	28.24	132	51.1	35
Pyraclostrobin	28.24	132	77	20
Pyraclostrobin	28.24	164	132.1	10
Pyraflufen-ethyl	21.24	349	238	16
Pyraflufen-ethyl	21.24	349	266.1	10
Pyraflufen-ethyl	21.24	412	349	12
Pyrazophos	23.65	221	148.7	14
Pyrazophos	23.65	221	193.1	8
Pyrazophos	23.65	231.9	204.1	10
Pyridaben	25.08	147.1	117.1	20
Pyridaben	25.08	147.1	119.1	8
Pyridaben	25.08	147.1	132.1	12
Pyridalyl	28.58	163.8	146.1	12
Pyridalyl	28.58	204	148.1	18
Pyridalyl	28.58	204	176.1	10
Pyridaphenthion	21.12	199	77.1	24
Pyridaphenthion	21.12	199	92.1	14

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Pyridaphenthion	21.12	340	199.1	8
Pyrimethanil	12.03	198.1	117.9	30
Pyrimethanil	12.03	198.1	157.6	18
Pyrimethanil	12.03	198.1	182.9	14
Pyriproxyfen	23	136.1	78	20
Pyriproxyfen	23	136.1	96	10
Pyriproxyfen	23	226.1	186.1	12
Quinalphos	17	146	118.1	8
Quinalphos	17	157.1	102	22
Quinalphos	17	157.1	129	14
Quinoxyfen	19.64	237	208	26
Quinoxyfen	19.64	271.8	237.1	12
Quinoxyfen	19.64	307	237	18
Quintozene	12.72	142	107	25
Quintozene	12.72	213.9	179	10
Quintozene	12.72	294.9	236.9	15
Rotenone2	34.49	191.8	147	24
Rotenone2	34.49	191.8	177.1	10
Rotenone2	34.49	394.3	191.7	20
Sedaxane	25.23	130.1	77.1	25
Sedaxane	25.23	159.1	139	10
Sedaxane	25.23	172.1	130.1	10
Silafluofen	28.76	179.1	151.1	10
Silafluofen	28.76	258.1	181.1	16
Silafluofen	28.76	258.1	243.1	14
Simazine	11.38	172.7	138	6
Simazine	11.38	172.7	172.2	8
Simazine	11.38	186	91	8
Spiromesifen	22.34	254.1	209.1	10
Spiromesifen	22.34	272.1	254.2	8
Spiroxamine1	13.25	100.1	41	20
Spiroxamine1	13.25	100.1	58	10
Spiroxamine1	13.25	100.1	72.1	8
Spiroxamine2	13.88	100.1	41	20
Spiroxamine2	13.88	100.1	58	10
Spiroxamine2	13.88	100.1	72.1	6
Sulfotep	11.54	202	145.9	10
Sulfotep	11.54	265.9	145.9	15
Sulfotep	11.54	322	202	10
Tebuconazole	20.32	125	89	16
Tebuconazole	20.32	125	99	16
Tebuconazole	20.32	250	125	20
Tebufenpyrad	21.99	276.1	171	10
Tebufenpyrad	21.99	318.1	131.1	14
Tebufenpyrad	21.99	318.1	145.1	14
Tecnazene	10.04	214.8	143.6	20
Tecnazene	10.04	214.8	178.7	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Tecnazene	10.04	214.8	179.9	15
Tefluthrin	12.19	177	127	14
Tefluthrin	12.19	177	137	16
Tefluthrin	12.19	197	141.1	10
TEPP	8.73	98.8	73	15
TEPP	8.73	161.1	90.3	15
TEPP	8.73	161.1	98.9	20
Tepraloxydim	20.94	164	53	26
Tepraloxydim	20.94	164	80.9	18
Tepraloxydim	20.94	164	108.2	8
Terbuthylazine	12.81	214.1	104	16
Terbuthylazine	12.81	214.1	132	10
Terbuthylazine	12.81	229.1	200.1	10
Tetrachlorvinphos	17.65	109	79	6
Tetrachlorvinphos	17.65	328.9	109	18
Tetrachlorvinphos	17.65	330.8	109	18
Tetraconazole	14.57	100.9	51	10
Tetraconazole	14.57	159	123.4	16
Tetraconazole	14.57	171	136	10
Tetraconazole	14.57	336	204	28
Tetradifon	22.41	159	74.8	32
Tetradifon	22.41	159	111	20
Tetradifon	22.41	159	131	10
Tetramethrin1	22.71	164	77.1	22
Tetramethrin1	22.71	164	107.1	12
Tetramethrin1	22.71	164	135.1	8
Tetramethrin2	23	164	77.1	22
Tetramethrin2	23	164	107.1	12
Tetramethrin2	23	164	135.1	8
Tetrasul	20.51	251.9	173	34
Tetrasul	20.51	251.9	181.9	32
Tetrasul	20.51	251.9	216.9	22
Thiabendazole	15.75	174	103	18
Thiabendazole	15.75	174	130.1	10
Thiabendazole	15.75	201	174	14
Thiamethoxam	15.05	212	125	10
Thiamethoxam	15.05	212	139	12
Thiamethoxam	15.05	247	182.1	10
Thiobencarb	15.56	72	44	6
Thiobencarb	15.56	100.1	44	10
Thiobencarb	15.56	100.1	72	6
Thiometon	11.15	125	79	8
Thiometon	11.15	158	125	10
Tolclofos-methyl	13.29	265	219.9	20
Tolclofos-methyl	13.29	265	250	12
Tolclofos-methyl	13.29	266.8	252	12
Tolyfluanid	15.52	137	65.1	28

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Tolyfluanid	15.52	137	91.1	18
Tolyfluanid	15.52	238	137	10
TPP	20.42	325.07	169.04	25
TPP	20.42	326	169	35
TPP	20.42	326.07	215.05	25
TPP	20.42	326.07	233.05	10
TPP	20.42	326.07	325.07	10
TPP	21.92	325.07	169.04	25
TPP	21.92	326	169	35
TPP	21.92	326.07	215.05	25
TPP	21.92	326.07	233.05	10
TPP	21.92	326.07	325.07	10
Tralkoxydim	24.58	109	57.1	6
Tralkoxydim	24.58	137	57.1	10
Tralkoxydim	24.58	137	109.1	6
Tralomethrin	30.48	171.9	93.1	10
Tralomethrin	30.48	173.8	93.1	8
Tralomethrin	30.48	181	152	22
Triadimefon	14.59	208	111	20
Triadimefon	14.59	208	126.7	12
Triadimefon	14.59	208	180.8	8
Triadimenol	15.87	128	65	18
Triadimenol	15.87	128	100	10
Triadimenol	15.87	168.2	70	10
Triallate	12.41	86.1	43.3	6
Triallate	12.41	268	183.9	18
Triallate	12.41	268	226	12
Triazophos	19.11	161	105.7	12
Triazophos	19.11	161	134.1	8
Triazophos	19.11	257	162	5
Triazophos	19.11	285	162	10
Trichlorfon	7.38	145	109	10
Trichlorfon	7.38	185	93	12
Trichloronate	16.05	268.9	222.9	20
Trichloronate	16.05	270.8	224.9	22
Trichloronate	16.05	297	269	12
Tricyclazole	17.09	162	84.9	18
Tricyclazole	17.09	162	133.9	8
Trifloxystrobin	19.61	116.1	89	8
Trifloxystrobin	19.61	145	95	8
Trifloxystrobin	19.61	186	145	10
Trifloxystrobin	19.61	222	190	5
Triflumizole	17.18	179	144	14
Triflumizole	17.18	206	179	14
Triflumizole	17.18	206	186	8
Trifluralin	10.57	306.1	159.7	20
Trifluralin	10.57	306.1	206	10

Pesticide name	RT	Precursor mass	Product Mass	Collision Energy
Trifluralin	10.57	306.1	264.1	8
Triflusulfuron-methyl	10.1	237	208	8
Triflusulfuron-methyl	10.1	237	222	15
Trinexapac-ethyl	15.02	151	77.1	20
Trinexapac-ethyl	15.02	151	95.1	8
Trinexapac-ethyl	15.02	224	151.1	8
Triticonazole	22.6	217	167	18
Triticonazole	22.6	235.1	181.9	12
Triticonazole	22.6	235.1	217.1	8
Tritosulfuron	10.09	145	95	5
Tritosulfuron	10.09	161	141	5
Valifenalate	24.33	116.1	98.1	5
Valifenalate	24.33	155.1	139	20
Valifenalate	24.33	158.1	98.1	10
Vamidothion	16.31	87.1	44.4	10
Vamidothion	16.31	87.1	58.3	8
Vamidothion	16.31	145	87.4	6
Vinclozolin	13.16	198	145	15
Vinclozolin	13.16	285	212	5
Zoxamide	20.82	186.9	123	22
Zoxamide	20.82	186.9	159	14
Zoxamide	20.82	258	187	10

Appendix 1b. LCMSMS transitions used for validation of pesticides in Hay

Not all transitions fulfil the +/- 30% ion ratio criteria

Compound name	RT	Precursor mass	Product mass	Collision Energy
1-Naphthylacetamide	3.521	185.8	141	-15
1-Naphthylacetamide	3.521	186.1	115.1	-35
2-hydroxypropoxycarbazone	2.826	415.1	174	-12
2-hydroxypropoxycarbazone	2.826	415.1	116	-20
6-Benzylaminopurine	2.911	226	91.1	-20
6-Benzylaminopurine	2.911	226	148	-20
Acephate	1.747	183.8	143	-12
Acetamiprid	2.648	223	126	-17
Acetamiprid	2.648	223	56	-9.5
Aldicarb Sulfone	1.947	240.4	148.2	-13
Aldicarb Sulfone	1.947	240.4	86.3	-21
Aldicarb Sulfone	1.947	240.1	223.3	-20
Aldicarb Sulfoxide (1)	1.869	223.95	131.98	-10
Aldicarb Sulfoxide (1)	1.869	223.95	89.2	-21
Ametoctradin	6.579	276	149	-38
Ametoctradin	6.579	276	176	-30
Amidosulfuron	4.127	370	218	-25
Amidosulfuron	4.127	370	261	-15
Amisulbrom	6.9	466	227	-13
Amisulbrom	6.9	466	148	-30
Atrazine	4.515	216	174	-15
Atrazine	4.515	216	96	-20
Atrazine	4.515	216	104	-24.5
Azimsulfuron	4.562	425.2	182.1	-15
Azimsulfuron	4.562	425.2	156.1	-15
Azinphos-ethyl	5.727	346	233	-12
Azinphos-ethyl	5.727	346	137	-22
Azinphos-methyl	4.867	318	261	-5.5
Azinphos-methyl	4.867	318	132	-11
Azoxystrobin	5.116	404	372	-15
Azoxystrobin	5.116	404	344	-21
Azoxystrobin	5.116	404	328	-39
Benalaxyl	6.291	326	148	-19
Benalaxyl	6.291	326	208	-14.5
Benalaxyl	6.291	326	294	-8.5
Bendiocarb	3.83	224	167	-7.5
Bendiocarb	3.83	224	109	-14
Bensulfuron methyl	4.917	411	149	-17.5
Bensulfuron methyl	4.917	411	182	-17.5
Bifenazate	5.684	301	170	-17
Bifenazate	5.684	301	170	-17
Bifenazate	5.684	301	198	-8
Bifenthrin	8.336	440	181	-10
Bifenthrin	8.336	440	166	-35

Compound name	RT	Precursor mass	Product mass	Collision Energy
Bitertanol	6.575	338	70	-5
Bitertanol	6.575	338	99	-12
Bitertanol	6.575	338	268	-8.5
Bixafen	6.153	414	394	-15
Bixafen	6.153	414	266	-25
Bixafen	6.153	416	396	-15
Boscalid	5.429	343	307	-12.5
Boscalid	5.429	343	271	-24
Bromadiolone	7.091	509	251.2	-20
Bromadiolone	7.091	511	251.2	-20
Bromadiolone	7.091	510.9	276.9	-20
Bromoxynil	4.253	276	79	20.5
Bromoxynil	4.253	276	80.6	25
Bromoxynil	4.253	276	274.6	5.5
Bromuconazole (1)	5.702	377.9	159	-17.5
Bromuconazole (1)	5.702	377.9	70	-9
Bromuconazole (2)	6.188	377.9	159	-17.5
Bromuconazole (2)	6.188	377.9	70	-9
Bupirimate	5.74	317	166	-23
Bupirimate	5.74	317	108	-25
Buprofezin	7.055	306	116	-14
Buprofezin	7.055	306	201	-8
Butralin	7.527	296	240	-11
Butralin	7.527	296	222	-19
Cadusafos	6.703	271	159	-11.5
Cadusafos	6.703	271	131	-20.5
Carbaryl	4.049	202	145	-7
Carbaryl	4.049	202	127	-26.5
Carbendazim	2.066	192	160	-13
Carbendazim	2.066	192	105	-31.5
Carbendazim	2.066	192	132	-24
Carbetamide	3.512	237	192	-5
Carbetamide	3.512	237	72	-20
Carbetamide	3.512	237	118	-10
Carbofuran	3.895	222	165	-9.5
Carbofuran	3.895	222	123	-17.5
Carbofuran, 3-hydroxy	2.657	238	163	-13
Carbofuran, 3-hydroxy	2.657	238	181	-9.5
Carbosulfan	8.136	381	118	-16.5
Carbosulfan	8.136	381	160	-10
Carboxin	4.003	236	143	-11
Carboxin	4.003	236	87	-23.5
Carboxin	4.003	236	93	-27.5
Carfentrazone-Ethyl	6.137	412.2	346	-20
Carfentrazone-Ethyl	6.137	412.2	366	-17
Chlorfluazuron	7.71	540	158	-17
Chlorfluazuron	7.71	540	383	-19.5

Compound name	RT	Precursor mass	Product mass	Collision Energy
Chloridazon	2.702	222	92	-23
Chloridazon	2.702	222	77	-29.5
Chlorobenzilate	5.353	342	307	-20
Chlorobenzilate	5.353	342	139	-20
Chlorotoluron	4.383	213	72	-20
Chlorotoluron	4.383	213	140	-20
Chlorpropham	5.563	214	154	-16
Chlorpropham	5.563	214	172	-7
Chlorpyrifos	7.349	351.7	200	-18
Chlorpyrifos	7.349	349.7	198	-16
Chlorpyrifos-methyl	6.698	322	125	-15
Chlorpyrifos-methyl	6.698	324	292	-15
Chlorsulfuron	4.113	358	167	-16.5
Chlorsulfuron	4.113	358	141	-14.5
Chromafenozide	5.713	395	175	-17
Chromafenozide	5.713	395	339.2	-5
Cinidon-ethyl	7.044	411	348	-25
Cinidon-ethyl	7.044	411	107	-35
Cinosulfuron	3.492	414	183	-20
Cinosulfuron	3.492	414	215	-20
Clethodim	6.898	360	166	-24.5
Clethodim	6.898	360	164	-17.5
Clodinafop-propargyl	6.138	350	266	-12
Clodinafop-propargyl	6.138	350	91	-26
Clofentezine	6.552	303	138	-11.5
Clofentezine	6.552	303	102	-30
Clomazone	5.034	240.04	125.06	-29
Clomazone	5.034	240.04	89.2	-10
Clomazone	5.034	240	100	-20
Clothianidin	2.473	250	169	-13
Clothianidin	2.473	250	132	-50
Cyazofamid	5.949	325	108	-9.5
Cyazofamid	5.949	325	217	-12.5
Cyazofamid	5.949	325	261	-6.5
Cycloxydim	6.773	326	280	-8
Cycloxydim	6.773	326	182	-20
Cyflufenamid	6.497	413	295	-12
Cyflufenamid	6.497	413	203	-35
Cyflumetofen	6.903	465	173	-23
Cyflumetofen	6.903	465	249	-20
Cyhalothrin, lambda	7.681	467	225	-15
Cyhalothrin, lambda	7.681	467	141	-45
Cymoxanil	2.867	199	128	-6
Cymoxanil	2.867	199	111	-16
Cypermethrin	7.8	433	191	-14
Cypermethrin	7.8	435	193	-14
Cyproconazole (1)	5.591	292	125	-25.5

Compound name	RT	Precursor mass	Product mass	Collision Energy
Cyproconazole (1)	5.591	292	70	-12
Cyproconazole (2)	5.73	292	125	-25.5
Cyproconazole (2)	5.73	292	70	-12
Deltamethrin	7.75	523	281	-14
Deltamethrin	7.75	521	279	-14
Demeton-S-methyl	3.926	231	89	-10
Demeton-S-methyl	3.926	231	61	-25
Demeton-S-methyl sulfone	2.105	263	169	-13.5
Demeton-S-methyl sulfone	2.105	263	109	-24
Demeton-S-methyl sulfone	2.105	263	121	-12
Desmedipham	4.817	318	154	-21
Desmedipham	4.817	318	182	-13
Dialifos	6.578	394	187	-5
Dialifos	6.578	394	208	-15
Diazinon	6.384	305	169	-20
Diazinon	6.384	305	97	-30
Diazinon	6.384	305	153	-20
Dichlorvos	3.758	221	109	-16
Dichlorvos	3.758	238	221	-4
Diethofencarb	5.129	268	226	-9
Diethofencarb	5.129	268	180	-17
Difenacoum	7.716	445	179	-35
Difenacoum	7.716	445	257	-15
Difenoconazole	6.734	406	251	-23.5
Difenoconazole	6.734	406	188	-42
Difenoconazole	6.734	406	337	-14
Diflubenzuron	6.068	311	158	-8
Diflubenzuron	6.068	311	141	-25
Dimethachlor	4.84	256	224	-8
Dimethachlor	4.84	256	148	-23
Dimethenamid	5.285	276	244	-10
Dimethenamid	5.285	276	168	-20
Dimethoate	2.673	230	199	-8
Dimethoate	2.673	230	125	-19
Dimethoate	2.673	230	171	-14
Dimethomorph (1)	5.262	388	301	-17.5
Dimethomorph (1)	5.262	388	139	-30.5
Dimethomorph (1)	5.262	388	165	-28.5
Dimethomorph (2)	5.516	388	301	-17.5
Dimethomorph (2)	5.516	388	139	-30.5
Dimethomorph (2)	5.516	388	165	-28.5
Diniconazole	6.642	326	70	-16.5
Diniconazole	6.642	326	159	-30.5
Dinotefuran	1.872	203	157	-5
Dinotefuran	1.872	203	129	-10
Dinoterb	6.375	239	207	23
Dinoterb	6.375	239	136	34

Compound name	RT	Precursor mass	Product mass	Collision Energy
Disulfoton	6.542	275	89	-5.5
Disulfoton	6.542	275	61	-19
Ditalimfos	5.731	300	148	-16
Ditalimfos	5.731	300	130	-30
Diuron	4.712	230.8	185.8	15
Diuron	4.712	230.8	149.9	20
DMF	3.577	150	106.8	-20
DMF	3.577	150	132.2	-35
DMST	4.01	215	106.1	-13
DMST	4.01	215	77	-43
DMST	4.01	215	151	-5
DNOC	4.24	196.95	137	17
DNOC	4.24	196.95	109.1	10
Dodemorph	4.17	282	116	-12.5
Dodemorph	4.17	282	98	-18.5
Dodine	5.765	228	60.3	-20
Dodine	5.765	228	57.3	-20
Emamectin benzoate	6.433	886.7	158	-29.5
Emamectin benzoate	6.433	886.7	302	-28
Epoxiconazole	5.902	330	121	-17.5
Epoxiconazole	5.902	330	101	-30
Ethiofencarb	4.222	226	107	-11
Ethiofencarb	4.222	226	165	-5.5
Ethion	7.229	385	199	-10
Ethion	7.229	402	199	-15
Ethion	7.229	402	385	-5
Ethirimol	2.87	210	140	-19.5
Ethirimol	2.87	210	98	-25.5
Ethofumesate	5.155	287	258.9	-5
Ethofumesate	5.155	287	162.2	-20
Ethoprophos	5.891	243.241	97	-23
Ethoprophos	5.891	243.241	131	-31
Ethoxyquin	4.498	218	174	-26
Ethoxyquin	4.498	218	148	-20
Ethoxysulfuron	5.489	399.1	261	-16
Ethoxysulfuron	5.489	399.1	218	-25
Etofenprox	8.252	394	177	-13.5
Etofenprox	8.252	394	135	-22.5
Etofenprox	8.252	394	359	-10.5
Etoxazole	7.438	360	141	-23.5
Etoxazole	7.438	360	177	-12.5
Fenamiphos	6.059	304	216.9	-21
Fenamiphos	6.059	304	201.7	-35
Fenamiphos sulfone	3.986	336	188	-31
Fenamiphos sulfone	3.986	336	266	-50
Fenamiphos sulfoxide	3.87	337.2	320.1	-5
Fenamiphos sulfoxide	3.87	337.2	171.1	-20

Compound name	RT	Precursor mass	Product mass	Collision Energy
Fenarimol	5.884	331	268	-18
Fenarimol	5.884	331	189	-38
Fenazaquin	7.842	307	161.1	-14
Fenazaquin	7.842	307	57.4	-20
Fenazaquin	7.842	307	147.1	-17
Fenbuconazole	6.028	337	125	-25
Fenbuconazole	6.028	337	70.2	-16
Fenhexamid	5.772	302	302	-8.5
Fenhexamid	5.772	302	97	-18.5
Fenitrothion	6.217	278	125	-20
Fenitrothion	6.217	278	109	-20
Fenitrothion	6.217	295	278	-5
Fenoxaprop-P-ethyl	6.935	362	288	-14.5
Fenoxaprop-P-ethyl	6.935	362	119	-22
Fenoxaprop-P-ethyl	6.935	362	121	-25
Fenoxycarb	6.13	302	116	-8
Fenoxycarb	6.13	302	88	-13.5
Fenoxycarb	6.13	302	256	-12
Fenpropathrin	7.594	367	125	-15
Fenpropathrin	7.594	367	97	-27.5
Fenpropidin	4.507	274	147	-23.5
Fenpropidin	4.507	274	117	-30.5
Fenpropimorph	4.654	304	147	-24
Fenpropimorph	4.654	304	130	-19
Fenpyrazamine	5.581	332	230	-15
Fenpyrazamine	5.581	332	216	-25
Fenpyroximate	7.553	422	366	-15.5
Fenpyroximate	7.553	422	135	-28.5
Fenthion	6.291	279	169	-15.5
Fenthion	6.291	279	105	-20.5
Fenthion	6.291	279	247	-10.5
Fenthion oxon sulfone	2.752	295	217	-20
Fenthion oxon sulfone	2.752	295	104.1	-33
Fenthion oxon sulfoxide	2.619	279.09	264	-15
Fenthion oxon sulfoxide	2.619	279.09	104	-20
Fenthion sulfone	4.157	328	311	-7
Fenthion sulfone	4.157	328	125.1	-22
Fenthion sulfone	4.157	328	279	-22
Fenthion sulfoxide	3.973	295	280	-17
Fenthion sulfoxide	3.973	295	109.2	-26
Fenthion sulfoxide	3.973	295	125	-30
Fipronil	6.101	435.22	330.2	13
Fipronil	6.101	435.22	250.1	42
Fipronil-sulfid	6.193	419	383	10
Fipronil-sulfid	6.193	419	262	30
Fipronil-sulfid	6.193	421	385	10
Fluazifop-p-butyl	7.034	384	282	-18

Compound name	RT	Precursor mass	Product mass	Collision Energy
Fluazifop-p-butyl	7.034	384	254	-17.5
Fluazifop-p-butyl	7.034	384	328	-14
Fluazinam	7.215	463	416	20
Fluazinam	7.215	463	370	25
Flubendiamide	6.152	681.4	254.2	25
Flubendiamide	6.152	681.4	274.3	13
Flubendiamide	6.152	681.4	272.1	17
Fludioxonil	5.362	247	126	28
Fludioxonil	5.362	247	180	24
Flufenacet	5.814	364	152	-17
Flufenacet	5.814	364	194	-9
Flufenoxuron	7.55	489.6	158.1	-13
Flufenoxuron	7.55	489.6	141	-22
Fluometuron	4.721	233	72	-13
Fluometuron	4.721	233	233	-11
Fluopicolide	5.491	383	173	-20
Fluopicolide	5.491	383	175	-20
Fluopyram	5.724	397	173	-30
Fluopyram	5.724	397	208	-22
Fluoxastrobin	5.786	459.19	427.1	-17
Fluoxastrobin	5.786	459.19	188	-45
Fluquinconazole	5.768	376	307	-21.5
Fluquinconazole	5.768	376	349	-18
Flurochloridone	5.624	312	292	-19
Flurochloridone	5.624	312	89	-22
Flurprimidol	5.541	313	270	-25
Flurprimidol	5.541	313	189	-51
Flurtamone	5.2	334	247	-25
Flurtamone	5.2	334	178	-45
Flurtamone	5.2	334	227	-40
Flusilazole	6.101	316	247	-16.5
Flusilazole	6.101	316	165	-23.5
Flutolanil	5.463	324	242	-18.5
Flutolanil	5.463	324	262	-11
Fluxapyroxad	5.507	382	342	-15
Fluxapyroxad	5.507	382	362	-10
Fonofos	6.288	247	109	-20
Fonofos	6.288	247	137	-10
Forchlorfenuron	4.658	248	129	-15
Forchlorfenuron	4.658	248	155	-14
Fosthiazate	4.29	284.4	104.1	-25
Fosthiazate	4.29	284.4	228.2	-30
Furathiocarb	6.988	383	195	-15
Furathiocarb	6.988	383	252	-10
Halosulfuron-methyl	5.752	435	182	-20
Halosulfuron-methyl	5.752	435	83	-43
Heptenophos	4.745	251	127.1	-14

Compound name	RT	Precursor mass	Product mass	Collision Energy
Heptenophos	4.745	251	125	-12
Hexaconazole	6.533	314	70	-12.5
Hexaconazole	6.533	314	159.7	-24.5
Hexythiazox	7.382	353	228	-14.5
Hexythiazox	7.382	353	168	-23.5
Imazalil	3.902	297	159	-16.5
Imazalil	3.902	297	201	-13
Imazosulfuron	5.37	413	153	-12
Imazosulfuron	5.37	413	257.9	-23
Imidacloprid	2.412	256	209	-13.5
Imidacloprid	2.412	256	175	-16.5
Indoxacarb	6.72	528	293	-12
Indoxacarb	6.72	528	150	-23.5
Indoxacarb	6.72	528	203	-32.5
Iodosulfuron-methyl	4.89	530.07	163.1	-13
Iodosulfuron-methyl	4.89	530.07	390	-21
Iprodione	6.08	330	245	-12
Iprodione	6.08	330	101	-25
Iprodione	6.08	332	247	-16
Iprovalicarb	5.724	321	119	-14
Iprovalicarb	5.724	321	203	-7
Isoprothiolane	5.439	291	231	-10
Isoprothiolane	5.439	291	189	-20
Isoproturon	4.682	207	72	-11.5
Isoproturon	4.682	207	165	-12
Isopyrazam	6.685	360.3	243.9	-20
Isopyrazam	6.685	360.3	320	-20
Isoxaflutole	4.662	360	251	-16
Isoxaflutole	4.662	360	220	-37
Kresoxim-methyl	6.214	314	116	-30
Kresoxim-methyl	6.214	314	131	-20
Linuron	5.233	249	160	-16
Linuron	5.233	249	182	-13.5
Malaoxon	3.917	315	127	-10
Malaoxon	3.917	315	99	-20
Malathion	5.493	331	127	-10
Malathion	5.493	331	99	-18
Mandestrobin	6.282	314.4	192	-7
Mandestrobin	6.282	314.4	160	-17
Mandestrobin	6.282	314.4	119.1	-23
Mandipropamid	5.41	412	328	-10
Mandipropamid	5.41	412	125	-39
Mecarbam	5.821	330	227	-8
Mecarbam	5.821	330	97	-45
Mecarbam	5.821	330	199	-14
Mepanipyrim	5.735	224	106	-20
Mepanipyrim	5.735	224	77	-49

Compound name	RT	Precursor mass	Product mass	Collision Energy
Mesotrione	3.129	337.8	290.9	15
Mesotrione	3.129	337.8	211.9	27
Metaflumizone	7.113	505.1	302.1	25
Metaflumizone	7.113	505.1	328	15
Metaflumizone	7.113	505	116.5	16.5
Metalaxyl	4.637	280	192	-16.5
Metalaxyl	4.637	280	220	-12.5
Metaldehyde	2.419	194	62.3	-6
Metaldehyde	2.419	194	106.2	-4
Metamitron	2.632	203	175	-14.5
Metamitron	2.632	203	104	-17
Metamitron	2.632	203	145	-13
Metconazole	6.53	320	70	-14.5
Metconazole	6.53	320	125	-32.5
Methacrifos	4.841	258.09	125	-21
Methacrifos	4.841	258.09	209	-11
Methamidophos	1.634	142	94	-11.5
Methamidophos	1.634	142	125	-12
Methiocarb	5.263	243.4	121.2	-30
Methiocarb	5.263	243.4	169.3	-13
Methiocarb sulfone	2.764	275	122	-14.5
Methiocarb sulfone	2.764	275	107	-33.5
Methiocarb sulfone	2.764	275	201	-7
Methiocarb sulfoxide	2.514	242	185	-20
Methiocarb sulfoxide	2.514	242	122	-23
Methomyl	2.094	163	106	-9.5
Methomyl	2.094	163	88	-8
Methoxyfenozide	5.477	369	149	-11.5
Methoxyfenozide	5.477	369	313	-5
Metobromuron	4.447	259	170	-15.5
Metobromuron	4.447	259	148	-13
Metolachlor	5.923	284	176	-25
Metolachlor	5.923	284	252	-14
Metosulam	3.933	417.9	174.9	-20
Metosulam	3.933	417.9	140	-40
Metrafenone	6.563	411	229	-14
Metrafenone	6.563	409	227	-27
Metribuzin	3.837	215	187	-16
Metribuzin	3.837	215	84	-16
Metsulfuron-methyl	3.828	382	167	-14
Metsulfuron-methyl	3.828	382	199	-27
Mevinphos	2.646	225	127	-13
Mevinphos	2.646	225	193	-6
Molinate	5.55	188	126	-12
Molinate	5.55	188	55	-23
Molinate	5.55	188	83	-16
Monocrotophos	2.651	224	127	-12.5

Compound name	RT	Precursor mass	Product mass	Collision Energy
Monocrotophos	2.651	224	193	-7.5
Monolinuron	4.182	215	126	-17
Monolinuron	4.182	215	148	-13
Myclobutanil	5.666	289	70	-16
Myclobutanil	5.666	289	125	-28
Napropamide	5.849	272	129	-14
Napropamide	5.849	272	171	-18
Nicosulfuron (2)	4.914	411	182	-18
Nicosulfuron (2)	4.914	411	213	-16
Nitenpyram	1.947	271	189	-10.5
Nitenpyram	1.947	271	130	-8
Novaluron	6.857	493	158	-20
Novaluron	6.857	493	141	-50
Ofurace	3.923	282	160	-22
Ofurace	3.923	282	236	-14
Omethoate	1.828	214	183	-10
Omethoate	1.828	214	125	-20
Omethoate	1.828	214	155	-14.5
Oryzalin	5.86	345	281	20
Oryzalin	5.86	345	78	20
Oxadiargyl	6.467	341	223	-15
Oxadiargyl	6.467	341	258	-10
Oxadixyl	4.635	279.14	219.1	-17
Oxadixyl	4.635	279.14	132.1	-30
Oxamyl	1.969	237	72	-9.5
Oxamyl	1.969	237	90	-6.5
Oxamyl	1.969	237	220	-5.5
Oxasulfuron	3.53	405.4	182.2	9
Oxasulfuron	3.53	405.4	122.3	20
Oxasulfuron	3.53	405.4	106.1	40
Oxycarboxin	2.925	268	175	-13
Oxycarboxin	2.925	268	147	-24
Paclobutrazol	5.424	294	125	-35
Paclobutrazol	5.424	294	70	-15
Paraoxon-methyl	3.375	265	202	-35
Paraoxon-methyl	3.375	265	127	-40
Parathion-ethyl	6.108	292	236	-20
Parathion-ethyl	6.108	292	94	-20
Parathion-ethyl	6.108	291.1	236.2	-20
Penconazole	6.307	284	159	-27.5
Penconazole	6.307	284	173	-16.5
Pencycuron	6.659	329	125	-20
Pencycuron	6.659	329	218	-13.5
Pendimethalin	7.402	282.12	212	-10
Pendimethalin	7.402	282.12	194	-10
Penflufen	6.177	318	233.9	-15
Penflufen	6.177	318	141	-30

Compound name	RT	Precursor mass	Product mass	Collision Energy
Penoxsulam	4.163	484	164	-30
Penoxsulam	4.163	484	195	-25
Penthiopyrad	6.26	360	177	-37
Penthiopyrad	6.26	360	256	-19
Penthiopyrad	6.26	360	276	-12
Pethoxamide	5.821	296.2	131	-20
Pethoxamide	5.821	296.2	116	-40
Phenmedipham	4.932	318	168	-11
Phenmedipham	4.932	318	136	-20
Phorat	6.455	261	75.3	-5
Phorat	6.455	261	170.8	-10
Phosmet	4.918	335	160	-17
Phosmet	4.918	335	133	-36
Phosmet oxon	3.907	302	160	-21
Phosmet oxon	3.907	302	133	-31
Phosphamidon	3.485	300	127	-22
Phosphamidon	3.485	300	174.1	-13
Phosphamidon	3.485	300	227	-12
Phoxim	6.472	299	129	-9
Phoxim	6.472	299	153	-6
Picoxystrobin	6.063	368	145	-18
Picoxystrobin	6.063	368	205	-6
Piperonyl butoxide	7.141	356.4	119	-26
Piperonyl butoxide	7.141	356.4	177	-7
Pirimicarb	3.283	239	72.1	-16
Pirimicarb	3.283	239	182.3	-25
Pirimicarb-desmethyl	3.249	225.11	72.1	-21
Pirimicarb-desmethyl	3.249	225.11	168.1	-22
Pirimiphos-methyl	6.453	306	164	-20
Pirimiphos-methyl	6.453	306	108	-20
Prochloraz	6.415	376	308	-10.5
Prochloraz	6.415	376	266	-16.5
Profoxydim	7.737	466	280	-10
Profoxydim	7.737	466	180	-20
Propachlor	4.626	212	170	-13
Propachlor	4.626	212	94.1	-25
Propamocarb	1.83	189	102	-13
Propamocarb	1.83	189	74	-23
Propamocarb	1.83	189	144	-7.5
Propaquizafop	7.062	444	371	-12
Propaquizafop	7.062	444	299	-31
Propargite	7.513	368	231	-9.5
Propargite	7.513	368	175	-15
Propham	4.465	180	138	-5
Propham	4.465	180	120	-15
Propiconazole	6.4	342	159	-20
Propiconazole	6.4	342	69	-20

Compound name	RT	Precursor mass	Product mass	Collision Energy
Propoxur	3.842	210.28	111.2	-13
Propoxur	3.842	210.28	168.3	-30
Propyzamide	5.458	256	190	-13
Propyzamide	5.458	256	145	-35
Propyzamide	5.458	256	173	-21
Prosulfocarb	6.924	252	91	-20
Prosulfocarb	6.924	252	128	-10
Prosulfuron	5.204	420.27	141.1	-15
Prosulfuron	5.204	420.27	167	-15
Prosulfuron	5.204	420.27	109	-15
Prothioconazole-desthio	5.975	312	125	-25
Prothioconazole-desthio	5.975	312	70	-18
Pyraclofos	6.478	360.9	138	-40
Pyraclofos	6.478	360.94	256.9	-21
Pyraclostrobin	6.468	388	163	-18.5
Pyraclostrobin	6.468	388	194	-7.5
Pyridaben	7.859	365.23	147.2	-23
Pyridaben	7.859	365.23	309.1	0
Pyridalyl	8.506	490	109	-25
Pyridalyl	8.506	490	111	-20
Pyridalyl	8.506	490	182.9	-20
Pyridate	8.106	379	207	-17
Pyridate	8.106	379	351	-8.5
Pyrimethanil	4.823	200	107	-19.5
Pyrimethanil	4.823	200	82	-20.5
Pyriproxyfen	7.263	322	96.2	-14
Pyriproxyfen	7.263	322	184.9	-22
Pyriproxyfen	7.263	322	227	-13
Pyroxsulam	3.74	435	195	-29
Pyroxsulam	3.74	435	124	-39
Quinoxyfen	7.35	308	161.9	-47
Quinoxyfen	7.35	308	197	-31
Rotenone	6.007	395	213	-20.5
Rotenone	6.007	395	192	-21.5
Sedaxane	5.634	333	159	-16
Sedaxane	5.634	333	292	-11.5
Sedaxane	5.634	333	139	-30
Simazine	3.847	202	124	-17
Simazine	3.847	202	132	-32
Spinetoram (major)	6.067	748.5	142	-28
Spinetoram (major)	6.067	748.5	98	-34
Spinetoram (minor)	6.307	760.5	142	-24
Spinetoram (minor)	6.307	760.5	98	-30
Spinosad A	5.93	733	142	-21.5
Spinosad A	5.93	733	189	-30
Spinosad A	5.93	733	98	-20
Spinosad D	6.18	747	142	-22

Compound name	RT	Precursor mass	Product mass	Collision Energy
Spinosad D	6.18	747	189	-27.5
Spinosad D	6.18	747	89.2	-40
Spirodiclofen	7.656	411	313	-20
Spirodiclofen	7.656	411	71	-20
Spirotetramat	5.729	374.2	330.2	-10
Spirotetramat	5.729	374.2	302.2	-15
Spirotetramat cis-enol	4.262	302	216	-30
Spirotetramat cis-enol	4.262	302	270	-20
Spirotetramat cis-keto-hydroxy	4.758	318	214	-25
Spirotetramat cis-keto-hydroxy	4.758	318	268	-15
Spirotetramat cis-keto-hydroxy	4.758	318	300.1	-4
Spirotetramat enol-glucoside	2.326	464	216	-42
Spirotetramat enol-glucoside	2.326	464	270	-32
Spirotetramat enol-glucoside	2.326	464	302	-12
Spirotetramat mono-hydroxy	3.724	304	254	-15
Spirotetramat mono-hydroxy	3.724	304	211	-22
Spiroxamine	4.865	298	144	-15
Spiroxamine	4.865	298	100	-23
Sulfotep	6.174	323	171	-11
Sulfotep	6.174	323	115	-25
Sulfotep	6.174	323	295	-7.5
Sulfoxaflor	2.812	278.3	174	-8
Sulfoxaflor	2.812	278.27	154	-25
Sulfoxaflor	2.812	278.3	105.1	-9
Tebuconazole	6.258	308	70	-13
Tebuconazole	6.258	308	125	-32
Tebufenozide	6.108	353	133	-17
Tebufenozide	6.108	353	297	-7.5
Tebufenpyrad	7.123	334	145	-24
Tebufenpyrad	7.123	334	117	-31
Teflubenzuron	7.243	379	339	9
Teflubenzuron	7.243	379	195	20.5
Teflubenzuron	7.243	379	359	5.5
Tembotrione	4.93	458	262	-27
Tembotrione	4.93	458	341	-13
Tepraloxydim	5.667	342	250	-11.5
Tepraloxydim	5.667	342	166	-20.5
Terbuthylazine	5.317	230.1	96.1	-15
Terbuthylazine	5.317	230.1	174	-13
Terbuthylazine	5.317	230.1	132	-20
Tetrachlorvinphos	6.118	367	127	-14
Tetrachlorvinphos	6.118	367	240.7	-19
Tetramethrin	7.022	332	164	-25
Tetramethrin	7.022	332	135	-15
Tetramethrin	7.022	332	286	-10
Thiabendazole	2.248	202	175	-19.5
Thiabendazole	2.248	202	131	-27

Compound name	RT	Precursor mass	Product mass	Collision Energy
Thiacloprid	2.941	253	126	-17
Thiacloprid	2.941	253	90	-30
Thiacloprid	2.941	253	99	-36.5
Thiamethoxam	2.154	292	211	-11.5
Thiamethoxam	2.154	292	132	-18.5
Thiamethoxam	2.154	292	181	-18
Thiencarbazone-methyl	3.464	391	130	-16
Thiencarbazone-methyl	3.464	391	359	-5
Thifensulfuron-methyl	3.653	388	167	-14
Thifensulfuron-methyl	3.653	388	205	-25.5
Thiobencarb	6.573	258	125	-15
Thiobencarb	6.573	258	89.2	-39
Thiodicarb	4.224	355	88	-8.5
Thiodicarb	4.224	355	108	-11.5
Thiodicarb	4.224	355	149	-8.5
Thiometon	4.41	247	89	-10
Thiometon	4.41	247	61	-25
Thiophanate-methyl	3.724	342.78	151.12	-20
Thiophanate-methyl	3.724	342.78	93.15	-50
Thiophanate-methyl	3.724	343	311	-8
Tolclofos-methyl	6.547	301	269	-14
Tolclofos-methyl	6.547	301	125	-16
Tolclofos-methyl	6.547	301	175	-25
Tolylfluanid	6.281	364	238	-14
Tolylfluanid	6.281	364	137	-28.5
Tolylfluanid	6.281	364	347	-6.5
Triadimefon	5.533	294	197	-16
Triadimefon	5.533	294	225	-12
Triadimenol	5.803	296	70	-7
Triadimenol	5.803	296	99	-11.5
Triallate	7.056	306	144.92	-23
Triallate	7.056	306	86	-24
Triasulfuron	3.662	402	166.9	-25
Triasulfuron	3.662	402	141	-18
Triazophos	5.68	314	162	-17
Triazophos	5.68	314	119	-30
Trichlorfon	2.718	274	109	-19.5
Trichlorfon	2.718	274	127	-18
Tricyclazole	3.125	190	136	-25.5
Tricyclazole	3.125	190	109	-31.5
Trifloxystrobin	6.804	409	186	-11
Trifloxystrobin	6.804	409	145	-36
Triflumizole	6.731	346	278	-9
Triflumizole	6.731	346	73	-12
Triflumuron	6.509	359.06	156.1	-25
Triflumuron	6.509	359.06	138.8	-20
Triflusulfuron-methyl	5.344	493	264	-30

Compound name	RT	Precursor mass	Product mass	Collision Energy
Triflusulfuron-methyl	5.344	493	238	-30
Triticonazole	5.885	318	70	-12
Triticonazole	5.885	318	125	-30.5
Valifenalate	5.522	399	116	-20
Valifenalate	5.522	399	155	-31
Vamidothion	2.604	288	146	-20
Vamidothion	2.604	288	118	-30
Zoxamide	6.415	336	187	-17
Zoxamide	6.415	336	132	-11
Zoxamide	6.415	336	159	-36.5

Appendix 2. Recoveries, repeatability (RSD_r), expanded uncertainty, combinded uncertainty and Limit of Quantification (LOQ) for pesticides validated on three cereal commodities, oat, rye and wheat using QuEChERS.

Numbers marked italic is outside 70-120% recovery, above 20% RSD and above 50% expanded uncertainty

	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
Pesticide	**0.025 mg/kg**				**0.05 mg/kg**				**0.5 mg/kg**				
GC 1,4-dimethylnaphthalene	84	10	38	11	96	19	41	20	101	3	7	4	0.025
LC 1-Naphthylacetamide	*57*	5	*86*	5	99	2	5	2	*124*	12	*55*	13	0.050
GC 1-Naphtylacetamide									99	4	9	4	0.500
LC 2-hydroxypropoxycarbazone									83	7	37	8	0.500
GC 2-Phenylphenol									96	3	11	3	0.500
LC 6-Benzylaminopurine	*66*	3	*69*	3	85	4	32	4	92	4	19	4	0.050
GC Acephate	*69*	19	*74*	21	90	15	38	16	80	6	42	7	0.025
LC Acephate	*56*	6	*89*	6	88	7	28	7	98	4	9	4	0.050
GC Acequinocyl	82	12	44	13	82	12	44	13	90	5	23	5	0.025
LC Acetamiprid	76	8	*51*	8	106	5	16	5	106	4	15	4	0.025
GC Acetochlor					85	*34*	*79*	37	103	3	8	3	0.050
GC Acibenzolar-S-methyl	111	11	33	12	101	9	19	10	99	1	3	1	0.025
GC Aclonifen	105	7	18	7	105	5	14	5	98	4	10	5	0.025
GC Acrinathrin I					*131*	13	*68*	14	96	5	14	6	0.050
GC Acrinathrin II					117	10	40	11	92	6	20	6	0.050
LC Aldicarb Sulfone	76	8	*51*	9	104	4	12	5	109	3	19	3	0.025
LC Aldicarb Sulfoxide I	87	11	35	11	115	14	43	15	104	6	16	7	0.025
GC Aldrin	94	10	26	11	89	3	23	4	90	1	21	1	0.025
LC Ametoctradin	87	3	26	3	100	3	7	3	104	4	11	4	0.025
LC Amidosulfuron					95	6	16	6	116	7	36	7	0.050
LC Amisulbrom	78	9	48	10	100	3	7	3	109	8	25	9	0.025
GC Anthraquinone	93	8	23	9	100	6	13	6	97	2	7	2	0.025
LC Atrazine	91	7	23	8	105	6	17	6	98	2	7	2	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Azimsulfuron	75	5	*51*	6	98	6	14	7	109	5	21	5	0.025
GC Azinphos-ethyl	88	7	27	7	94	6	18	7	87	3	28	4	0.025
LC Azinphos-ethyl	75	7	*51*	7	100	15	32	16	*124*	11	*53*	12	0.025
GC Azinphos-methyl	90	12	32	13	91	11	29	11	89	2	23	2	0.025
LC Azinphos-methyl	88	5	27	6	105	10	25	11	105	6	17	7	0.025
GC Azoxystrobin	85	5	32	6	96	5	14	6	97	3	8	3	0.025
LC Azoxystrobin	85	5	31	5	103	5	12	5	108	5	19	5	0.025
GC Beflubutamid	97	4	11	5	104	12	28	13	102	3	7	3	0.025
GC Benalaxyl	111	13	35	14	111	7	27	7	108	7	22	7	0.025
LC Benalaxyl	87	3	27	3	98	3	8	4	108	5	19	5	0.025
GC Bendiocarb					114	*21*	*53*	23	115	4	31	5	0.050
LC Bendiocarb	95	4	13	4	109	3	19	4	108	7	21	7	0.025
GC Benfluralin	91	10	27	10	102	5	12	6	98	5	12	5	0.025
LC Bensulfuron methyl									91	5	22	6	0.500
GC Bifenazate	103	7	16	7	89	7	26	7	89	1	22	1	0.025
LC Bifenazate									86	2	28	2	0.500
GC Bifenthrin	81	2	38	2	88	3	24	3	92	2	16	2	0.025
LC Bifenthrin	70	3	*60*	3	111	6	26	6	96	6	15	7	0.025
GC Biphenyl					102	9	20	10	105	5	15	5	0.050
GC Bitertanol	91	3	20	3	100	6	13	7	100	3	6	3	0.025
LC Bitertanol	86	5	30	5	109	11	30	12	89	5	24	5	0.025
GC Bixafen	94	5	17	5	100	5	10	5	102	2	6	2	0.025
LC Bixafen					97	5	12	5	*135*	7	*71*	8	0.050
GC Boscalid	88	3	24	3	100	5	11	5	99	1	4	2	0.025
LC Boscalid	78	7	46	7	105	5	14	5	102	6	14	7	0.025
LC Bromadiolone									112	8	29	9	0.500
GC Bromophos-ethyl	87	12	36	13	93	9	24	10	97	3	10	4	0.025
GC Bromopropylate	88	3	24	4	*138*	3	*76*	4	98	2	6	2	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Bromoxynil	78	7	47	7	90	4	21	4	81	4	39	5	0.025
LC Bromuconazole I	82	6	38	6	100	6	13	7	109	8	24	8	0.025
LC Bromuconazole II	87	7	30	8	104	9	20	9	98	8	17	8	0.025
GC Bromuconazole I	100	18	38	19	90	17	41	18	98	5	11	5	0.025
GC Bromuconazole II	97	10	23	11	111	6	26	7	97	3	9	4	0.025
GC Bupirimate	84	11	40	12	112	7	28	8	99	3	6	3	0.025
LC Bupirimate	89	3	24	4	103	4	10	4	99	6	12	6	0.025
GC Buprofezin					112	*22*	*52*	23	94	3	15	4	0.050
LC Buprofezin	86	3	29	3	98	2	6	3	101	2	6	3	0.025
GC Butralin									93	12	30	13	0.500
LC Butralin	93	3	16	3	98	2	7	3	101	4	8	4	0.025
GC Cadusafos	86	3	28	3	94	6	18	7	96	2	8	2	0.025
LC Cadusafos	84	4	32	4	97	3	8	3	105	5	14	5	0.025
GC Captan									*59*	12	*86*	13	0.500
GC Carbaryl					90	13	34	14	73	6	*55*	6	0.050
LC Carbaryl	80	4	40	4	98	10	22	11	97	7	15	7	0.025
LC Carbendazim	70	3	*59*	3	93	5	17	5	104	3	11	3	0.025
GC Carbetamide									105	7	19	8	0.500
LC Carbetamide	74	3	*52*	4	100	3	6	3	113	12	37	13	0.025
GC Carbofuran									98	15	34	17	0.500
LC Carbofuran	98	4	9	4	*131*	13	*69*	14	*153*	13	*110*	14	0.025
LC Carbofuran, 3-hydroxy	97	4	11	5	104	4	12	4	106	2	13	2	0.025
GC Carbophenothion	110	9	28	10	105	8	20	9	96	4	12	5	0.025
GC Carbosulfan	90	12	32	13	102	11	23	11	89	2	22	2	0.025
GC Carboxin	79	16	*54*	18	78	8	48	9	82	5	37	5	0.025
LC Carboxin					86	9	34	10	84	6	35	7	0.050
LC Carfentrazone-Ethyl					99	14	30	15	107	7	20	7	0.050
GC Carfentrazon-ethyl	101	7	15	8	91	4	21	5	97	2	8	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Chlorantraniliprole					96	6	15	6	*123*	6	47	7	0.050
GC Chlorfenapyr					94	18	41	20	95	14	33	16	0.050
GC Chlorfenson	115	17	47	18	96	11	26	12	96	2	9	2	0.025
GC Chlorfenvinphos	106	17	39	19	106	5	16	6	98	1	5	1	0.025
LC Chlorfluazuron	73	9	*57*	10	87	8	31	9	103	8	17	8	0.025
GC Chloridazon									101	10	22	11	0.500
LC Chloridazon									106	6	17	6	0.500
GC Chlormephos									85	10	37	11	0.500
GC Chlorobenzilate	84	6	35	6	98	4	10	5	97	2	7	2	0.025
GC Chloropropylate	95	3	12	3	103	3	9	3	104	2	8	2	0.025
GC Chlorothalonil									*47*	7	*106*	7	0.500
LC Chlorotoluron	102	1	5	1	109	2	18	2	105	3	11	3	0.025
GC Chlorpropham					95	9	23	10	101	6	14	7	0.050
LC Chlorpropham									109	7	23	7	0.500
GC Chlorpyrifos	111	13	35	14	98	10	22	11	93	3	14	3	0.025
LC Chlorpyrifos	87	5	29	5	99	6	13	6	99	3	6	3	0.025
GC Chlorpyrifos-methyl	85	9	36	10	77	*39*	*96*	42	98	4	10	4	0.025
LC Chlorpyrifos-methyl	75	2	50	2	99	5	12	6	104	4	12	4	0.025
GC Chlorsulfuron	*64*	9	*75*	10	78	10	49	10	78	3	44	3	0.025
LC Chlorsulfuron									113	7	31	7	0.500
GC Chlorthal-dimethyl	81	8	40	8	99	8	17	8	101	4	9	5	0.025
LC Chromafenozide	80	14	50	15	98	13	28	14	110	10	30	11	0.025
GC Cinidon-ethyl	*122*	15	*55*	16	109	4	21	5	93	2	14	2	0.025
LC Cinidon-ethyl					92	10	26	10	*135*	11	*74*	12	0.050
LC Cinosulfuron									91	11	30	12	0.500
GC Clethodim									*66*	4	*68*	5	0.500
LC Clethodim					80	5	42	5	82	5	38	5	0.050
GC Clodinafop-propargyl	99	*22*	47	24	101	9	20	10	111	4	23	4	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Clodinafop-propargyl					94	8	21	9	*123*	6	48	7	0.050
GC Clofentezine									107	7	21	8	0.500
LC Clofentezine	76	12	*54*	13	*141*	4	*83*	4	*36*	2	*127*	2	0.025
GC Clomazone	85	8	35	8	96	6	15	6	95	3	12	3	0.025
LC Clomazone	91	8	25	9	102	3	8	4	105	7	18	7	0.025
LC Clothianidin	74	7	*55*	7	104	5	13	5	105	4	13	4	0.025
LC Cyazofamid	84	6	34	6	97	6	15	7	102	6	13	7	0.025
LC Cycloxydim					80	16	*53*	18	89	4	23	4	0.050
GC Cyflufenamid	95	4	13	4	107	3	16	4	103	2	7	2	0.025
LC Cyflufenamid					94	4	14	4	112	8	30	9	0.050
GC Cyflumetofen									109	9	26	9	0.500
LC Cyflumetofen	106	3	13	4	110	4	22	4	105	4	12	4	0.025
GC Cyflutrin	89	7	26	7	90	6	24	6	96	1	8	2	0.025
LC Cyhalothrin, lambda									103	12	28	13	0.500
GC Cyhalothrin, lambda R					117	11	41	12	107	9	24	10	0.050
LC Cymoxanil	80	6	43	7	102	9	21	10	117	4	35	4	0.025
GC Cypermethrin	96	17	38	19	94	4	15	4	94	3	14	4	0.025
LC Cypermethrin	79	3	43	4	91	5	21	5	99	6	14	7	0.025
GC Cyproconazole	112	13	36	14	80	8	44	9	100	2	5	2	0.025
LC Cyproconazole I	99	9	19	10	115	7	33	7	109	5	22	6	0.025
LC Cyproconazole II					96	9	21	10	115	11	39	12	0.050
GC Cyprodinil					92	15	37	16	93	3	15	3	0.050
LC Deltamethrin	73	7	*56*	7	96	9	21	10	97	7	16	8	0.025
GC Deltamethrin					97	9	21	10	87	3	26	3	0.050
GC Demeton-S-methyl	74	5	*52*	6	90	10	29	11	92	2	16	2	0.025
LC Demeton-S-methyl	73	12	*61*	14	104	8	18	8	*138*	10	*78*	11	0.025
LC Demeton-S-methyl sulfone					104	5	14	6	96	4	13	5	0.050
LC Demeton-S-methyl sulfoxid I	84	5	34	6	102	6	13	6	102	4	10	5	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Demeton-S-methyl sulfoxid II	84	4	33	4	101	7	15	7	102	3	8	3	0.025
GC Demeton-S-methyl-sulfone									71	20	*72*	22	0.500
LC Desmedipham									110	6	23	7	0.500
GC Dialifos	*133*	11	*71*	12	111	6	25	7	100	4	9	4	0.025
LC Dialifos					91	10	28	11	*123*	10	50	10	0.050
GC Diazinon	93	14	33	15	103	8	18	9	98	5	11	5	0.025
LC Diazinon	83	4	35	4	101	7	16	8	99	7	16	8	0.025
GC Dichlobenil	96	7	17	7	100	12	25	13	102	2	6	3	0.025
GC Dichlofenthion	92	6	21	7	95	3	12	3	102	2	5	2	0.025
GC Dichlorvos	74	17	*64*	18	90	7	26	8	87	6	30	6	0.025
LC Dichlorvos	113	14	39	15	97	7	16	7	99	6	12	6	0.025
GC Dicloran	71	15	*66*	16	104	13	29	14	97	3	10	3	0.025
GC Dicofol, p,p'-	80	13	49	14	108	8	23	8	110	4	22	4	0.025
GC Dicrotophos									97	4	10	4	0.500
GC Dieldrin									94	12	29	13	0.500
GC Diethofencarb	85	10	38	11	98	5	12	5	103	4	10	4	0.025
LC Diethofencarb	78	4	46	4	99	4	10	5	116	6	34	6	0.025
LC Difenacoum					83	9	40	10	96	5	15	6	0.050
LC Difenoconazole	74	5	*54*	5	100	7	15	7	109	6	22	6	0.025
GC Difenoconazole					111	12	33	13	101	2	4	2	0.050
LC Diflubenzuron	71	6	*60*	6	98	4	9	4	116	8	37	9	0.025
GC Diflufenican	106	10	25	11	106	6	17	6	104	3	11	3	0.025
GC Dimethachlor	94	9	23	10	100	4	8	4	103	2	7	2	0.025
LC Dimethachlor	96	4	11	4	105	2	11	2	109	3	19	3	0.025
GC Dimethenamid	103	5	12	5	103	4	11	5	104	2	10	3	0.025
LC Dimethenamid	87	2	27	2	99	3	6	3	108	3	17	3	0.025
GC Dimethoate					93	20	45	21	89	5	25	6	0.050
LC Dimethoate					115	4	31	5	109	2	19	3	0.050

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Dimethomorph I	88	4	26	4	105	4	14	5	96	4	12	5	0.025
LC Dimethomorph II	84	3	33	3	103	5	12	5	100	3	6	3	0.025
GC Dimethomorph I	87	5	28	6	95	7	18	7	97	3	9	4	0.025
GC Dimethomorph II	85	14	43	15	99	10	22	11	104	2	9	2	0.025
GC Dimoxystrobin	97	6	15	7	103	4	11	4	103	2	6	2	0.025
GC Diniconazole	*124*	10	*52*	10	118	3	37	4	108	2	16	2	0.025
LC Diniconazole	81	3	39	4	105	8	19	8	108	7	22	8	0.025
LC Dinotefuran	72	9	*60*	9	97	9	19	9	112	7	29	8	0.025
LC Dinoterb	99	6	13	6	100	6	12	6	87	7	29	7	0.025
GC Dioxathion					90	8	27	9	99	2	4	2	0.025
GC Diphenylamine	83	15	47	16	93	9	25	10	92	2	16	3	0.025
GC Disulfoton					84	19	*52*	20	94	6	17	6	0.050
GC Ditalimfos	*68*	11	*69*	12	70	11	*64*	11	70	3	*60*	3	0.025
LC Ditalimfos									86	8	33	9	0.500
LC Diuron									99	5	11	6	0.500
LC DMF					108	3	17	3	101	3	6	3	0.050
LC DMST	94	6	17	6	119	11	45	12	118	8	40	9	0.025
LC DNOC	88	14	39	15	89	6	25	6	83	6	36	7	0.025
LC Dodemorph	95	3	13	4	102	3	8	4	100	3	6	3	0.025
GC Dodemorph I	102	12	27	13	101	9	19	9	99	2	5	2	0.025
GC Dodemorph II	82	*22*	*59*	24	89	12	34	13	103	4	11	5	0.025
LC Dodine	101	6	13	6	96	3	10	3	96	6	15	6	0.025
LC Emamectin benzoate	105	6	16	6	105	8	19	9	96	8	18	8	0.025
GC Endosulfan sulfate	75	12	*57*	13	82	10	43	11	93	2	15	3	0.025
GC Endosulfan, alpha					91	*33*	*74*	36	102	20	43	22	0.050
GC Endosulfan, beta	74	*22*	*70*	24	114	*23*	*56*	24	98	6	14	7	0.025
GC Endrin					101	17	37	18	90	3	22	4	0.050
GC EPN	98	10	22	11	99	9	20	10	95	2	11	2	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Epoxiconazole	72	10	*60*	10	83	10	40	11	95	2	12	2	0.025
LC Epoxiconazole					91	15	38	16	100	10	22	11	0.050
GC Ethalfluralin	90	15	39	16	104	11	25	12	89	6	26	7	0.025
GC Ethiofencarb					93	7	22	8	82	6	38	6	0.050
LC Ethiofencarb	73	4	*56*	5	90	5	23	5	93	3	16	4	0.025
GC Ethion	87	7	30	7	97	7	17	8	97	1	7	1	0.025
LC Ethion	82	5	38	5	100	4	10	5	101	7	14	7	0.025
LC Ethirimol					91	15	37	16	99	3	7	3	0.050
GC Ethofumesate	103	9	21	10	113	13	38	14	105	4	13	4	0.025
LC Ethofumesate	84	13	44	14	100	11	25	12	112	3	25	4	0.025
GC Ethoprophos	90	11	32	12	97	13	30	15	99	4	9	4	0.025
LC Ethoprophos	88	5	26	6	102	6	13	6	105	8	21	9	0.025
LC Ethoxyquin									79	4	43	4	0.500
LC Ethoxysulfuron					79	5	43	5	98	7	15	7	0.050
GC Etofenprox	81	4	39	4	93	6	18	6	94	2	12	2	0.025
LC Etofenprox	77	5	48	6	94	5	16	5	101	5	10	5	0.025
GC Etoxazole	105	10	23	10	101	8	18	9	101	2	5	2	0.025
LC Etoxazole	81	3	39	3	93	2	15	2	105	4	13	4	0.025
GC Etridiazole	106	6	17	6	97	16	36	18	92	6	21	7	0.025
GC Famoxadone	94	13	30	14	102	12	25	12	81	*40*	*94*	43	0.025
GC Fenamiphos					106	5	16	5	96	5	14	5	0.050
LC Fenamiphos	75	3	50	3	95	3	12	3	105	7	19	8	0.025
GC Fenamiphos sulfone	110	8	26	8	104	6	15	6	98	2	5	2	0.025
LC Fenamiphos sulfone	81	3	39	3	99	7	14	7	98	8	18	9	0.025
LC Fenamiphos sulfoxide	116	14	45	15	94	*23*	*51*	25	114	12	38	13	0.025
GC Fenarimol	84	5	34	5	101	5	10	5	98	1	5	1	0.025
LC Fenarimol					102	6	14	6	101	10	22	11	0.050
GC Fenazaquin	83	5	37	5	93	3	15	3	93	2	15	2	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Fenazaquin	76	4	49	5	96	3	10	3	102	5	12	6	0.025
GC Fenbuconazole	87	3	26	4	100	5	10	5	100	2	4	2	0.025
LC Fenbuconazole	70	6	*62*	7	101	6	13	7	101	10	21	11	0.025
GC Fenchlorfos	84	14	44	15	84	5	34	6	98	3	7	3	0.025
GC Fenhexamid									76	13	*56*	14	0.500
LC Fenhexamid					87	14	40	15	100	6	14	7	0.050
GC Fenitrothion	77	8	49	9	84	7	35	8	95	3	12	3	0.025
GC Fenoxaprop-P	105	13	30	14	102	7	16	8	99	2	6	3	0.025
LC Fenoxaprop-P-ethyl	83	4	35	4	99	3	7	3	108	6	20	6	0.025
GC Fenoxycarb	87	4	28	5	97	5	13	6	96	4	12	4	0.025
LC Fenoxycarb	83	3	34	3	98	4	9	4	103	5	13	5	0.025
GC Fenpropathrin	103	19	42	21	82	*25*	*64*	27	96	5	13	5	0.025
LC Fenpropathrin	98	9	21	10	108	7	22	7	108	6	20	6	0.025
GC Fenpropidin									90	2	20	2	0.500
LC Fenpropidin	83	5	35	6	*126*	7	*53*	7	*123*	5	46	6	0.025
GC Fenpropimorph					81	11	45	12	92	3	17	3	0.050
LC Fenpropimorph	76	8	*51*	9	114	7	32	8	96	4	11	4	0.025
LC Fenpyrazamine	99	7	14	7	101	3	7	3	102	5	12	6	0.025
GC Fenpyroximate					86	5	29	5	101	4	9	4	0.050
LC Fenpyroximate	88	4	25	5	94	3	13	4	100	4	8	4	0.025
GC Fenson	88	5	27	6	101	4	10	5	95	3	12	3	0.025
GC Fenthion	84	16	46	17	91	8	26	9	96	3	10	3	0.025
LC Fenthion	90	2	20	2	93	8	22	9	105	7	18	8	0.025
LC Fenthion oxon sulfone	82	6	39	7	100	6	14	7	99	5	11	5	0.025
LC Fenthion oxon sulfoxide	77	3	47	3	100	5	11	5	103	4	10	4	0.025
LC Fenthion sulfone	95	10	24	11	103	10	22	11	104	5	13	5	0.025
GC Fenthion sulfoxide									99	4	8	4	0.500
LC Fenthion sulfoxide	83	4	35	5	104	10	22	11	103	6	14	6	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Fenvalerate I+II	76	5	50	6	92	3	17	3	91	1	19	2	0.025
GC Fipronil	82	9	40	9	101	10	22	11	98	4	10	5	0.025
LC Fipronil	92	6	21	7	105	9	23	10	97	6	14	6	0.025
LC Fipronil-sulfid					73	19	*67*	20	91	6	22	6	0.050
GC Flonicamid	102	8	19	9	105	2	11	3	103	1	7	2	0.025
GC Fluazifop-P-butyl	*121*	14	*52*	16	104	11	24	12	101	3	8	4	0.025
LC Fluazifop-p-butyl	82	3	36	3	96	3	10	3	102	4	10	4	0.025
LC Fluazinam	101	6	14	7	106	5	16	5	102	5	12	6	0.025
LC Flubendiamide	115	6	33	6	110	8	27	9	92	6	22	7	0.025
GC Flucythrinate	98	5	12	6	100	6	13	6	101	2	5	2	0.025
GC Fludioxonil	72	7	*57*	7	99	7	16	8	95	4	14	4	0.025
LC Fludioxonil	92	7	22	8	101	8	17	8	98	4	9	4	0.025
GC Fluensulfone					107	20	46	22	100	4	10	5	0.050
GC Flufenacet	112	12	36	13	94	11	26	12	101	1	3	1	0.025
LC Flufenacet					98	5	11	5	120	9	45	9	0.050
GC Flufenoxuron									102	4	10	5	0.500
LC Flufenoxuron	85	5	31	5	96	8	19	8	99	9	19	9	0.025
GC Flumetralin	118	10	42	10	105	11	27	12	94	4	14	4	0.025
GC Flumioxazin	103	15	34	17	104	4	13	5	105	4	13	4	0.025
GC Fluometuron	86	10	34	10	105	*28*	*62*	31	96	9	21	10	0.025
LC Fluometuron	86	5	29	5	101	9	21	10	106	8	21	9	0.025
GC Fluopicolide	101	7	15	8	114	4	29	4	112	2	25	2	0.025
LC Fluopicolide	79	5	43	5	101	4	9	4	114	5	30	5	0.025
GC Fluopyram	100	10	22	11	106	3	13	3	102	2	5	2	0.025
LC Fluopyram	77	6	49	7	96	7	18	8	111	9	29	10	0.025
LC Fluoxastrobin	91	3	20	3	96	5	13	5	108	8	25	9	0.025
GC Flupyradifurone	89	6	25	6	102	6	13	6	102	3	9	4	0.025
GC Fluquinconazole	115	8	34	8	96	6	16	7	99	3	6	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Fluquinconazole	90	8	27	9	96	3	10	4	113	11	36	12	0.025
GC Flurochloridone	105	*21*	46	22	93	14	33	15	100	3	7	3	0.025
LC Flurochloridone	95	9	22	10	106	8	22	9	112	8	29	9	0.025
GC Flurprimidol	104	5	14	6	105	2	12	2	106	2	12	2	0.025
LC Flurprimidol	85	7	33	7	103	6	15	7	113	7	30	7	0.025
GC Flurtamone	96	5	14	6	104	6	15	6	104	2	10	3	0.025
LC Flurtamone	86	5	29	5	100	3	7	3	104	3	10	4	0.025
GC Flusilazole	92	13	32	14	102	10	22	11	98	3	9	4	0.025
LC Flusilazole	78	6	45	6	100	5	11	5	104	9	21	10	0.025
GC Flutolanil	101	5	12	6	105	2	11	2	104	2	9	2	0.025
LC Flutolanil	91	5	21	6	101	3	6	3	106	5	16	5	0.025
GC Flutriafol	77	8	49	9	102	9	20	10	100	2	5	2	0.025
GC Fluvalinate I +II	79	13	*51*	14	89	4	24	4	82	5	38	6	0.025
LC Fluxapyroxad	72	7	*58*	8	99	6	13	7	118	4	37	5	0.025
GC Folpet					70	11	*64*	11	70	3	*60*	3	0.050
GC Fonofos	101	3	6	3	101	3	6	3	99	2	4	2	0.025
LC Fonofos	79	4	43	5	96	5	14	6	113	5	27	5	0.025
LC Forchlorfenuron					96	3	12	4	*133*	6	*67*	7	0.050
GC Formothion									100	7	15	7	0.500
LC Fosthiazate	86	3	29	3	104	7	16	7	100	5	10	5	0.025
GC Fuberidazol									90	6	23	6	0.500
LC Furathiocarb	91	2	19	3	98	4	9	4	106	3	14	3	0.025
GC Halosulfuron methyl									98	15	32	16	0.500
LC Halosulfuron-methyl	94	8	21	9	120	7	43	7	*123*	7	49	8	0.025
LC Haloxyfop	*59*	5	*82*	5	*54*	3	*91*	3	*51*	2	*98*	2	0.025
GC HCH, alpha	84	9	38	10	95	8	21	9	96	2	9	2	0.025
GC HCH, beta	118	13	45	14	97	12	26	13	97	4	11	5	0.025
GC Heptachlor	93	7	20	7	90	3	22	4	94	2	14	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Heptenophos	79	4	42	4	95	2	12	3	95	2	11	2	0.025
LC Heptenophos	95	5	14	5	103	5	12	5	96	2	10	2	0.025
GC Hexaconazole									95	6	15	6	0.500
LC Hexaconazole	97	8	18	9	99	9	20	10	101	5	11	6	0.025
LC Hexythiazox	80	5	41	6	95	7	18	8	95	3	12	4	0.025
GC Hexythiozox	90	13	36	14	84	10	39	11	97	6	15	7	0.025
GC Imazalil					102	3	9	4	95	7	17	7	0.050
LC Imazalil	86	9	35	10	105	15	35	17	101	12	25	13	0.025
LC Imazosulfuron									99	5	10	5	0.500
LC Imidacloprid	76	5	50	5	105	3	13	4	105	4	13	4	0.025
GC Indoxacarb					93	20	46	22	95	4	13	5	0.050
LC Indoxacarb	80	3	40	4	102	10	23	11	105	7	18	7	0.025
GC Iodofenfos	83	8	38	8	101	10	21	10	95	2	11	2	0.025
LC Iodosulfuron-methyl					82	10	42	11	101	12	26	13	0.050
GC Ipconazole	74	20	*68*	22	85	13	41	14	105	5	14	5	0.025
GC Iprodione	73	*24*	*76*	26	105	*24*	*53*	26	90	3	21	3	0.025
LC Iprodione					89	11	32	11	110	8	27	9	0.050
LC Iprovalicarb					102	2	7	3	107	2	14	2	0.050
GC Iprovalicarb	80	15	*52*	17	89	20	49	22	98	5	11	5	0.025
GC Isocarbophos	98	18	38	19	101	6	13	7	101	5	12	6	0.025
GC Isofenphos	93	3	15	3	103	3	10	4	102	2	7	2	0.025
GC Isofenphos-methyl	81	9	43	9	95	5	14	5	99	2	5	2	0.025
GC Isoprocarb	86	8	33	9	97	4	11	4	102	1	4	1	0.025
GC Isoprothiolane	97	9	20	9	93	8	21	8	99	4	9	4	0.025
LC Isoprothiolane	79	4	43	5	102	4	11	5	108	6	20	7	0.025
LC Isoproturon	85	7	34	8	106	5	16	5	111	4	24	4	0.025
LC Isopyrazam	85	6	32	7	100	3	6	3	106	4	15	5	0.025
GC Isoxaflutole									97	9	21	10	0.500

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Isoxaflutole	87	12	37	13	*122*	6	45	6	*135*	11	*74*	12	0.025
GC Kresoxim-methyl	101	19	41	20	99	9	20	10	96	2	9	3	0.025
LC Kresoxim-methyl	85	8	35	9	101	13	29	14	106	20	45	22	0.025
GC Lindane	103	9	20	10	88	6	26	6	96	6	15	7	0.025
GC Linuron					100	7	15	7	83	8	38	9	0.050
LC Linuron	102	14	30	15	100	9	19	9	98	2	6	3	0.025
LC Malaoxon	81	2	38	2	103	7	16	7	103	6	15	7	0.025
GC Malathion	76	16	*59*	17	95	3	11	3	96	4	11	4	0.025
LC Malathion	76	4	49	5	98	6	15	7	113	5	28	5	0.025
GC Mandestrobin	105	6	16	7	107	4	16	4	106	1	12	1	0.025
LC Mandestrobin	92	3	18	3	98	2	6	2	108	5	18	5	0.025
LC Mandipropamid	89	6	25	7	104	6	14	6	107	6	18	6	0.025
GC Mecarbam									101	9	19	10	0.500
LC Mecarbam	82	5	37	5	97	5	12	5	111	6	26	6	0.025
GC Mepanipyrim									98	6	15	7	0.500
LC Mepanipyrim	88	5	26	5	97	2	7	3	108	3	17	3	0.025
LC Mesotrione					93	10	25	10	*58*	2	*85*	2	0.050
LC Metaflumizone	85	6	33	7	102	10	22	11	100	4	8	4	0.025
GC Metalaxyl					88	11	34	12	97	2	8	2	0.050
LC Metalaxyl	86	5	29	6	105	5	14	5	106	6	18	6	0.025
LC Metaldehyde					91	17	40	18	*134*	14	*75*	15	0.050
GC Metamitron									89	5	25	5	0.500
LC Metamitron					90	7	25	8	117	6	36	7	0.050
GC Metazachlor	92	2	16	3	103	2	7	2	105	4	14	4	0.025
GC Metconazole	110	9	28	9	102	8	17	8	95	3	12	4	0.025
LC Metconazole	85	4	31	5	99	6	12	6	96	5	14	6	0.025
GC Methacrifos	90	10	30	11	114	10	36	11	95	7	19	8	0.025
LC Methacrifos	*69*	15	*69*	16	107	10	26	10	98	10	22	11	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Methamidophos	72	16	*66*	17	79	8	45	9	81	3	40	4	0.025
LC Methamidophos	84	12	42	13	89	6	26	7	81	10	43	10	0.025
GC Methidathion	114	10	35	10	94	*47*	*102*	*51*	101	3	7	3	0.025
GC Methiocarb					101	9	20	10	81	7	41	7	0.050
LC Methiocarb									118	16	49	17	0.500
LC Methiocarb sulfone					85	7	35	8	86	5	31	5	0.050
LC Methiocarb sulfoxide	73	5	*55*	5	100	7	16	8	93	7	20	7	0.025
LC Methomyl					115	7	34	8	102	5	12	6	0.050
GC Methoprene									117	17	*50*	18	0.500
LC Methoxyfenozide	86	8	33	9	120	16	*53*	18	108	18	41	19	0.025
GC Metobromuron					107	17	38	18	107	6	18	6	0.050
LC Metobromuron	104	6	15	6	109	7	23	7	102	6	15	7	0.025
GC Metolachlor	91	5	20	5	103	4	9	4	103	1	7	1	0.025
LC Metolachlor	89	7	26	8	100	5	11	6	106	4	16	5	0.025
LC Metosulam									82	6	37	6	0.500
LC Metrafenone					94	6	18	7	107	6	19	7	0.050
GC Metribuzin	96	18	39	19	99	14	30	15	98	2	6	2	0.025
LC Metribuzin					103	9	20	10	115	7	34	8	0.050
LC Metsulfuron-methyl					78	5	46	6	77	5	46	5	0.050
GC Mevinphos	71	15	*66*	16	94	3	13	3	93	3	15	3	0.025
LC Mevinphos	80	5	42	6	102	6	13	6	101	3	7	4	0.025
GC Molinate	95	7	18	8	103	12	28	13	104	4	12	5	0.025
LC Molinate	100	4	8	4	102	4	10	4	100	2	4	2	0.025
GC Monocrotophos									88	5	25	5	0.500
LC Monolinuron	84	5	34	6	103	7	17	8	102	3	8	3	0.025
GC Myclobutanil	94	7	20	8	96	8	19	9	98	4	9	4	0.025
LC Myclobutanil									81	14	48	15	0.500
GC Napropamide	89	6	26	7	101	4	10	5	106	3	13	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Napropamide	80	5	42	6	100	4	9	4	110	4	22	4	0.025
LC Nicosulfuron					72	5	*57*	5	89	6	26	6	0.050
LC Nitenpyram					91	15	36	16	103	7	17	8	0.050
LC Novaluron	87	8	31	9	97	7	17	8	105	5	16	6	0.025
GC Nuarimol	92	7	22	8	102	7	17	8	97	2	7	2	0.025
GC Ofurace	88	5	25	5	99	9	20	10	97	4	10	4	0.025
LC Ofurace	76	6	49	6	98	10	22	11	104	7	17	7	0.025
GC Omethoate	90	19	46	21	111	7	28	8	98	5	12	6	0.025
LC Omethoate	80	5	42	6	96	5	13	5	99	4	8	4	0.025
LC Oryzalin	102	13	29	15	99	13	29	14	99	3	7	4	0.025
GC Oxadiargyl	91	*28*	*63*	30	*123*	18	*61*	19	111	5	24	5	0.025
LC Oxadiargyl					98	9	20	9	107	15	37	17	0.050
GC Oxadixyl	82	8	40	8	98	7	15	7	100	3	6	3	0.025
LC Oxamyl	75	5	*51*	5	109	6	22	7	109	5	20	5	0.025
LC Oxasulfuron	82	8	41	9	77	4	48	5	*67*	6	*67*	7	0.025
LC Oxycarboxin	72	4	*58*	5	93	6	20	7	116	6	35	6	0.025
GC Oxyfluorfen	105	8	20	9	104	7	17	7	101	4	9	4	0.025
GC Paclobutrazol	117	12	43	13	88	12	35	13	98	3	8	3	0.025
LC Paclobutrazol	96	16	36	17	100	8	18	9	107	3	14	3	0.025
GC Paraoxon-methyl									88	8	29	8	0.500
LC Paraoxon-methyl									103	10	23	11	0.500
GC Parathion-ethyl	75	8	*53*	8	98	7	16	8	97	4	11	5	0.025
GC Parathion-methyl	106	10	25	11	92	12	31	13	94	4	14	4	0.025
GC Penconazole	84	8	36	8	99	6	13	7	99	4	9	5	0.025
LC Penconazole	87	8	31	9	101	6	13	7	104	7	17	8	0.025
GC Pencycuron	84	8	36	8	95	5	14	5	95	3	12	3	0.025
LC Pencycuron	76	2	47	3	95	4	14	5	102	5	12	5	0.025
GC Pendimethalin	109	18	43	19	94	4	15	4	92	4	18	4	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Pendimethalin	86	2	29	2	97	4	10	4	96	3	10	3	0.025
GC Penflufen	93	5	17	5	106	4	14	4	106	1	12	1	0.025
LC Penflufen	78	5	45	5	100	2	5	3	114	4	28	4	0.025
LC Penoxsulam					85	8	35	9	96	6	16	7	0.050
GC Pentachloraniline	91	15	37	16	94	5	16	5	99	2	5	2	0.025
GC Penthiopyrad	103	7	16	7	105	6	16	6	102	3	7	3	0.025
LC Penthiopyrad	75	7	*52*	8	100	5	10	5	117	6	37	7	0.025
GC Permethrin	84	11	40	12	79	11	48	12	95	3	12	4	0.025
GC Pethoxamide	*128*	6	*57*	6	119	15	50	16	100	3	7	3	0.025
LC Pethoxamide	84	7	35	7	105	7	18	7	115	6	32	6	0.025
LC Phenmedipham					120	4	42	5	110	6	24	6	0.050
GC Phenthoate	93	13	32	15	97	4	11	5	99	3	7	3	0.025
LC Phorat	81	4	39	4	94	4	15	5	110	4	23	5	0.025
GC Phorate	98	15	33	16	100	8	18	9	99	2	4	2	0.025
GC Phosalone	95	7	18	8	97	9	21	10	95	3	12	3	0.025
GC Phosmet	84	10	39	11	94	11	27	12	89	1	23	1	0.025
LC Phosmet	99	20	44	22	120	17	*55*	19	110	7	26	8	0.025
LC Phosmet oxon									111	7	26	7	0.500
GC Phosphamidon	106	18	40	19	94	7	18	7	92	9	26	10	0.025
LC Phosphamidon	85	4	31	4	103	6	14	6	92	4	19	5	0.025
LC Phoxim	82	1	36	1	97	7	17	8	104	9	22	10	0.025
GC Picolinafen	96	6	15	6	100	5	11	5	102	2	5	2	0.025
GC Picoxystrobin					102	9	21	10	104	2	8	2	0.050
LC Picoxystrobin	80	8	43	9	94	9	23	10	107	7	21	8	0.025
GC Piperonyl Butoxide	96	4	11	4	106	5	16	5	105	2	11	2	0.025
LC Piperonyl butoxide	98	6	14	7	101	5	12	6	105	3	11	3	0.025
GC Pirimicarb	112	8	29	8	115	4	31	4	100	2	4	2	0.025
LC Pirimicarb	83	5	35	5	100	2	5	3	98	3	8	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Pirimicarb desmetyl	89	8	28	9	94	3	13	3	96	1	8	1	0.025
LC Pirimicarb-desmethyl									90	10	29	11	0.500
GC Pirimiphos methyl	70	12	*65*	13	103	7	16	8	103	6	14	6	0.025
GC Pirimiphos-ethyl	87	7	29	8	98	5	12	6	100	3	6	3	0.025
LC Pirimiphos-methyl	84	2	32	2	97	5	13	6	106	8	21	9	0.025
GC Prochloraz					97	6	14	6	98	3	9	4	0.050
LC Prochloraz	77	3	46	4	101	9	19	10	98	6	14	7	0.025
GC Procymidone					101	11	23	12	103	5	11	5	0.050
GC Profenofos					93	13	30	14	94	2	12	2	0.050
LC Profoxydim	103	4	11	4	95	*22*	49	24	83	6	37	7	0.025
GC Propachlor	93	9	23	10	99	7	14	7	103	2	7	2	0.025
LC Propachlor	97	5	13	5	105	4	13	4	107	4	17	4	0.025
LC Propamocarb					99	3	6	3	88	5	25	5	0.050
GC Propanil	106	11	27	12	101	6	13	6	101	2	5	2	0.025
GC Propaquizafop	*139*	19	*88*	21	113	13	39	14	92	3	18	4	0.025
LC Propaquizafop	84	5	34	5	98	6	13	6	107	6	19	7	0.025
GC Propargite									95	5	15	5	0.500
LC Propargite	72	5	*57*	5	95	6	16	6	112	6	27	6	0.025
GC Propham	97	5	13	6	103	10	22	11	101	3	8	4	0.025
LC Propham	108	4	18	4	111	6	27	7	108	8	22	8	0.025
LC Propiconazole	88	5	26	6	100	7	15	7	102	9	20	10	0.025
GC Propiconazole	116	5	35	6	102	12	26	13	95	2	11	3	0.025
GC Propoxur	80	16	*53*	18	94	7	20	8	96	6	15	6	0.025
LC Propoxur					104	14	31	15	113	6	29	7	0.050
GC Propyzamide	87	10	34	11	97	4	11	5	99	2	5	3	0.025
LC Propyzamide					100	6	12	6	116	3	33	3	0.050
GC Proquinazid	91	4	19	4	96	6	15	6	102	3	8	3	0.025
GC Prosulfocarb									97	2	7	2	0.500

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Prosulfocarb	77	3	45	3	97	5	11	5	108	3	17	3	0.025
LC Prosulfuron					84	2	33	2	83	5	37	6	0.050
LC Prothioconazole-desthio	80	2	40	2	100	4	8	4	96	7	17	7	0.025
GC Prothiofos					87	11	36	12	92	4	18	4	0.050
GC Pyraclofos	104	14	31	15	98	13	28	14	101	3	8	4	0.025
LC Pyraclofos	77	4	48	4	96	4	12	5	109	7	24	8	0.025
GC Pyraclostrobin					114	14	42	15	91	7	23	8	0.050
LC Pyraclostrobin	80	3	40	3	98	5	12	6	103	8	18	8	0.025
GC Pyraflufen-ethyl	90	16	39	17	105	15	35	17	111	5	24	5	0.025
LC Pyraflufen-Ethyl					96	7	18	8	119	6	41	7	0.050
GC Pyrazophos	100	8	18	9	98	5	12	6	98	1	5	1	0.025
GC Pyridaben	81	8	41	9	94	6	18	7	98	3	6	3	0.025
LC Pyridaben	77	3	47	3	96	5	15	6	102	5	11	5	0.025
GC Pyridalyl	83	8	37	8	88	5	25	5	95	2	12	2	0.025
LC Pyridalyl	86	5	31	6	92	11	29	12	95	5	15	5	0.025
GC Pyridaphenthion	110	7	25	7	100	7	15	8	97	3	8	3	0.025
LC Pyridate									72	5	*57*	5	0.500
GC Pyrimethanil	87	16	43	17	96	6	16	7	100	4	9	4	0.025
LC Pyrimethanil	75	11	*55*	11	101	4	8	4	97	4	10	4	0.025
GC Pyriproxyfen	91	6	22	7	94	4	16	5	96	2	9	2	0.025
LC Pyriproxyfen	80	3	40	3	96	5	13	5	101	4	8	4	0.025
LC Pyroxsulam									72	8	*59*	8	0.500
GC Quinalphos	93	13	31	14	99	7	16	8	100	3	7	4	0.025
GC Quinoxyfen	80	2	40	2	88	6	27	6	92	2	16	2	0.025
LC Quinoxyfen	82	5	37	5	95	3	12	3	90	5	23	5	0.025
GC Quintozene	87	14	40	15	93	8	23	9	92	5	18	5	0.025
LC Rotenone	76	8	*51*	8	98	6	14	6	107	7	21	7	0.025
GC Sedaxane	98	6	13	6	104	3	11	4	105	3	12	3	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
LC Sedaxane	94	6	16	6	103	5	13	6	105	9	21	9	0.025
GC Silafluofen	84	3	33	3	88	4	25	4	98	2	5	2	0.025
GC Simazine	109	*21*	48	22	82	14	46	15	100	5	12	6	0.025
LC Simazine	82	5	37	5	103	8	18	9	114	6	30	6	0.025
LC Spinetoram I	71	8	*60*	8	87	11	36	12	108	11	29	12	0.025
LC Spinetoram II	77	13	*55*	14	85	7	33	8	95	13	30	14	0.025
LC Spinosad A	82	10	41	10	*124*	9	*52*	10	*124*	17	*60*	18	0.025
LC Spinosad D					93	14	33	15	94	12	29	13	0.050
LC Spirodiclofen	88	9	32	10	99	4	9	5	94	6	18	6	0.025
GC Spiromesifen	103	19	42	21	100	11	23	11	106	4	15	4	0.025
LC Spirotetramat	77	7	49	7	93	5	17	5	105	5	16	6	0.025
LC Spirotetramat cis-enol					120	5	41	6	*59*	4	*82*	4	0.050
LC Spirotetramat cis-keto-hydroxy	71	7	*60*	8	102	16	35	17	116	10	39	11	0.025
LC Spirotetramat enol-glucoside					76	8	*51*	8	92	8	23	8	0.050
LC Spirotetramat mono-hydroxy					104	6	15	6	*128*	10	*61*	11	0.050
LC Spiroxamine	92	6	20	7	114	8	33	9	101	6	14	7	0.025
GC Spiroxamine1	75	11	*55*	12	95	9	21	9	94	2	12	2	0.025
GC Spiroxamine2	93	11	28	12	97	11	24	12	94	3	13	3	0.025
GC Sulfotep	103	10	23	11	109	5	20	5	102	2	5	2	0.025
LC Sulfotep	74	5	*53*	5	97	5	11	5	112	5	27	6	0.025
LC Sulfoxaflor	82	5	38	5	100	6	14	7	109	6	22	6	0.025
GC Tebuconazole	89	13	36	14	94	10	25	11	96	3	10	3	0.025
LC Tebuconazole	83	2	34	2	106	7	19	8	100	8	17	9	0.025
LC Tebufenozide	74	19	*66*	21	103	15	32	16	*136*	*25*	*90*	27	0.025
GC Tebufenpyrad	86	5	30	5	94	6	18	6	97	1	7	1	0.025
LC Tebufenpyrad	84	2	31	3	98	5	11	5	95	4	12	4	0.025
GC Tecnazene	74	19	*66*	20	96	16	35	17	95	4	13	4	0.025
LC Teflubenzuron	83	7	37	8	102	8	17	8	102	2	6	2	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Tefluthrin	77	3	46	4	92	4	18	5	93	2	14	2	0.025
LC Tembotrione									76	6	49	7	0.500
GC TEPP									109	18	42	19	0.500
GC Tepraloxydim	*122*	*25*	*69*	27	108	*26*	*59*	28	79	7	44	8	0.025
LC Tepraloxydim					83	9	39	10	92	4	18	4	0.050
GC Terbuthylazine	*124*	8	*51*	9	117	6	37	7	102	3	8	3	0.025
LC Terbuthylazine	78	4	45	4	99	3	7	3	116	4	32	5	0.025
GC Tetrachlorvinphos	103	8	17	8	99	10	23	11	103	4	10	4	0.025
LC Tetrachlorvinphos					102	8	18	9	118	5	37	5	0.050
GC Tetraconazole	85	12	40	13	103	5	13	5	100	3	7	3	0.025
GC Tetradifon	75	12	*56*	13	102	10	21	10	96	3	10	3	0.025
LC Tetramethrin	72	3	*57*	3	94	6	18	6	115	4	31	5	0.025
GC Tetramethrin1					85	13	42	14	100	9	20	10	0.050
GC Tetramethrin2					110	3	21	3	101	2	5	2	0.050
GC Tetrasul	71	*34*	*94*	37	86	6	31	7	88	7	28	7	0.025
GC Thiabendazole	91	14	34	15	86	14	41	15	82	2	36	2	0.025
LC Thiabendazole					101	5	11	5	90	5	22	6	0.050
LC Thiacloprid	84	5	33	5	100	5	10	5	103	4	11	4	0.025
GC Thiamethoxam	94	14	32	15	108	11	29	12	88	6	28	7	0.025
LC Thiamethoxam	84	5	34	5	101	9	19	9	102	5	11	5	0.025
LC Thiencarbazone-methyl					95	8	21	9	100	12	26	13	0.050
LC Thifensulfuron-methyl					71	6	*60*	7	101	11	24	12	0.050
GC Thiobencarb	101	9	20	10	100	6	14	7	103	4	10	4	0.025
LC Thiobencarb	70	4	*60*	4	98	4	10	4	117	4	35	4	0.025
LC Thiodicarb	78	3	46	3	92	7	22	7	87	4	28	5	0.025
GC Thiometon					78	9	49	10	98	3	8	3	0.050
LC Thiometon					108	13	32	14	110	10	30	11	0.050
LC Thiophanate-methyl	70	7	*61*	7	80	4	41	5	85	5	32	5	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Tolclofos-methyl	80	9	44	10	96	5	13	5	98	2	5	2	0.025
LC Tolclofos-methyl	86	13	40	14	94	12	29	13	100	7	15	7	0.025
GC Tolyfluanid	71	10	*62*	11	*59*	7	*84*	7	*58*	6	*85*	6	0.025
LC Tolylfluanid									81	10	44	11	0.500
GC Tralkoxydim	109	9	27	10	110	5	23	5	90	5	23	6	0.025
LC Tralkoxydim I	79	10	48	11	101	15	32	16	102	6	14	7	0.025
LC Tralkoxydim II	112	6	27	6	97	2	7	2	85	2	30	2	0.025
GC Tralomethrin	100	10	22	11	96	12	28	13	95	2	10	2	0.025
GC Triadimefon	85	13	40	14	89	10	31	11	99	1	4	1	0.025
LC Triadimefon	84	5	34	5	104	8	19	9	100	7	15	8	0.025
GC Triadimenol									98	4	11	5	0.500
LC Triadimenol	89	6	25	6	104	3	11	4	109	5	22	6	0.025
GC Triallate	82	14	47	15	83	6	36	6	95	2	10	3	0.025
LC Triallate	87	4	27	4	94	5	16	5	100	6	13	6	0.025
LC Triasulfuron									96	12	27	13	0.500
GC Triazophos	84	9	37	9	98	9	19	9	98	2	5	2	0.025
LC Triazophos	89	2	23	2	102	5	11	5	109	5	22	6	0.025
GC Trichlorfon	74	17	*64*	18	90	7	26	8	87	6	30	6	0.025
LC Trichlorfon	88	13	38	14	98	7	15	7	109	6	23	7	0.025
GC Trichloronate	91	6	22	6	89	5	24	6	97	2	8	2	0.025
GC Tricyclazole	95	18	41	20	91	7	24	7	96	3	9	3	0.025
LC Tricyclazole	80	7	43	7	92	3	17	4	95	5	14	5	0.025
GC Trifloxystrobin	82	15	47	16	99	7	15	8	97	3	10	4	0.025
LC Trifloxystrobin	83	5	35	5	99	5	10	5	103	6	14	6	0.025
GC Triflumizole	87	17	44	18	92	6	21	7	97	4	10	4	0.025
LC Triflumizole	82	5	38	6	95	9	21	10	106	5	16	5	0.025
LC Triflumuron	85	10	37	10	98	13	29	14	111	9	29	10	0.025
GC Trifluralin	89	6	26	7	100	13	28	14	98	3	8	4	0.025

Pesticide	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	Recovery %	STD %	Expanded Uncertainty %	Combinded Uncertainty %	LOQ
	0.025 mg/kg				0.05 mg/kg				0.5 mg/kg				
GC Triflusulfuron-methyl	100	8	17	8	108	8	22	8	100	3	6	3	0.025
LC Triflusulfuron-methyl	82	6	37	6	87	3	27	4	96	5	13	5	0.025
GC Trinexapac-ethyl	*36*	7	*130*	8	*49*	5	*103*	5	*52*	3	*96*	3	0.025
GC Triticonazole					103	14	31	15	97	4	11	4	0.050
LC Triticonazole	85	5	32	6	99	6	13	6	99	5	12	6	0.025
GC Tritosulfuron	101	*24*	*51*	26	97	9	20	10	101	4	8	4	0.025
GC Valifenalate	94	8	21	9	102	7	15	7	107	4	16	5	0.025
LC Valifenalate	93	3	15	4	102	2	7	2	103	3	8	3	0.025
LC Vamidothion	71	6	*59*	6	101	6	12	6	93	9	25	10	0.025
GC Vinclozolin	86	14	40	15	101	12	25	13	101	3	7	3	0.025
GC Zoxamide					97	7	16	7	82	3	36	4	0.050
LC Zoxamide	78	4	45	5	96	8	19	9	111	9	29	10	0.025

Appendix 3: Principles of the QuEChERS method for extraction of hay

Weigh 1 g (±0.01 g) of hay flour feed into a 50 ml single use centrifuge tube (red cap). Add internal standard and/or spike standard (maximum 25 µl)

Add a ceramic homogenizer and 10 ml of cold water and shake briefly

Add 10 ml acetonitrile and shake mechanically for 1 min. (1. extraction)

Add the prepared mixture of 4 g MgSO4, 1 g NaCl, 1 g Na_3 citrate dihydrate and 0.5 g Na_2H cirate sesquihydrate. Shake for a few seconds after each addition to prevent lumps.

Shake mechanically for 1 min. (2. Extraction with phase separation)

Centrifuge for 10 min at 4500 rpm

Transfer 6 ml of the extract to a 15 ml single use centrifuge tube containing **900 mg PSA** and **900 mg $MgSO_4$**. Close the tube and shake mechanically for 30 seconds.

Centrifuge for 5 min. at 4500 rpm

Transfer the extract (ca. 3 ml) to a 15 ml single use centrifuge tube. Add 40 µl of 5% formic acid solution in acetonitrile (10 µl/ml extract). Dilute the extract 1:1 with acetonitrile

Transfer the final extract into auto sampler vials and analyse by GC and LC.