

关键词

全自动QuEChERS净化仪；GC-MS/MS；农残

介绍

使用乙腈（或酸化乙腈）提取白菜、苹果、菠菜、金针菇、大米和茶叶等基质，经盐析、离心后取上清液，再应用睿科全自动QuEChERS净化仪系统，经由m-PFC（多壁碳纳米管）柱净化，萃取多种农药及其代谢物，洗脱液直接由GC-MS/MS分析检测。

本应用文章参考《GB 23200.113-2018食品安全国家标准 植物源性食品中208种农药及其代谢物残留量的测定 气相色谱-质谱联用法》，采用m-PFC（多壁碳纳米管）柱进行萃取和净化，气相色谱-质谱联用技术检测分析，建立了多种植物源性食品基质中对多农残快速且高准确度的前处理和检测分析方法。

1. 仪器、试剂以及耗材

仪器

RayKol QS 60 全自动 QuEChERS 净化仪
 RayKol Auto Prep 200 全自动液体样品处理工作站
 RayKol Auto EVA 80 高通量全自动平行浓缩仪
 GC-MS, Agilent 8890-7000D 气相色谱-质谱联用仪

耗材

m-PFC PP 净化柱 (多壁碳纳米管) : 180mg/3mL
 m-PFC CP 净化柱 (多壁碳纳米管) : 180mg/3mL
 m-PFC HP 净化柱 (多壁碳纳米管) : 180mg/3mL
 Agilent CP9151 VF-1701MS (30 m x 250 μm x 0.25 μm)

试剂

乙腈 (HPLC 级)
 冰醋酸 (AR 级)
 109 种 A 组农药混合标准溶液, 113 种 B 组农药基质混合标准工作溶液

2. 标准曲线配制

使用 Auto Prep 200 液体样品处理工作站进行农药混合标准工作溶液的配制。将购买的 A 组农药混标 (50 μg/mL) 通过工作站的有机配液模块进行配制: 将混合标准储备液直接稀释到 1 μg/mL 中间使用液, 再进行质量浓度为 0.0 μg/L, 10.0 μg/L, 20.0 μg/L, 50.0 μg/L, 100.0 μg/L、200.0 μg/L 的系列基质混合标准工作溶液的配制。具体配制方法如图-1 所示。B 组农药混标配制方法同上。

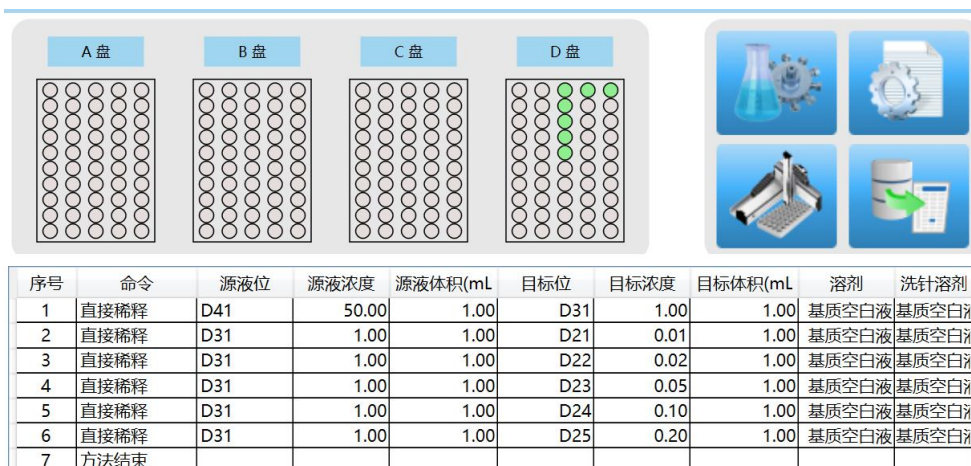


图-1 Auto Prep 200 的农药基质混合标准工作溶液配制方法

3. 样品制备

3.1 白菜、苹果、菠菜、金针菇基质

3.11 提取

称取 10 g 试样（精确至 0.01 g）于 50 mL 塑料离心管中，准确加入 10 mL 乙腈、4 g 无水硫酸镁、1 g 氯化钠、1 g 柠檬酸钠、0.5 g 柠檬酸氢二钠及 1 颗陶瓷均质子，盖上离心管盖，用 V12 振荡器以 550rpm 的速度剧烈震荡 1min，以 4200r/min 离心 5min，取上清液备用。

3.12 净化

准确移取 1 mL 上清液于 QS 60 的样品盘位中，将 PP 型号的 m-PFC 柱安装在 QS 60 的柱架上（对于颜色较深的菠菜试样，其所使用的净化柱型号为 CP），运行仪器方法（图-2），净化后的样液即可供气质联用仪检测。

3.2 大米基质

3.21 提取

称取 5 g 试样（精确至 0.01 g）于 50 mL 塑料离心管中，加 10 mL 水涡旋混匀，静置 30 min。准确加入 15 mL 乙腈：醋酸溶液（99：1）、6 g 无水硫酸镁、1.5 g 醋酸钠及 1 颗陶瓷均质子，盖上离心管盖，用 V12 振荡器以 550rpm 的速度剧烈震荡 1min，以 4200r/min 离心 5min，取上清液备用。

3.22 净化

准确移取 1 mL 上清液于 QS 60 的样品盘位中，将 HF 型号的 m-PFC 柱安装在 QS 60 的柱架上，运行仪器方法（图-2），净化后的样液即可供气质联用仪检测。

3.3 茶叶基质

3.31 提取

称取 5 g 试样（精确至 0.01 g）于 50 mL 塑料离心管中，加 10 mL 水涡旋混匀，静置 30 min。准确加入 15 mL 乙腈：醋酸溶液（99：1）、6 g 无水硫酸镁、1.5 g 醋酸钠及 1 颗陶瓷均质子，盖上离心管盖，剧烈震荡 1 min 后 4200 r/min 离心 5 min，取上层清液备用。

3.32 净化

准确移取 1 mL 上清液于 QS 60 的样品盘位中，将 CP 型号的 m-PFC 柱安装在 QS 60 的柱架上，运行仪器方法（图-2），净化后的样液即可供气质联用仪检测。

方法： 23200.113.m						
上样	样品体积	1.0	mL	吸取速度	10	mL/min
	抽取次数	1	次	补偿体积	1.0	mL
过柱	过柱速度	2	mL/min	等待时间	10	S
	氮气压力	8	Psi	持续时间	20	S
	循环次数	1	次	缓冲位	<input checked="" type="radio"/> 是 <input type="radio"/> 否	
过膜	过滤速度	10	mL/min	等待时间	5	S
	氮气压力	25	Psi	持续时间	10	S

图-2 QS 60 净化方法

4. 气质联用检测条件

样口温度 280 °C，不分流进样，隔垫吹扫流量为 3 mL/min，进样量 1.0 μL；载气为高纯氦气，恒流模式，流速为 1.0 mL/min；色谱柱升温程序：初始温度 40°C，保持 1 min；以 40 °C/min 速度升温至 120 °C；以 5 °C/min 升温至 240 °C，以 12 °C/min 升温至 300°C，保持 6 min。

电子轰击源（EI）70 eV，离子源温度 280 °C，接口（传输线）温度 280 °C，溶剂延迟 5 min；多反应监测模式检测，208 种农药及其代谢物的保留时间、定量离子对、定性离子对以及碰撞电压见附录 B。

5. 样品测试

5.1 基质标准工作曲线

选择定量离子的峰面积作为纵坐标，浓度作为横坐标，做相关曲线，曲线为线性回归，各点权重相等，拟合出工作曲线，线性相关系数 $r > 0.995$ ；此曲线两周需要重新配置一次。

5.2 基质加标回收实验

选取白菜、苹果、菠菜、金针菇、大米和茶叶六种代表性基质样品，添加高浓度样品、中浓度样品、低浓度样品用 m-PFC 净化柱法进行标回收实验。详细的实验数据见下列附录 A 各表所示。

6. 结果与讨论

6.1 加标回收实验结果

选取白菜、苹果、菠菜、金针菇、大米和茶叶六种代表性基质样品作为方法验证的基质

样品，选择高浓度（100 μg/L）、中浓度（40 μg/L）、低浓度（20 μg/L）三种浓度，用 m-PFC 净化柱法进行试验。对白菜、苹果和金针菇这类含水量大、色素低、含糖量高的简单基质样品，使用 m-PFC 净化柱的方法，加标试验回收率在 60.03%~119.98%之间，RSD 在 0.04%~18.82%；对于菠菜和茶叶这类含大量色素及干扰物质的复杂基质样品，使用 m-PFC 净化柱的方法，加标试验回收率在 61.13%~118.17%之间，RSD 在 0.13%~18.84%；对于大米这类富含淀粉且水分较低的干性基质样品，使用 m-PFC 净化柱的方法，加标试验回收率在 62.90%~118.93%之间，RSD 在 0.13%~16.05%；

具体的加标回收率及相对标准偏差结果见下表。

表 A.1 白菜 A、B 组农残加标回收率及相对标准偏差结果（n=6）

序号	检测项目	A 组加标回收率结果（上机检测浓度）					
		20 μg/L		40 μg/L		100 μg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	84.71%	5.63%	97.71%	3.68%	84.53%	0.57%
2	乙草胺	96.40%	2.37%	94.33%	8.66%	96.01%	3.24%
3	苯草醚	85.53%	2.34%	92.01%	7.33%	98.08%	0.91%
4	甲草胺	94.83%	0.42%	96.68%	8.70%	95.47%	2.44%
5	烯丙菊酯	98.41%	3.27%	70.92%	2.31%	85.17%	1.37%
6	α-六六六	104.89%	7.17%	101.93%	8.14%	102.80%	3.11%
7	α-硫丹	96.65%	3.23%	97.11%	4.91%	99.08%	1.62%
8	莎稗磷	94.69%	0.86%	92.11%	14.62%	87.55%	2.44%
9	脱乙基莠去津	93.96%	8.59%	93.68%	8.73%	91.19%	1.87%
7	β-硫丹	95.58%	1.14%	98.69%	6.11%	96.09%	2.08%
10	联苯菊酯	103.36%	2.87%	102.03%	8.81%	104.91%	2.19%
11	啶酰菌胺	92.65%	3.10%	94.08%	4.89%	94.23%	1.00%
12	除草定	101.08%	6.69%	106.32%	6.35%	104.54%	3.36%
13	溴苯烯磷	98.33%	0.79%	99.73%	3.01%	100.56%	0.99%
14	溴硫磷	95.03%	0.43%	95.83%	3.34%	97.47%	0.91%
15	溴螨酯	97.73%	5.42%	98.91%	11.12%	101.01%	3.30%
16	乙嘧酚磺酸酯	100.81%	2.67%	98.68%	11.27%	102.38%	3.39%
17	三硫磷	97.92%	2.22%	98.47%	6.78%	100.62%	1.49%
18	虫螨磷-1	95.27%	1.51%	99.09%	7.01%	100.76%	2.91%
	虫螨磷-2	97.66%	2.30%	93.79%	6.73%	98.23%	2.71%
19	环草敌	86.45%	2.15%	92.17%	3.95%	89.74%	1.60%
20	环氟菌胺	104.13%	2.78%	98.58%	5.82%	101.73%	1.53%
21	氯氰菊酯	103.41%	0.82%	103.58%	7.74%	105.87%	2.03%

22	脱叶磷	111.54%	3.24%	105.82%	9.03%	100.14%	8.65%
23	溴氰菊酯	99.29%	9.09%	112.19%	7.61%	102.45%	8.20%
24	除线磷	95.02%	1.73%	98.55%	6.74%	98.39%	2.14%
25	敌草腈	76.03%	4.40%	89.08%	9.02%	79.94%	1.15%
26	敌敌畏	80.27%	3.72%	93.17%	8.35%	83.75%	0.53%
27	氯硝胺	78.41%	5.52%	85.77%	6.94%	84.81%	3.02%
28	三氯杀螨醇	95.34%	1.75%	90.92%	5.44%	97.27%	0.97%
29	乐果	86.99%	0.70%	92.45%	7.34%	86.72%	1.16%
30	敌噁磷	60.06%	9.33%	109.10%	3.54%	98.46%	6.00%
31	灭菌磷	94.60%	5.64%	96.12%	5.41%	96.10%	4.21%
32	敌瘟磷	99.19%	1.60%	101.67%	5.32%	97.40%	1.77%
33	异狄氏剂	105.29%	4.93%	100.90%	5.70%	101.27%	1.38%
34	苯硫磷	90.70%	5.37%	93.00%	8.90%	99.70%	2.27%
35	氟环唑	97.56%	3.29%	96.91%	4.11%	97.80%	1.55%
36	乙丁烯氟灵	92.24%	3.33%	95.10%	9.65%	98.41%	3.78%
37	灭线磷	94.85%	0.04%	97.06%	4.17%	95.05%	1.35%
38	咪唑菌酮	96.75%	3.61%	96.45%	4.77%	99.61%	0.71%
39	氯苯嘧啶醇	96.74%	5.32%	98.14%	7.65%	97.47%	2.31%
40	苯硫威	96.84%	1.49%	99.49%	7.17%	98.63%	2.67%
41	丰索磷	102.25%	1.18%	102.48%	3.92%	95.67%	1.40%
42	倍硫磷	96.10%	1.30%	96.39%	7.49%	98.88%	2.20%
43	氰戊菊酯-1	97.44%	1.72%	95.40%	2.78%	98.74%	7.59%
	氰戊菊酯-2	103.92%	4.82%	94.35%	2.31%	113.72%	5.77%
44	氟酰胺	98.60%	1.70%	98.94%	5.16%	102.46%	1.81%
45	地虫硫磷	92.77%	0.57%	92.67%	4.53%	92.20%	1.55%
46	安硫磷	99.07%	7.45%	105.28%	4.75%	87.20%	10.70%
47	噻唑膦	104.45%	2.53%	108.27%	7.09%	99.68%	0.76%
48	六氯苯	71.61%	1.72%	79.66%	7.12%	76.06%	2.57%
49	环嗪酮	93.83%	4.36%	95.03%	3.09%	95.80%	1.34%
50	抑霉唑	97.24%	2.26%	94.81%	8.69%	97.35%	2.61%
51	异稻瘟净	96.54%	2.29%	97.38%	5.35%	100.14%	0.98%
52	异柳磷	97.46%	3.28%	97.30%	12.04%	101.48%	3.50%
53	甲基异柳磷	97.35%	2.29%	96.14%	8.68%	99.91%	2.39%
54	异丙威	94.59%	1.20%	92.62%	8.10%	90.26%	3.00%
55	噁唑啉	89.38%	3.93%	93.25%	5.02%	100.17%	2.09%
56	醚菌酯	97.15%	1.40%	96.88%	5.46%	100.14%	1.18%
57	啞菌胺	85.56%	1.05%	89.60%	4.43%	90.35%	1.84%
58	地胺磷	90.99%	2.16%	97.01%	3.80%	98.22%	1.62%
59	甲霜灵	96.40%	5.42%	98.85%	8.98%	95.96%	0.11%
60	虫螨畏	88.79%	1.79%	95.68%	5.78%	90.39%	1.30%
61	甲胺磷	82.18%	3.25%	94.28%	2.09%	90.39%	0.57%

62	异丙甲草胺	94.89%	1.48%	96.40%	5.33%	97.20%	1.43%
63	噻草酮	92.24%	2.74%	95.01%	3.42%	93.51%	1.50%
64	速灭磷	90.24%	2.34%	97.44%	7.87%	93.22%	1.92%
65	禾草敌	83.82%	3.99%	94.06%	3.53%	88.78%	0.97%
66	久效磷	74.95%	1.60%	85.20%	6.85%	74.98%	1.46%
67	2,4'-滴滴滴	105.74%	3.57%	96.56%	5.18%	101.35%	1.38%
67	2,4'-滴滴涕	100.04%	2.08%	99.54%	5.96%	100.59%	1.36%
68	噁草酮	98.29%	0.68%	98.37%	5.23%	100.09%	1.38%
69	乙氧氟草醚	100.53%	3.91%	96.53%	5.07%	104.11%	2.46%
67	4,4'-滴滴滴	95.73%	2.39%	96.88%	5.68%	100.42%	1.28%
67	4,4'-滴滴伊	100.53%	2.37%	100.84%	5.21%	102.82%	1.52%
70	对氧磷	105.04%	4.49%	105.01%	6.51%	103.10%	2.05%
71	甲基对氧磷	94.48%	5.19%	96.92%	6.76%	87.50%	2.34%
72	对硫磷	87.98%	3.09%	95.05%	5.40%	101.84%	1.26%
73	戊菌唑	96.62%	1.90%	97.76%	9.70%	97.74%	1.68%
74	氯菊酯	99.74%	7.56%	96.34%	4.59%	100.64%	0.85%
75	甲拌磷砒	97.03%	2.63%	97.16%	4.84%	97.07%	1.45%
75	甲拌磷亚砒	94.36%	8.05%	113.64%	4.20%	97.82%	2.13%
76	增效醚	97.84%	4.15%	97.13%	10.73%	101.57%	3.53%
77	哌草磷	95.20%	3.87%	95.08%	6.19%	99.83%	1.12%
78	抗蚜威	95.61%	3.41%	95.94%	6.86%	94.49%	1.96%
79	甲基嘧啶磷	93.64%	3.12%	95.32%	10.61%	96.64%	3.22%
80	丙草胺	98.97%	1.21%	96.33%	5.45%	95.95%	1.60%
81	环丙氟灵	90.72%	1.45%	88.05%	3.63%	98.17%	2.96%
82	扑灭津	97.04%	1.75%	95.60%	4.17%	95.77%	1.23%
83	胺丙畏	93.43%	1.48%	96.17%	7.69%	98.22%	2.35%
84	残杀威	104.12%	3.38%	116.06%	5.76%	103.40%	1.76%
85	吡菌磷	94.15%	2.35%	96.99%	7.22%	98.41%	1.50%
86	哒螨灵	99.18%	3.05%	99.64%	7.27%	103.07%	1.74%
87	吡丙醚	100.24%	3.89%	96.20%	7.25%	99.16%	1.90%
88	啶硫磷	99.44%	7.06%	96.38%	8.66%	97.80%	3.13%
89	啶氧灵	83.90%	2.01%	85.47%	8.81%	86.73%	1.96%
90	治螟磷	95.67%	3.63%	95.86%	8.92%	96.08%	3.47%
91	戊唑醇	96.15%	1.77%	98.70%	2.71%	99.39%	0.88%
92	吡螨胺	99.91%	1.67%	98.39%	6.20%	99.03%	2.12%
93	丁基嘧啶磷	95.78%	0.47%	98.20%	5.31%	96.49%	1.48%
94	特丁硫磷	93.81%	0.93%	94.95%	9.25%	96.16%	3.44%
94	特丁硫磷砒	97.08%	4.72%	97.45%	13.23%	99.00%	5.31%
95	三氯杀螨砒	100.58%	4.48%	100.23%	4.29%	100.88%	0.77%
96	胺菊酯 1	99.15%	3.42%	100.50%	8.26%	102.56%	2.66%
	胺菊酯 2	89.07%	4.16%	89.05%	7.23%	100.73%	4.72%

97	禾草丹	99.16%	1.80%	98.79%	5.04%	97.41%	1.78%
98	三唑酮	97.25%	4.64%	97.29%	9.19%	96.58%	1.74%
99	三唑醇	93.46%	2.59%	98.21%	12.70%	95.90%	1.95%
100	野麦畏	92.50%	1.18%	96.77%	7.77%	95.31%	3.82%
101	三唑磷	98.25%	2.55%	97.64%	10.66%	98.38%	3.12%
102	肟菌酯	94.02%	6.42%	95.99%	11.90%	99.60%	2.99%
103	乙炔菌核利	101.12%	8.67%	99.68%	10.20%	98.14%	1.67%

表 A.2 苹果 A、B 组农残加标回收率及相对标准偏差结果 (n=6)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	92.60%	3.87%	85.16%	3.20%	89.51%	2.00%
2	乙草胺	95.85%	0.61%	96.04%	1.92%	86.88%	0.64%
3	苯草醚	76.64%	1.87%	72.82%	2.05%	92.34%	1.09%
4	甲草胺	97.77%	0.82%	96.88%	1.22%	88.30%	1.00%
5	烯丙菊酯	104.22%	1.73%	98.55%	3.17%	90.76%	1.84%
6	α-六六六	93.77%	4.70%	97.70%	6.03%	90.19%	3.67%
7	α-硫丹	94.70%	1.74%	95.97%	2.39%	89.11%	1.30%
8	莎稗磷	111.78%	2.70%	111.40%	1.08%	93.46%	1.39%
9	脱乙基莠去津	92.88%	3.95%	88.40%	1.50%	87.20%	1.96%
7	β-硫丹	94.96%	0.94%	94.20%	1.50%	84.26%	1.59%
10	联苯菊酯	99.39%	2.56%	97.97%	4.07%	90.66%	1.60%
11	啶酰菌胺	87.11%	3.22%	82.24%	2.88%	88.17%	1.74%
12	除草定	88.58%	5.41%	82.74%	2.96%	81.20%	0.78%
13	溴苯烯磷	89.97%	0.14%	89.33%	3.57%	81.74%	0.71%
14	溴硫磷	92.42%	1.40%	92.21%	1.70%	93.83%	1.30%
15	溴螨酯	98.18%	0.90%	93.54%	2.16%	101.40%	0.86%
16	乙嘧啶磺酸酯	102.38%	1.34%	97.31%	1.75%	94.50%	0.85%
17	三硫磷	89.56%	4.70%	89.00%	3.28%	89.58%	1.79%
18	虫螨磷 1	96.28%	6.65%	95.22%	5.22%	90.87%	3.18%
	虫螨磷 2	92.25%	1.91%	94.42%	2.80%	85.75%	0.94%
19	环草敌	86.67%	1.84%	88.90%	1.67%	93.05%	1.84%
20	环氟菌胺	102.19%	0.92%	101.01%	2.85%	91.72%	1.58%
21	氟氰菊酯	103.12%	1.35%	99.89%	2.62%	80.49%	2.41%
22	脱叶磷	102.28%	3.47%	92.18%	2.30%	87.28%	0.64%
23	溴氰菊酯	118.76%	2.56%	110.05%	3.47%	75.88%	1.35%
24	除线磷	93.89%	1.93%	94.96%	2.37%	72.60%	1.74%
25	敌草腈	77.84%	7.18%	81.14%	3.26%	91.49%	4.26%

26	敌敌畏	79.18%	8.17%	81.92%	4.00%	88.12%	2.44%
27	氯硝胺	69.52%	0.09%	66.35%	3.28%	92.58%	1.06%
28	三氯杀螨醇	86.60%	1.36%	84.73%	2.62%	91.36%	0.54%
29	乐果	86.02%	4.63%	83.16%	1.77%	90.76%	1.60%
30	敌噁磷	101.77%	6.93%	84.08%	6.23%	89.29%	2.46%
31	灭菌磷	91.36%	3.81%	89.29%	0.41%	93.58%	4.77%
32	敌瘟磷	94.74%	0.67%	92.79%	2.26%	89.36%	1.06%
33	异狄氏剂	90.75%	0.62%	93.69%	0.62%	86.78%	0.44%
34	苯硫磷	86.88%	2.76%	84.29%	2.42%	90.25%	0.39%
35	氟环唑	90.10%	2.19%	88.89%	4.48%	79.28%	1.49%
36	乙丁烯氟灵	88.89%	1.02%	88.41%	2.43%	90.44%	1.52%
37	灭线磷	90.92%	1.00%	91.02%	1.29%	86.22%	1.63%
38	咪唑菌酮	95.31%	3.66%	96.98%	2.92%	95.06%	1.18%
39	氯苯嘧啶醇	96.19%	4.49%	94.72%	5.33%	95.39%	1.79%
40	苯硫威	89.11%	1.07%	85.23%	4.16%	80.60%	1.44%
41	丰索磷	108.10%	4.06%	102.24%	3.28%	87.30%	0.73%
42	倍硫磷	99.46%	3.07%	94.86%	5.24%	117.10%	5.10%
43	氰戊菊酯 1	91.32%	8.43%	88.51%	2.14%	85.95%	0.19%
	氰戊菊酯 2	97.11%	6.43%	94.64%	0.30%	84.90%	2.88%
44	氟酰胺	119.98%	5.53%	102.84%	3.36%	88.51%	0.89%
45	地虫硫磷	89.07%	1.18%	89.30%	1.98%	90.98%	1.50%
46	安硫磷	92.78%	8.03%	100.62%	5.29%	89.28%	0.70%
47	噻唑磷	105.01%	4.26%	94.03%	2.53%	89.01%	1.54%
48	六氯苯	69.53%	2.46%	72.86%	3.99%	93.07%	3.46%
49	环嗪酮	96.34%	4.77%	93.41%	2.71%	90.72%	0.95%
50	抑霉唑	78.08%	1.41%	77.29%	1.03%	90.43%	0.41%
51	异稻瘟净	86.58%	1.35%	86.67%	1.97%	90.78%	1.15%
52	异柳磷	92.48%	0.67%	89.24%	1.49%	77.66%	0.28%
53	甲基异柳磷	92.90%	1.32%	91.11%	2.22%	74.84%	0.96%
54	异丙威	90.41%	0.60%	95.19%	2.73%	79.24%	1.77%
55	噁唑啉	81.45%	4.40%	77.06%	4.10%	74.01%	0.77%
56	醚菌酯	93.75%	2.53%	91.18%	2.94%	93.20%	0.37%
57	啞菌胺	77.72%	1.09%	72.70%	3.48%	97.86%	1.12%
58	地胺磷	83.88%	3.86%	81.81%	3.05%	82.68%	1.10%
59	甲霜灵	96.15%	2.44%	91.59%	2.85%	84.50%	0.84%
60	虫螨畏	87.31%	4.23%	90.77%	2.78%	79.30%	3.32%
61	甲胺磷	72.12%	4.91%	70.05%	3.11%	90.39%	1.82%
62	异丙甲草胺	92.67%	0.81%	91.56%	2.06%	90.10%	1.09%
63	噻草酮	86.38%	2.59%	87.58%	1.36%	93.20%	0.92%
64	速灭磷	87.43%	3.57%	88.04%	2.03%	91.74%	2.76%

65	禾草敌	85.75%	3.51%	89.30%	2.59%	88.50%	2.11%
66	久效磷	98.33%	8.95%	90.83%	2.92%	88.01%	2.13%
67	2,4'-滴滴滴	103.06%	1.62%	99.52%	2.44%	90.21%	2.10%
67	2,4'-滴滴涕	97.16%	0.95%	94.72%	2.93%	89.95%	0.73%
68	噁草酮	95.52%	1.34%	95.17%	3.73%	88.48%	0.91%
69	乙氧氟草醚	81.42%	1.54%	80.83%	5.57%	90.57%	1.58%
67	4,4'-滴滴滴	87.92%	0.51%	90.25%	3.02%	89.93%	0.29%
67	4,4'-滴滴伊	92.63%	0.88%	93.05%	2.64%	89.02%	0.92%
70	对氧磷	71.67%	1.59%	76.54%	6.75%	88.13%	0.34%
71	甲基对氧磷	85.04%	3.86%	79.97%	2.49%	84.40%	0.67%
72	对硫磷	81.07%	5.00%	78.55%	2.33%	89.40%	4.12%
73	戊菌唑	94.53%	2.43%	90.63%	3.21%	88.04%	1.02%
74	氯菊酯	98.32%	2.51%	93.99%	6.20%	85.22%	7.69%
75	甲拌磷砒	96.61%	2.21%	90.45%	1.77%	89.79%	0.51%
75	甲拌磷亚砒	92.67%	5.59%	80.40%	5.52%	90.14%	4.73%
76	增效醚	90.81%	1.50%	90.98%	2.83%	96.89%	1.02%
77	哌草磷	92.16%	4.05%	92.93%	2.74%	89.20%	0.26%
78	抗蚜威	96.70%	2.70%	92.68%	3.33%	108.99%	2.53%
79	甲基嘧啶磷	91.19%	1.54%	93.90%	2.12%	85.30%	0.94%
80	丙草胺	97.74%	0.27%	95.58%	3.78%	89.12%	0.71%
81	环丙氟灵	87.99%	3.25%	87.01%	3.40%	80.66%	1.90%
82	扑灭津	97.27%	1.30%	93.21%	2.33%	85.24%	0.92%
83	胺丙畏	90.64%	0.46%	89.27%	1.89%	97.72%	0.99%
84	残杀威	98.15%	4.53%	94.16%	4.18%	89.39%	3.49%
85	吡菌磷	94.48%	4.84%	93.54%	2.96%	84.36%	2.13%
86	哒螨灵	93.54%	2.56%	92.96%	3.66%	91.73%	1.47%
87	吡丙醚	93.63%	0.63%	91.94%	5.65%	93.19%	1.27%
88	啶硫磷	90.16%	1.77%	88.41%	5.31%	91.71%	2.28%
89	啶氧灵	80.85%	2.40%	77.59%	4.81%	94.62%	1.31%
90	治螟磷	93.62%	0.71%	92.04%	3.53%	94.46%	4.35%
91	戊唑醇	91.55%	3.01%	93.56%	1.50%	67.76%	1.92%
92	吡螨胺	97.21%	1.44%	96.08%	2.35%	88.89%	2.81%
93	丁基嘧啶磷	95.25%	1.01%	94.00%	3.11%	86.90%	1.52%
94	特丁硫磷	93.75%	5.06%	94.05%	7.83%	67.05%	4.06%
94	特丁硫磷砒	90.85%	6.74%	90.37%	1.64%	87.65%	1.59%
95	三氯杀螨砒	111.25%	1.96%	105.12%	3.62%	84.60%	1.33%
96	胺菊酯 1	104.40%	2.93%	98.88%	4.98%	82.79%	2.15%
	胺菊酯 2	92.90%	0.88%	92.72%	1.95%	83.20%	0.87%
97	禾草丹	91.43%	0.17%	89.22%	3.27%	88.70%	1.28%
98	三唑酮	90.14%	1.92%	93.65%	2.87%	74.52%	1.95%

99	三唑醇	112.32%	2.34%	98.19%	2.02%	88.57%	0.92%
100	野麦畏	93.46%	1.35%	93.55%	2.50%	69.18%	1.00%
101	三唑磷	93.19%	1.84%	91.83%	2.16%	94.44%	0.72%
102	肟菌酯	89.53%	1.52%	88.56%	2.69%	86.43%	1.08%
103	乙烯菌核利	97.50%	1.23%	95.86%	3.20%	86.06%	0.60%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
104	氟丙菊酯	118.13%	3.28%	106.29%	4.85%	96.74%	2.78%
105	艾氏剂	82.73%	2.37%	90.55%	6.03%	81.62%	3.33%
106	莠灭净	81.87%	0.94%	86.78%	3.26%	81.61%	2.61%
107	阿特拉通	79.36%	11.85%	88.32%	9.81%	80.47%	4.12%
108	莠去津	84.09%	3.70%	91.14%	9.96%	82.87%	2.20%
109	益棉磷	84.19%	4.09%	88.43%	4.18%	82.51%	3.58%
110	氟丁酰草胺	83.30%	2.26%	90.01%	3.86%	83.28%	4.32%
111	苯霜灵	87.30%	1.64%	92.65%	2.16%	85.42%	1.62%
112	乙丁氟灵	76.78%	2.89%	80.07%	1.85%	76.95%	1.01%
6	β-六六六	84.14%	9.34%	93.03%	1.48%	86.47%	2.50%
113	甲羧除草醚	91.80%	2.71%	91.54%	3.11%	84.31%	2.22%
114	联苯	99.67%	2.41%	89.58%	2.55%	60.90%	2.51%
115	乙基溴硫磷	82.63%	2.82%	86.05%	2.01%	81.50%	2.22%
116	丁草胺	82.65%	3.58%	91.54%	1.44%	84.46%	3.12%
117	抑草磷	68.26%	2.41%	73.83%	2.14%	70.35%	1.52%
118	克百威	83.36%	3.82%	93.63%	5.24%	80.22%	2.49%
119	氯丹-反式	86.07%	11.55%	93.36%	2.11%	86.83%	2.02%
120	杀螨酯	81.74%	4.00%	89.83%	5.51%	82.62%	3.64%
121	毒虫畏	81.05%	3.24%	88.16%	4.67%	81.87%	3.53%
122	乙酯杀螨醇	81.84%	3.44%	89.84%	3.44%	83.26%	2.65%
123	氯苯甲醚	82.85%	1.44%	89.58%	2.29%	76.85%	1.24%
124	氯苯胺灵	96.94%	5.06%	104.74%	5.66%	92.03%	1.35%
125	毒死蜱	86.40%	3.94%	90.90%	4.29%	76.33%	3.60%
126	甲基毒死蜱	82.90%	4.30%	89.47%	2.08%	82.45%	7.32%
127	异噁草酮	81.04%	3.12%	87.79%	2.62%	81.53%	1.89%
128	蝇毒磷	85.28%	0.65%	97.94%	4.19%	86.60%	2.68%
129	氟氯氰菊酯	91.03%	2.53%	97.60%	2.09%	89.50%	1.80%
130	环丙唑醇	80.67%	2.48%	86.59%	4.94%	81.49%	9.72%
131	噻菌环胺	77.93%	4.14%	83.16%	4.87%	76.38%	3.38%
6	δ-六六六	81.90%	5.76%	88.78%	3.57%	81.95%	3.85%
132	敌草净	86.90%	4.28%	92.34%	4.17%	85.74%	2.38%
133	二嗪磷	84.69%	2.37%	91.48%	1.47%	83.40%	1.90%

134	禾草灵	85.05%	3.71%	92.46%	2.19%	85.51%	1.87%
135	百治磷	85.42%	3.12%	92.34%	5.74%	85.78%	3.19%
136	狄氏剂	87.42%	2.70%	95.42%	2.72%	84.11%	2.48%
137	苯醚甲环唑	81.78%	2.41%	87.68%	4.40%	81.01%	2.97%
138	烯唑醇	77.22%	1.11%	86.31%	4.92%	78.72%	1.23%
139	二苯胺	81.01%	3.27%	85.95%	6.22%	76.78%	4.32%
140	异丙净	78.41%	2.77%	83.01%	1.85%	78.90%	1.84%
141	硫草敌	72.85%	1.40%	85.15%	5.95%	65.45%	3.89%
142	乙硫磷	76.71%	2.77%	84.18%	2.36%	79.17%	0.98%
143	乙氧呋草黄	83.88%	7.06%	90.51%	4.87%	85.31%	1.99%
144	乙螨唑	83.96%	2.34%	93.21%	3.97%	84.87%	1.55%
145	土菌灵	71.59%	3.01%	77.89%	2.39%	64.85%	1.19%
146	乙嘧硫磷	79.70%	4.61%	87.46%	5.52%	81.13%	7.17%
147	伐灭磷	106.21%	2.53%	116.14%	3.55%	110.40%	1.03%
148	腈苯唑	82.73%	1.90%	91.70%	3.58%	82.98%	2.64%
149	杀螟硫磷	63.85%	8.71%	73.03%	5.50%	70.50%	3.43%
150	仲丁威	81.82%	2.05%	89.43%	6.10%	81.51%	3.45%
151	甲氰菊酯	81.41%	7.32%	91.69%	6.14%	85.90%	6.96%
42	倍硫磷砒	109.83%	3.89%	119.26%	5.42%	114.37%	4.60%
42	倍硫磷亚砒	104.64%	2.35%	112.17%	2.62%	104.57%	1.44%
152	氟虫腈	75.14%	1.71%	87.17%	7.16%	78.74%	2.99%
153	吡氟禾草灵	82.40%	1.20%	87.84%	2.97%	83.74%	1.33%
154	氟氰戊菊酯-1	90.56%	3.17%	98.27%	4.24%	78.21%	1.48%
	氟氰戊菊酯-2	90.63%	5.53%	96.84%	6.75%	79.89%	1.78%
155	咯菌腈	80.59%	2.60%	84.53%	2.38%	78.61%	1.80%
156	三氟硝草醚	71.95%	1.79%	75.80%	2.61%	72.73%	1.28%
157	氟啶唑	89.74%	3.40%	98.02%	11.99%	88.99%	3.54%
158	氟胺氰菊酯	104.45%	1.97%	109.53%	4.24%	96.85%	3.22%
6	γ -六六六	87.51%	5.14%	94.25%	2.54%	86.36%	1.19%
159	己唑醇	82.03%	3.12%	90.50%	5.77%	83.12%	3.43%
160	异菌脲	94.08%	3.17%	105.26%	4.15%	88.78%	2.37%
161	氯唑磷	84.29%	9.16%	89.72%	4.13%	83.23%	4.72%
162	水胺硫磷	76.36%	3.57%	81.54%	2.78%	74.86%	0.70%
163	氧异柳磷	68.85%	4.22%	78.53%	3.59%	72.94%	1.86%
164	稻瘟灵	90.40%	5.09%	94.46%	2.52%	89.75%	2.80%
165	高效氯氟氰菊酯-1	69.43%	3.34%	61.44%	4.74%	62.43%	2.71%
	高效氯氟氰菊酯-2	97.11%	2.22%	106.84%	2.41%	104.63%	0.68%
166	溴苯腈	82.49%	5.20%	88.86%	1.60%	82.80%	1.79%
167	马拉氧磷	73.81%	4.00%	89.30%	6.90%	77.50%	3.20%

168	马拉硫磷	74.82%	2.50%	83.88%	6.07%	77.87%	5.15%
169	苯噻酰草胺	76.03%	9.89%	83.06%	3.82%	75.30%	4.20%
170	杀扑磷	83.74%	2.13%	89.30%	3.69%	83.16%	1.59%
171	烯虫酯	74.15%	2.64%	80.79%	1.93%	72.37%	1.64%
172	甲氧滴滴涕	100.99%	2.76%	85.10%	6.15%	82.94%	1.20%
173	绿谷隆	69.66%	4.51%	77.03%	2.28%	72.08%	2.02%
174	腈菌唑	82.12%	3.27%	90.14%	3.67%	82.69%	3.07%
175	二溴磷	101.28%	0.54%	107.44%	2.15%	92.12%	1.11%
176	敌草胺	86.37%	2.39%	91.43%	3.32%	83.37%	2.89%
177	除草醚	67.71%	3.95%	73.27%	2.35%	69.28%	1.56%
67	2,4'-滴滴伊	84.37%	2.76%	90.94%	3.33%	85.34%	2.14%
178	氧乐果	87.56%	2.63%	109.11%	3.32%	95.12%	3.57%
179	噁霜灵	100.20%	4.01%	102.17%	3.17%	88.78%	2.57%
67	4,4'-滴滴涕	72.66%	8.54%	79.02%	5.29%	80.28%	3.21%
180	多效唑	78.05%	5.30%	83.98%	3.02%	79.06%	0.80%
181	甲基对硫磷	67.62%	3.88%	74.05%	2.55%	67.73%	1.32%
182	二甲戊灵	71.98%	11.96%	74.72%	3.73%	70.96%	2.62%
183	五氯苯胺	67.87%	10.33%	74.04%	2.22%	63.48%	1.17%
184	五氯硝基苯	75.82%	7.46%	81.74%	2.47%	74.02%	1.85%
75	甲拌磷	101.36%	3.88%	118.98%	2.27%	95.49%	1.25%
185	伏杀硫磷	83.14%	3.30%	90.51%	5.66%	84.40%	2.32%
186	硫环磷	74.89%	5.92%	79.99%	3.64%	73.69%	1.57%
187	亚胺硫磷	101.29%	1.98%	112.42%	2.71%	106.37%	1.98%
188	磷胺	88.42%	4.50%	100.15%	3.25%	89.19%	2.99%
189	噻啉磷	72.16%	6.55%	84.49%	10.73%	79.82%	4.40%
190	腐霉利	90.51%	5.48%	94.09%	2.38%	86.19%	2.93%
191	丙溴磷	85.91%	7.03%	96.52%	3.83%	86.66%	2.98%
192	扑草净	82.47%	2.81%	90.80%	3.82%	83.97%	3.00%
193	炔苯酰草胺	80.26%	4.71%	88.63%	10.54%	82.73%	7.59%
194	敌稗	77.44%	4.06%	81.63%	4.05%	75.80%	5.98%
195	丙环唑	106.51%	3.08%	95.68%	1.97%	88.03%	1.93%
196	丙硫磷	75.97%	6.67%	83.75%	9.77%	79.46%	1.59%
197	哒嗪硫磷	89.65%	4.29%	100.90%	2.33%	91.38%	1.28%
198	嘧霉胺	70.01%	3.88%	78.10%	3.14%	68.06%	2.15%
199	皮蝇磷	82.13%	1.17%	92.60%	2.77%	83.90%	1.76%
200	西玛津	81.34%	3.72%	87.09%	3.97%	79.57%	4.16%
201	四氯硝基苯	76.12%	5.19%	83.41%	5.74%	72.54%	1.24%
202	特丁津	86.55%	5.39%	92.27%	6.34%	84.74%	2.52%
203	特丁净	79.35%	2.97%	87.00%	4.53%	79.51%	2.02%
204	杀虫畏	86.79%	7.06%	96.90%	2.40%	88.01%	1.66%
205	四氟醚唑	83.47%	5.15%	91.16%	3.69%	84.04%	2.20%

206	虫线磷	77.75%	1.51%	83.91%	3.96%	74.35%	2.36%
207	甲基立枯磷	81.95%	3.33%	89.62%	8.18%	82.70%	9.10%
208	毒壤磷	80.21%	3.04%	86.36%	2.49%	80.25%	1.91%

表 A.2 苹果 A、B 组农残加标回收率及相对标准偏差结果 (n=6)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	92.60%	3.87%	85.16%	3.20%	89.51%	2.00%
2	乙草胺	95.85%	0.61%	96.04%	1.92%	86.88%	0.64%
3	苯草醚	76.64%	1.87%	72.82%	2.05%	92.34%	1.09%
4	甲草胺	97.77%	0.82%	96.88%	1.22%	88.30%	1.00%
5	烯丙菊酯	104.22%	1.73%	98.55%	3.17%	90.76%	1.84%
6	α-六六六	93.77%	4.70%	97.70%	6.03%	90.19%	3.67%
7	α-硫丹	94.70%	1.74%	95.97%	2.39%	89.11%	1.30%
8	莎稗磷	111.78%	2.70%	111.40%	1.08%	93.46%	1.39%
9	脱乙基莠去津	92.88%	3.95%	88.40%	1.50%	87.20%	1.96%
7	β-硫丹	94.96%	0.94%	94.20%	1.50%	84.26%	1.59%
10	联苯菊酯	99.39%	2.56%	97.97%	4.07%	90.66%	1.60%
11	啶酰菌胺	87.11%	3.22%	82.24%	2.88%	88.17%	1.74%
12	除草定	88.58%	5.41%	82.74%	2.96%	81.20%	0.78%
13	溴苯烯磷	89.97%	0.14%	89.33%	3.57%	81.74%	0.71%
14	溴硫磷	92.42%	1.40%	92.21%	1.70%	93.83%	1.30%
15	溴螨酯	98.18%	0.90%	93.54%	2.16%	101.40%	0.86%
16	乙嘧啶磺酸酯	102.38%	1.34%	97.31%	1.75%	94.50%	0.85%
17	三硫磷	89.56%	4.70%	89.00%	3.28%	89.58%	1.79%
18	虫螨磷 1	96.28%	6.65%	95.22%	5.22%	90.87%	3.18%
	虫螨磷 2	92.25%	1.91%	94.42%	2.80%	85.75%	0.94%
19	环草敌	86.67%	1.84%	88.90%	1.67%	93.05%	1.84%
20	环氟菌胺	102.19%	0.92%	101.01%	2.85%	91.72%	1.58%
21	氯氰菊酯	103.12%	1.35%	99.89%	2.62%	80.49%	2.41%
22	脱叶磷	102.28%	3.47%	92.18%	2.30%	87.28%	0.64%
23	溴氰菊酯	118.76%	2.56%	110.05%	3.47%	75.88%	1.35%
24	除线磷	93.89%	1.93%	94.96%	2.37%	72.60%	1.74%
25	敌草腈	77.84%	7.18%	81.14%	3.26%	91.49%	4.26%
26	敌敌畏	79.18%	8.17%	81.92%	4.00%	88.12%	2.44%
27	氯硝胺	69.52%	0.09%	66.35%	3.28%	92.58%	1.06%
28	三氯杀螨醇	86.60%	1.36%	84.73%	2.62%	91.36%	0.54%
29	乐果	86.02%	4.63%	83.16%	1.77%	90.76%	1.60%

30	敌噁磷	101.77%	6.93%	84.08%	6.23%	89.29%	2.46%
31	灭菌磷	91.36%	3.81%	89.29%	0.41%	93.58%	4.77%
32	敌瘟磷	94.74%	0.67%	92.79%	2.26%	89.36%	1.06%
33	异狄氏剂	90.75%	0.62%	93.69%	0.62%	86.78%	0.44%
34	苯硫磷	86.88%	2.76%	84.29%	2.42%	90.25%	0.39%
35	氟环唑	90.10%	2.19%	88.89%	4.48%	79.28%	1.49%
36	乙丁烯氟灵	88.89%	1.02%	88.41%	2.43%	90.44%	1.52%
37	灭线磷	90.92%	1.00%	91.02%	1.29%	86.22%	1.63%
38	咪唑菌酮	95.31%	3.66%	96.98%	2.92%	95.06%	1.18%
39	氯苯嘧啶醇	96.19%	4.49%	94.72%	5.33%	95.39%	1.79%
40	苯硫威	89.11%	1.07%	85.23%	4.16%	80.60%	1.44%
41	丰索磷	108.10%	4.06%	102.24%	3.28%	87.30%	0.73%
42	倍硫磷	99.46%	3.07%	94.86%	5.24%	117.10%	5.10%
43	氰戊菊酯 1	91.32%	8.43%	88.51%	2.14%	85.95%	0.19%
	氰戊菊酯 2	97.11%	6.43%	94.64%	0.30%	84.90%	2.88%
44	氟酰胺	119.98%	5.53%	102.84%	3.36%	88.51%	0.89%
45	地虫硫磷	89.07%	1.18%	89.30%	1.98%	90.98%	1.50%
46	安硫磷	92.78%	8.03%	100.62%	5.29%	89.28%	0.70%
47	噻唑磷	105.01%	4.26%	94.03%	2.53%	89.01%	1.54%
48	六氯苯	69.53%	2.46%	72.86%	3.99%	93.07%	3.46%
49	环嗪酮	96.34%	4.77%	93.41%	2.71%	90.72%	0.95%
50	抑霉唑	78.08%	1.41%	77.29%	1.03%	90.43%	0.41%
51	异稻瘟净	86.58%	1.35%	86.67%	1.97%	90.78%	1.15%
52	异柳磷	92.48%	0.67%	89.24%	1.49%	77.66%	0.28%
53	甲基异柳磷	92.90%	1.32%	91.11%	2.22%	74.84%	0.96%
54	异丙威	90.41%	0.60%	95.19%	2.73%	79.24%	1.77%
55	噁唑啉	81.45%	4.40%	77.06%	4.10%	74.01%	0.77%
56	醚菌酯	93.75%	2.53%	91.18%	2.94%	93.20%	0.37%
57	嘧菌胺	77.72%	1.09%	72.70%	3.48%	97.86%	1.12%
58	地胺磷	83.88%	3.86%	81.81%	3.05%	82.68%	1.10%
59	甲霜灵	96.15%	2.44%	91.59%	2.85%	84.50%	0.84%
60	虫螨畏	87.31%	4.23%	90.77%	2.78%	79.30%	3.32%
61	甲胺磷	72.12%	4.91%	70.05%	3.11%	90.39%	1.82%
62	异丙甲草胺	92.67%	0.81%	91.56%	2.06%	90.10%	1.09%
63	嗪草酮	86.38%	2.59%	87.58%	1.36%	93.20%	0.92%
64	速灭磷	87.43%	3.57%	88.04%	2.03%	91.74%	2.76%
65	禾草敌	85.75%	3.51%	89.30%	2.59%	88.50%	2.11%
66	久效磷	98.33%	8.95%	90.83%	2.92%	88.01%	2.13%
67	2,4'-滴滴涕	103.06%	1.62%	99.52%	2.44%	90.21%	2.10%
67	2,4'-滴滴涕	97.16%	0.95%	94.72%	2.93%	89.95%	0.73%

68	噁草酮	95.52%	1.34%	95.17%	3.73%	88.48%	0.91%
69	乙氧氟草醚	81.42%	1.54%	80.83%	5.57%	90.57%	1.58%
67	4,4'-滴滴滴	87.92%	0.51%	90.25%	3.02%	89.93%	0.29%
67	4,4'-滴滴伊	92.63%	0.88%	93.05%	2.64%	89.02%	0.92%
70	对氧磷	71.67%	1.59%	76.54%	6.75%	88.13%	0.34%
71	甲基对氧磷	85.04%	3.86%	79.97%	2.49%	84.40%	0.67%
72	对硫磷	81.07%	5.00%	78.55%	2.33%	89.40%	4.12%
73	戊菌唑	94.53%	2.43%	90.63%	3.21%	88.04%	1.02%
74	氯菊酯	98.32%	2.51%	93.99%	6.20%	85.22%	7.69%
75	甲拌磷砒	96.61%	2.21%	90.45%	1.77%	89.79%	0.51%
75	甲拌磷亚砒	92.67%	5.59%	80.40%	5.52%	90.14%	4.73%
76	增效醚	90.81%	1.50%	90.98%	2.83%	96.89%	1.02%
77	哌草磷	92.16%	4.05%	92.93%	2.74%	89.20%	0.26%
78	抗蚜威	96.70%	2.70%	92.68%	3.33%	108.99%	2.53%
79	甲基嘧啶磷	91.19%	1.54%	93.90%	2.12%	85.30%	0.94%
80	丙草胺	97.74%	0.27%	95.58%	3.78%	89.12%	0.71%
81	环丙氟灵	87.99%	3.25%	87.01%	3.40%	80.66%	1.90%
82	扑灭津	97.27%	1.30%	93.21%	2.33%	85.24%	0.92%
83	胺丙畏	90.64%	0.46%	89.27%	1.89%	97.72%	0.99%
84	残杀威	98.15%	4.53%	94.16%	4.18%	89.39%	3.49%
85	吡菌磷	94.48%	4.84%	93.54%	2.96%	84.36%	2.13%
86	哒螨灵	93.54%	2.56%	92.96%	3.66%	91.73%	1.47%
87	吡丙醚	93.63%	0.63%	91.94%	5.65%	93.19%	1.27%
88	啶硫磷	90.16%	1.77%	88.41%	5.31%	91.71%	2.28%
89	啶氧灵	80.85%	2.40%	77.59%	4.81%	94.62%	1.31%
90	治螟磷	93.62%	0.71%	92.04%	3.53%	94.46%	4.35%
91	戊唑醇	91.55%	3.01%	93.56%	1.50%	67.76%	1.92%
92	吡螨胺	97.21%	1.44%	96.08%	2.35%	88.89%	2.81%
93	丁基嘧啶磷	95.25%	1.01%	94.00%	3.11%	86.90%	1.52%
94	特丁硫磷	93.75%	5.06%	94.05%	7.83%	67.05%	4.06%
94	特丁硫磷砒	90.85%	6.74%	90.37%	1.64%	87.65%	1.59%
95	三氯杀螨砒	111.25%	1.96%	105.12%	3.62%	84.60%	1.33%
96	胺菊酯 1	104.40%	2.93%	98.88%	4.98%	82.79%	2.15%
	胺菊酯 2	92.90%	0.88%	92.72%	1.95%	83.20%	0.87%
97	禾草丹	91.43%	0.17%	89.22%	3.27%	88.70%	1.28%
98	三唑酮	90.14%	1.92%	93.65%	2.87%	74.52%	1.95%
99	三唑醇	112.32%	2.34%	98.19%	2.02%	88.57%	0.92%
100	野麦畏	93.46%	1.35%	93.55%	2.50%	69.18%	1.00%
101	三唑磷	93.19%	1.84%	91.83%	2.16%	94.44%	0.72%
102	肟菌酯	89.53%	1.52%	88.56%	2.69%	86.43%	1.08%

103	乙烯菌核利	97.50%	1.23%	95.86%	3.20%	86.06%	0.60%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
104	氟丙菊酯	118.13%	3.28%	106.29%	4.85%	96.74%	2.78%
105	艾氏剂	82.73%	2.37%	90.55%	6.03%	81.62%	3.33%
106	莠灭净	81.87%	0.94%	86.78%	3.26%	81.61%	2.61%
107	阿特拉通	79.36%	11.85%	88.32%	9.81%	80.47%	4.12%
108	莠去津	84.09%	3.70%	91.14%	9.96%	82.87%	2.20%
109	益棉磷	84.19%	4.09%	88.43%	4.18%	82.51%	3.58%
110	氟丁酰草胺	83.30%	2.26%	90.01%	3.86%	83.28%	4.32%
111	苯霜灵	87.30%	1.64%	92.65%	2.16%	85.42%	1.62%
112	乙丁氟灵	76.78%	2.89%	80.07%	1.85%	76.95%	1.01%
6	β-六六六	84.14%	9.34%	93.03%	1.48%	86.47%	2.50%
113	甲羧除草醚	91.80%	2.71%	91.54%	3.11%	84.31%	2.22%
114	联苯	99.67%	2.41%	89.58%	2.55%	60.90%	2.51%
115	乙基溴硫磷	82.63%	2.82%	86.05%	2.01%	81.50%	2.22%
116	丁草胺	82.65%	3.58%	91.54%	1.44%	84.46%	3.12%
117	抑草磷	68.26%	2.41%	73.83%	2.14%	70.35%	1.52%
118	克百威	83.36%	3.82%	93.63%	5.24%	80.22%	2.49%
119	氯丹-反式	86.07%	11.55%	93.36%	2.11%	86.83%	2.02%
120	杀螨酯	81.74%	4.00%	89.83%	5.51%	82.62%	3.64%
121	毒虫畏	81.05%	3.24%	88.16%	4.67%	81.87%	3.53%
122	乙酯杀螨醇	81.84%	3.44%	89.84%	3.44%	83.26%	2.65%
123	氯苯甲醚	82.85%	1.44%	89.58%	2.29%	76.85%	1.24%
124	氯苯胺灵	96.94%	5.06%	104.74%	5.66%	92.03%	1.35%
125	毒死蜱	86.40%	3.94%	90.90%	4.29%	76.33%	3.60%
126	甲基毒死蜱	82.90%	4.30%	89.47%	2.08%	82.45%	7.32%
127	异噁草酮	81.04%	3.12%	87.79%	2.62%	81.53%	1.89%
128	蝇毒磷	85.28%	0.65%	97.94%	4.19%	86.60%	2.68%
129	氟氯氰菊酯	91.03%	2.53%	97.60%	2.09%	89.50%	1.80%
130	环丙唑醇	80.67%	2.48%	86.59%	4.94%	81.49%	9.72%
131	噻菌环胺	77.93%	4.14%	83.16%	4.87%	76.38%	3.38%
6	δ-六六六	81.90%	5.76%	88.78%	3.57%	81.95%	3.85%
132	敌草净	86.90%	4.28%	92.34%	4.17%	85.74%	2.38%
133	二嗪磷	84.69%	2.37%	91.48%	1.47%	83.40%	1.90%
134	禾草灵	85.05%	3.71%	92.46%	2.19%	85.51%	1.87%
135	百治磷	85.42%	3.12%	92.34%	5.74%	85.78%	3.19%
136	狄氏剂	87.42%	2.70%	95.42%	2.72%	84.11%	2.48%
137	苯醚甲环唑	81.78%	2.41%	87.68%	4.40%	81.01%	2.97%
138	烯唑醇	77.22%	1.11%	86.31%	4.92%	78.72%	1.23%

139	二苯胺	81.01%	3.27%	85.95%	6.22%	76.78%	4.32%
140	异丙净	78.41%	2.77%	83.01%	1.85%	78.90%	1.84%
141	硫草敌	72.85%	1.40%	85.15%	5.95%	65.45%	3.89%
142	乙硫磷	76.71%	2.77%	84.18%	2.36%	79.17%	0.98%
143	乙氧呋草黄	83.88%	7.06%	90.51%	4.87%	85.31%	1.99%
144	乙螨唑	83.96%	2.34%	93.21%	3.97%	84.87%	1.55%
145	土菌灵	71.59%	3.01%	77.89%	2.39%	64.85%	1.19%
146	乙嘧硫磷	79.70%	4.61%	87.46%	5.52%	81.13%	7.17%
147	伐灭磷	106.21%	2.53%	116.14%	3.55%	110.40%	1.03%
148	腈苯唑	82.73%	1.90%	91.70%	3.58%	82.98%	2.64%
149	杀螟硫磷	63.85%	8.71%	73.03%	5.50%	70.50%	3.43%
150	仲丁威	81.82%	2.05%	89.43%	6.10%	81.51%	3.45%
151	甲氰菊酯	81.41%	7.32%	91.69%	6.14%	85.90%	6.96%
42	倍硫磷砒	109.83%	3.89%	119.26%	5.42%	114.37%	4.60%
42	倍硫磷亚砒	104.64%	2.35%	112.17%	2.62%	104.57%	1.44%
152	氟虫腓	75.14%	1.71%	87.17%	7.16%	78.74%	2.99%
153	吡氟禾草灵	82.40%	1.20%	87.84%	2.97%	83.74%	1.33%
154	氟氰戊菊酯-1	90.56%	3.17%	98.27%	4.24%	78.21%	1.48%
	氟氰戊菊酯-2	90.63%	5.53%	96.84%	6.75%	79.89%	1.78%
155	咯菌腈	80.59%	2.60%	84.53%	2.38%	78.61%	1.80%
156	三氟硝草醚	71.95%	1.79%	75.80%	2.61%	72.73%	1.28%
157	氟啶唑	89.74%	3.40%	98.02%	11.99%	88.99%	3.54%
158	氟胺氰菊酯	104.45%	1.97%	109.53%	4.24%	96.85%	3.22%
6	γ-六六六	87.51%	5.14%	94.25%	2.54%	86.36%	1.19%
159	己唑醇	82.03%	3.12%	90.50%	5.77%	83.12%	3.43%
160	异菌脲	94.08%	3.17%	105.26%	4.15%	88.78%	2.37%
161	氯唑磷	84.29%	9.16%	89.72%	4.13%	83.23%	4.72%
162	水胺硫磷	76.36%	3.57%	81.54%	2.78%	74.86%	0.70%
163	氧异柳磷	68.85%	4.22%	78.53%	3.59%	72.94%	1.86%
164	稻瘟灵	90.40%	5.09%	94.46%	2.52%	89.75%	2.80%
165	高效氯氟氰菊酯-1	69.43%	3.34%	61.44%	4.74%	62.43%	2.71%
	高效氯氟氰菊酯-2	97.11%	2.22%	106.84%	2.41%	104.63%	0.68%
166	溴苯腓	82.49%	5.20%	88.86%	1.60%	82.80%	1.79%
167	马拉氧磷	73.81%	4.00%	89.30%	6.90%	77.50%	3.20%
168	马拉硫磷	74.82%	2.50%	83.88%	6.07%	77.87%	5.15%
169	苯噻酰草胺	76.03%	9.89%	83.06%	3.82%	75.30%	4.20%
170	杀扑磷	83.74%	2.13%	89.30%	3.69%	83.16%	1.59%
171	烯虫酯	74.15%	2.64%	80.79%	1.93%	72.37%	1.64%
172	甲氧滴滴涕	100.99%	2.76%	85.10%	6.15%	82.94%	1.20%

173	绿谷隆	69.66%	4.51%	77.03%	2.28%	72.08%	2.02%
174	腈菌唑	82.12%	3.27%	90.14%	3.67%	82.69%	3.07%
175	二溴磷	101.28%	0.54%	107.44%	2.15%	92.12%	1.11%
176	敌草胺	86.37%	2.39%	91.43%	3.32%	83.37%	2.89%
177	除草醚	67.71%	3.95%	73.27%	2.35%	69.28%	1.56%
67	2,4'-滴滴伊	84.37%	2.76%	90.94%	3.33%	85.34%	2.14%
178	氧乐果	87.56%	2.63%	109.11%	3.32%	95.12%	3.57%
179	噁霜灵	100.20%	4.01%	102.17%	3.17%	88.78%	2.57%
67	4,4'-滴滴涕	72.66%	8.54%	79.02%	5.29%	80.28%	3.21%
180	多效唑	78.05%	5.30%	83.98%	3.02%	79.06%	0.80%
181	甲基对硫磷	67.62%	3.88%	74.05%	2.55%	67.73%	1.32%
182	二甲戊灵	71.98%	11.96%	74.72%	3.73%	70.96%	2.62%
183	五氯苯胺	67.87%	10.33%	74.04%	2.22%	63.48%	1.17%
184	五氯硝基苯	75.82%	7.46%	81.74%	2.47%	74.02%	1.85%
75	甲拌磷	101.36%	3.88%	118.98%	2.27%	95.49%	1.25%
185	伏杀硫磷	83.14%	3.30%	90.51%	5.66%	84.40%	2.32%
186	硫环磷	74.89%	5.92%	79.99%	3.64%	73.69%	1.57%
187	亚胺硫磷	101.29%	1.98%	112.42%	2.71%	106.37%	1.98%
188	磷胺	88.42%	4.50%	100.15%	3.25%	89.19%	2.99%
189	嘧啶磷	72.16%	6.55%	84.49%	10.73%	79.82%	4.40%
190	腐霉利	90.51%	5.48%	94.09%	2.38%	86.19%	2.93%
191	丙溴磷	85.91%	7.03%	96.52%	3.83%	86.66%	2.98%
192	扑草净	82.47%	2.81%	90.80%	3.82%	83.97%	3.00%
193	炔苯酰草胺	80.26%	4.71%	88.63%	10.54%	82.73%	7.59%
194	敌稗	77.44%	4.06%	81.63%	4.05%	75.80%	5.98%
195	丙环唑	106.51%	3.08%	95.68%	1.97%	88.03%	1.93%
196	丙硫磷	75.97%	6.67%	83.75%	9.77%	79.46%	1.59%
197	哒嗪硫磷	89.65%	4.29%	100.90%	2.33%	91.38%	1.28%
198	嘧霉胺	70.01%	3.88%	78.10%	3.14%	68.06%	2.15%
199	皮蝇磷	82.13%	1.17%	92.60%	2.77%	83.90%	1.76%
200	西玛津	81.34%	3.72%	87.09%	3.97%	79.57%	4.16%
201	四氯硝基苯	76.12%	5.19%	83.41%	5.74%	72.54%	1.24%
202	特丁津	86.55%	5.39%	92.27%	6.34%	84.74%	2.52%
203	特丁净	79.35%	2.97%	87.00%	4.53%	79.51%	2.02%
204	杀虫畏	86.79%	7.06%	96.90%	2.40%	88.01%	1.66%
205	四氟醚唑	83.47%	5.15%	91.16%	3.69%	84.04%	2.20%
206	虫线磷	77.75%	1.51%	83.91%	3.96%	74.35%	2.36%
207	甲基立枯磷	81.95%	3.33%	89.62%	8.18%	82.70%	9.10%
208	毒壤磷	80.21%	3.04%	86.36%	2.49%	80.25%	1.91%

表 A.3 菠菜 A、B 组农残加标回收率及相对标准偏差结果 (n=6)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	89.14%	9.18%	88.48%	3.63%	68.74%	2.85%
2	乙草胺	96.40%	7.22%	104.15%	3.82%	97.92%	1.61%
3	苯草醚	75.13%	4.61%	96.05%	3.65%	103.59%	0.89%
4	甲草胺	92.36%	6.64%	105.52%	4.03%	89.24%	1.78%
5	烯丙菊酯	93.65%	3.62%	81.84%	3.13%	105.28%	4.06%
6	α-六六六	112.50%	1.95%	107.36%	1.09%	102.14%	0.45%
7	α-硫丹	93.38%	2.01%	107.83%	1.14%	100.99%	0.50%
8	莎稗磷	69.68%	6.71%	106.21%	4.10%	75.66%	4.46%
9	脱乙基莠去津	86.13%	7.21%	98.20%	2.03%	93.93%	1.78%
7	β-硫丹	92.44%	6.82%	91.73%	1.23%	110.85%	3.64%
10	联苯菊酯	88.56%	5.42%	97.19%	3.60%	114.05%	2.01%
11	啶酰菌胺	88.88%	3.66%	84.51%	2.75%	110.20%	0.85%
12	除草定	86.08%	5.16%	104.08%	3.26%	97.32%	0.78%
13	溴苯烯磷	89.33%	5.99%	97.84%	0.75%	98.61%	0.24%
14	溴硫磷	86.47%	5.46%	96.77%	2.33%	71.62%	0.80%
15	溴螨酯	77.55%	6.59%	83.38%	2.74%	103.58%	2.37%
16	乙嘧酚磺酸酯	89.35%	8.01%	97.93%	7.35%	98.02%	0.84%
17	三硫磷	87.47%	12.30%	106.39%	3.95%	102.57%	2.46%
18	虫螨磷 1	96.24%	7.82%	106.23%	3.30%	97.45%	3.29%
	虫螨磷 2	92.71%	5.56%	97.68%	3.36%	95.15%	4.96%
19	环草敌	70.13%	7.17%	76.03%	10.18%	93.55%	2.91%
20	环氟菌胺	116.62%	3.00%	76.94%	2.96%	109.02%	0.91%
21	氯氰菊酯	100.22%	6.92%	91.77%	7.24%	106.52%	1.64%
22	脱叶磷	117.05%	5.29%	68.60%	3.10%	102.97%	2.96%
23	溴氰菊酯	72.74%	13.94%	75.74%	8.64%	85.90%	3.36%
24	除线磷	91.41%	4.47%	101.33%	2.00%	98.20%	1.17%
25	敌草腈	77.32%	6.65%	96.13%	2.15%	81.18%	6.79%
26	敌敌畏	75.56%	10.39%	72.43%	0.44%	85.02%	4.55%
27	氯硝胺	86.51%	7.72%	96.71%	6.01%	80.63%	1.80%
28	三氯杀螨醇	99.15%	9.46%	106.93%	2.98%	80.73%	2.95%
29	乐果	86.20%	6.03%	103.46%	1.38%	78.91%	2.54%
30	敌噁磷	73.03%	4.09%	113.36%	7.30%	105.38%	1.72%
31	灭菌磷	109.34%	11.35%	101.72%	1.90%	100.84%	2.97%
32	敌瘟磷	117.54%	4.24%	89.93%	2.75%	113.41%	2.03%
33	异狄氏剂	115.25%	8.03%	93.84%	1.90%	105.10%	3.29%
34	苯硫磷	86.01%	4.20%	76.58%	2.25%	97.61%	1.16%

35	氟环唑	69.23%	3.94%	102.45%	1.90%	98.44%	1.39%
36	乙丁烯氟灵	69.49%	8.18%	67.00%	3.67%	89.36%	0.36%
37	灭线磷	74.70%	6.14%	78.09%	2.91%	92.68%	1.50%
38	咪唑菌酮	96.89%	6.77%	85.59%	5.69%	107.66%	1.03%
39	氯苯嘧啶醇	89.42%	6.93%	83.79%	2.00%	96.30%	2.24%
40	苯硫威	117.22%	4.38%	100.93%	2.30%	96.98%	0.21%
41	丰索磷	77.47%	5.06%	104.23%	1.28%	97.56%	1.49%
42	倍硫磷	91.17%	2.03%	103.08%	7.20%	77.93%	5.63%
43	氰戊菊酯 1	109.88%	2.90%	95.99%	1.00%	107.01%	2.07%
	氰戊菊酯 2	75.51%	7.68%	98.59%	5.75%	104.93%	1.08%
44	氟酰胺	94.60%	3.62%	87.43%	2.23%	104.88%	1.20%
45	地虫硫磷	93.82%	5.66%	79.17%	1.85%	93.88%	1.69%
46	安硫磷	86.00%	8.89%	97.21%	1.14%	79.15%	6.95%
47	噻唑膦	103.65%	5.25%	96.03%	5.68%	96.71%	3.67%
48	六氯苯	64.75%	7.42%	94.78%	2.70%	83.51%	1.45%
49	环嗪酮	91.19%	6.90%	79.68%	3.88%	99.33%	1.41%
50	抑霉唑	66.49%	8.88%	104.31%	5.99%	98.96%	4.10%
51	异稻瘟净	85.67%	7.70%	96.91%	4.80%	90.33%	2.10%
52	异柳磷	98.06%	11.42%	102.90%	8.22%	96.67%	4.58%
53	甲基异柳磷	98.72%	9.53%	105.47%	5.44%	99.64%	2.93%
54	异丙威	69.33%	9.13%	98.22%	3.69%	88.87%	1.74%
55	噁唑啉	89.27%	3.95%	104.83%	3.14%	98.33%	1.83%
56	醚菌酯	75.27%	5.54%	109.06%	3.03%	104.37%	2.13%
57	啞菌胺	70.83%	7.59%	97.91%	3.35%	97.92%	1.78%
58	地胺磷	93.16%	3.71%	98.19%	1.52%	99.00%	0.20%
59	甲霜灵	93.62%	6.68%	103.38%	3.80%	86.21%	1.57%
60	虫螨畏	112.00%	8.06%	99.42%	1.29%	93.22%	1.96%
61	甲胺磷	76.72%	8.74%	92.63%	3.86%	72.93%	2.76%
62	异丙甲草胺	95.99%	6.88%	105.88%	4.92%	82.95%	0.57%
63	噻草酮	108.60%	10.10%	92.48%	3.21%	96.10%	1.26%
64	速灭磷	87.18%	7.45%	68.08%	1.70%	91.61%	0.24%
65	禾草敌	115.19%	11.65%	96.09%	3.86%	90.69%	8.18%
66	久效磷	88.81%	8.68%	95.17%	4.81%	78.96%	3.53%
67	2,4'-滴滴滴	66.44%	4.95%	86.35%	2.40%	97.72%	1.04%
67	2,4'-滴滴涕	105.18%	1.76%	98.04%	3.51%	103.95%	2.43%
68	噁草酮	74.87%	3.85%	105.42%	1.80%	97.64%	1.43%
69	乙氧氟草醚	91.03%	7.68%	103.51%	6.77%	97.34%	1.18%
67	4,4'-滴滴滴	116.26%	1.62%	88.41%	1.69%	104.73%	0.95%
67	4,4'-滴滴伊	113.52%	1.92%	108.08%	1.24%	99.69%	0.50%
70	对氧磷	93.95%	3.07%	103.20%	3.98%	95.46%	1.64%
71	甲基对氧磷	85.73%	7.08%	97.77%	11.55%	108.03%	4.69%

72	对硫磷	95.48%	3.13%	103.18%	3.16%	95.79%	1.72%
73	戊菌唑	97.95%	6.78%	105.46%	4.37%	99.08%	1.91%
74	氯菊酯	96.01%	4.58%	83.86%	2.78%	102.80%	2.58%
75	甲拌磷砒	74.42%	5.19%	105.84%	6.82%	97.34%	2.59%
75	甲拌磷亚砒	97.96%	6.88%	90.60%	5.59%	103.05%	2.09%
76	增效醚	77.87%	6.50%	109.98%	4.21%	106.15%	2.68%
77	啶草磷	89.85%	6.52%	78.34%	3.03%	97.74%	1.58%
78	抗蚜威	85.81%	6.62%	95.32%	4.46%	95.08%	1.92%
79	甲基嘧啶磷	95.45%	6.60%	103.67%	3.31%	88.40%	1.61%
80	丙草胺	90.71%	3.57%	107.94%	1.86%	102.83%	1.40%
81	环丙氟灵	89.24%	6.36%	81.39%	8.08%	90.38%	3.05%
82	扑灭津	89.59%	7.16%	71.84%	6.00%	97.40%	2.16%
83	胺丙畏	98.21%	6.86%	88.28%	3.33%	94.50%	1.77%
84	残杀威	91.01%	4.72%	89.32%	2.03%	98.64%	0.81%
85	吡菌磷	93.59%	3.91%	98.96%	0.82%	97.46%	1.11%
86	哒螨灵	103.91%	3.79%	85.07%	2.57%	108.33%	0.91%
87	吡丙醚	93.94%	4.10%	83.85%	2.06%	106.89%	1.53%
88	啶硫磷	96.66%	5.75%	103.97%	4.58%	98.37%	0.66%
89	啶氧灵	84.18%	6.74%	98.47%	3.31%	99.83%	1.41%
90	治螟磷	66.98%	8.22%	76.92%	3.52%	99.66%	1.06%
91	戊唑醇	97.53%	6.23%	97.93%	2.52%	95.83%	1.99%
92	吡螨胺	85.09%	4.61%	73.11%	2.25%	101.00%	1.49%
93	丁基嘧啶磷	88.42%	3.78%	74.96%	2.21%	98.21%	0.67%
94	特丁硫磷	98.26%	0.45%	107.87%	7.33%	102.02%	2.73%
94	特丁硫磷砒	72.26%	10.50%	103.28%	7.39%	98.01%	7.87%
95	三氯杀螨砒	96.28%	6.39%	78.22%	1.57%	107.01%	4.31%
96	胺菊酯 1	101.41%	5.07%	97.16%	0.87%	102.32%	9.94%
	胺菊酯 2	101.40%	5.40%	102.46%	2.90%	102.32%	2.15%
97	禾草丹	97.22%	3.72%	104.96%	0.63%	83.30%	0.42%
98	三唑酮	92.74%	6.06%	100.60%	3.59%	95.35%	1.80%
99	三唑醇	95.73%	7.00%	106.79%	4.11%	98.22%	1.14%
100	野麦畏	95.47%	7.71%	97.36%	3.22%	97.28%	2.75%
101	三唑磷	76.43%	5.61%	103.96%	2.32%	99.51%	1.29%
102	肟菌酯	92.17%	5.86%	88.50%	3.97%	109.76%	2.19%
103	乙烯菌核利	94.86%	7.16%	106.66%	6.19%	86.39%	1.70%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
104	氟丙菊酯	114.26%	4.39%	100.41%	4.54%	117.75%	1.27%
105	艾氏剂	103.39%	0.33%	83.22%	3.16%	78.37%	0.50%

106	莠灭净	110.17%	2.28%	87.33%	9.69%	84.30%	1.55%
107	阿特拉通	102.96%	1.14%	82.96%	2.82%	83.59%	0.38%
108	莠去津	109.55%	1.46%	83.29%	8.62%	81.77%	1.78%
109	益棉磷	84.42%	10.31%	113.28%	4.32%	91.10%	1.91%
110	氟丁酰草胺	101.65%	1.65%	89.24%	4.92%	86.12%	0.90%
111	苯霜灵	99.16%	1.10%	90.20%	2.58%	86.45%	0.56%
112	乙丁氟灵	111.69%	2.31%	90.65%	6.25%	89.47%	0.85%
6	β-六六六	103.28%	0.50%	90.96%	2.33%	85.54%	0.43%
113	甲羧除草醚	98.79%	10.07%	94.81%	8.70%	94.27%	1.35%
114	联苯	72.12%	5.19%	75.85%	8.70%	100.56%	1.11%
115	乙基溴硫磷	96.95%	3.49%	85.67%	9.11%	85.83%	1.26%
116	丁草胺	99.53%	4.06%	89.90%	5.38%	86.51%	0.74%
117	抑草磷	104.92%	4.48%	96.97%	6.20%	97.46%	1.21%
118	克百威	97.95%	7.05%	86.48%	6.01%	78.94%	0.71%
119	氯丹-反式	98.66%	1.08%	88.03%	3.62%	84.46%	1.11%
120	杀螨酯	98.59%	1.16%	86.53%	4.17%	85.52%	0.57%
121	毒虫畏	94.94%	1.75%	84.52%	5.23%	82.00%	1.63%
122	乙酯杀螨醇	100.55%	2.55%	89.93%	8.89%	86.87%	1.47%
123	氯苯甲醚	82.94%	1.93%	77.70%	4.07%	107.98%	1.14%
124	氯苯胺灵	91.77%	9.74%	87.77%	3.51%	76.67%	2.92%
125	毒死蜱	90.70%	0.63%	102.41%	4.59%	105.48%	0.66%
126	甲基毒死蜱	112.99%	1.20%	85.41%	5.14%	82.66%	0.53%
127	异噁草酮	90.16%	1.52%	88.61%	5.17%	86.76%	0.68%
128	蝇毒磷	93.73%	1.69%	105.54%	10.11%	76.26%	4.16%
129	氟氯氰菊酯	95.43%	3.92%	113.07%	6.02%	83.93%	0.30%
130	环丙唑醇	107.65%	2.21%	87.50%	5.43%	104.43%	0.72%
131	啶菌环胺	99.55%	0.86%	81.14%	4.49%	79.33%	0.93%
6	δ-六六六	116.00%	0.64%	91.88%	1.97%	87.03%	0.13%
132	敌草净	91.55%	1.27%	85.08%	5.32%	84.07%	1.25%
133	二嗪磷	107.82%	1.57%	87.02%	4.07%	83.40%	0.34%
134	禾草灵	96.28%	0.87%	88.19%	5.06%	86.46%	0.34%
135	百治磷	94.25%	1.64%	105.59%	3.56%	107.06%	0.56%
136	狄氏剂	100.57%	3.60%	84.33%	5.18%	82.22%	0.74%
137	苯醚甲环唑	80.02%	2.14%	115.50%	3.53%	87.18%	0.15%
138	烯唑醇	100.85%	2.44%	85.41%	6.01%	83.72%	1.64%
139	二苯胺	103.55%	1.20%	82.62%	4.92%	80.88%	1.71%
140	异丙净	98.14%	1.18%	87.03%	7.17%	83.95%	2.43%
141	硫草敌	61.13%	4.10%	98.89%	2.37%	72.04%	1.44%
142	乙硫磷	96.04%	5.38%	88.98%	11.29%	86.94%	0.96%
143	乙氧呋草黄	98.45%	3.10%	88.58%	7.73%	87.02%	1.61%
144	乙螨唑	103.39%	3.85%	113.51%	10.47%	87.58%	1.49%

145	土菌灵	91.14%	3.55%	86.28%	2.40%	97.39%	2.03%
146	乙嘧硫磷	107.65%	4.85%	86.48%	9.20%	84.47%	0.96%
147	伐灭磷	83.27%	4.07%	96.49%	4.68%	88.48%	2.09%
148	腈苯唑	95.50%	2.64%	89.27%	6.02%	90.81%	0.31%
149	杀螟硫磷	94.35%	1.62%	91.20%	6.58%	88.93%	0.32%
150	仲丁威	115.51%	2.99%	91.37%	10.57%	85.54%	1.04%
151	甲氰菊酯	99.88%	2.45%	83.45%	5.37%	87.81%	1.08%
42	倍硫磷砒	75.33%	2.68%	107.01%	3.93%	76.20%	1.02%
42	倍硫磷亚砒	80.68%	0.57%	103.41%	1.20%	101.03%	2.26%
153	吡氟禾草灵	100.45%	0.77%	93.21%	2.47%	88.44%	0.36%
154	氟氰戊菊酯-1	100.75%	2.59%	108.10%	4.88%	86.04%	0.69%
	氟氰戊菊酯-2	107.33%	2.23%	114.75%	3.17%	92.95%	0.73%
155	咯菌腈	108.50%	7.66%	87.47%	5.95%	88.92%	1.11%
156	三氟硝草醚	115.78%	7.02%	109.35%	8.77%	100.58%	0.18%
157	氟啶唑	94.65%	3.41%	94.59%	7.90%	83.88%	1.39%
158	氟胺氰菊酯	100.98%	3.85%	100.29%	5.23%	91.85%	1.33%
6	γ -六六六	99.19%	0.60%	83.45%	1.69%	78.23%	0.52%
159	己唑醇	94.47%	2.86%	87.65%	4.32%	84.22%	2.06%
160	异菌脲	96.23%	3.73%	117.35%	7.19%	83.10%	1.16%
161	氯唑磷	115.45%	1.78%	85.55%	5.59%	84.22%	0.37%
162	水胺硫磷	95.06%	1.93%	83.86%	5.42%	83.58%	3.41%
163	氧异柳磷	96.17%	11.33%	93.44%	6.46%	90.39%	1.09%
164	稻瘟灵	99.37%	1.20%	86.54%	5.10%	85.68%	1.04%
165	高效氯氟氰菊酯-1	82.53%	0.48%	84.77%	0.56%	84.59%	1.29%
	高效氯氟氰菊酯-2	108.94%	5.07%	90.79%	5.13%	110.23%	2.81%
166	溴苯腈	100.32%	3.64%	101.57%	3.29%	79.48%	0.48%
167	马拉氧磷	99.24%	6.49%	97.67%	6.19%	90.96%	0.62%
168	马拉硫磷	101.44%	2.74%	92.59%	5.13%	87.50%	0.65%
169	苯噻酰草胺	100.74%	1.35%	117.04%	2.62%	80.62%	0.16%
170	杀扑磷	100.33%	2.19%	82.83%	4.59%	78.61%	1.29%
171	烯虫酯	82.54%	4.24%	95.15%	4.27%	83.91%	1.12%
172	甲氧滴滴涕	107.35%	3.35%	82.16%	5.43%	91.54%	1.13%
173	绿谷隆	94.96%	3.03%	80.65%	5.53%	77.80%	0.64%
174	腈菌唑	96.70%	1.91%	88.35%	5.58%	85.29%	0.84%
175	二溴磷	65.42%	2.67%	85.79%	5.78%	106.07%	1.59%
176	敌草胺	98.19%	1.86%	88.27%	4.61%	84.14%	0.59%
177	除草醚	94.77%	5.08%	93.13%	7.55%	89.62%	0.76%
67	2,4'-滴滴伊	98.41%	1.26%	86.75%	4.50%	83.98%	0.73%
178	氧乐果	95.85%	4.95%	96.86%	8.78%	95.58%	4.95%

179	噁霜灵	106.97%	3.14%	95.11%	5.49%	85.30%	0.58%
67	2,4'-滴滴伊	98.41%	1.26%	86.75%	4.50%	83.98%	0.73%
180	多效唑	94.39%	2.23%	87.00%	3.96%	84.45%	1.22%
181	甲基对硫磷	105.47%	4.52%	101.46%	5.50%	96.76%	1.25%
182	二甲戊灵	98.12%	4.85%	97.01%	6.27%	97.64%	0.71%
183	五氯苯胺	92.67%	0.28%	106.85%	5.23%	86.36%	0.25%
184	五氯硝基苯	108.05%	2.16%	83.75%	5.58%	81.73%	0.47%
75	甲拌磷	63.43%	3.33%	87.22%	4.12%	82.02%	1.27%
185	伏杀硫磷	92.47%	2.57%	107.96%	5.44%	77.45%	1.08%
186	硫环磷	98.41%	4.18%	81.24%	6.85%	79.02%	0.17%
187	亚胺硫磷	82.67%	4.95%	116.46%	6.08%	100.54%	3.70%
188	磷胺	74.82%	4.03%	107.27%	5.58%	88.45%	2.80%
189	嘧啶磷	95.27%	1.24%	89.68%	4.98%	87.54%	0.86%
190	腐霉利	82.38%	2.50%	81.66%	2.83%	85.91%	2.05%
191	丙溴磷	95.58%	2.86%	82.05%	8.57%	90.66%	2.46%
192	扑草净	116.80%	1.68%	87.38%	4.60%	84.40%	1.37%
193	炔苯酰草胺	112.87%	2.46%	90.24%	5.33%	89.27%	0.49%
194	敌稗	100.84%	1.98%	84.10%	4.52%	82.61%	0.38%
195	丙环唑	117.13%	1.99%	102.80%	10.13%	82.45%	2.47%
196	丙硫磷	99.60%	1.91%	89.76%	6.72%	84.95%	0.66%
197	哒嗪硫磷	100.32%	4.40%	111.09%	5.64%	81.84%	0.73%
198	嘧霉胺	91.38%	2.60%	107.20%	3.08%	103.04%	1.94%
199	皮蝇磷	114.10%	1.43%	85.69%	4.49%	82.71%	0.31%
200	西玛津	108.83%	2.07%	85.77%	4.43%	81.93%	0.14%
201	四氯硝基苯	79.90%	1.51%	96.40%	5.35%	106.56%	1.48%
202	特丁津	104.80%	0.65%	84.99%	4.37%	82.10%	0.67%
203	特丁净	94.45%	0.28%	77.91%	4.97%	81.06%	1.09%
204	杀虫畏	74.93%	3.87%	104.40%	5.72%	102.09%	3.20%
205	四氟醚唑	98.29%	1.75%	88.94%	5.54%	84.29%	0.91%
206	虫线磷	107.76%	2.73%	82.21%	6.88%	80.39%	1.26%
207	甲基立枯磷	115.39%	1.27%	86.19%	5.40%	84.28%	0.59%
208	毒壤磷	102.07%	1.36%	87.43%	4.23%	84.68%	0.70%

表 A.4 金针菇 A、B 组农残加标回收率及相对标准偏差结果 (n=6)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	77.86%	5.54%	105.71%	1.95%	79.46%	5.66%
2	乙草胺	82.52%	4.27%	106.93%	1.72%	80.61%	3.58%
3	苯草醚	73.25%	7.51%	102.38%	2.72%	82.48%	9.65%
4	甲草胺	81.28%	8.55%	106.07%	3.52%	81.23%	6.78%
5	烯丙菊酯	106.95%	8.50%	74.85%	1.85%	96.08%	7.86%
6	α-六六六	78.44%	7.15%	99.60%	2.20%	76.93%	5.72%
7	α-硫丹	77.04%	7.76%	98.76%	5.15%	79.03%	6.14%
8	莎稗磷	79.48%	6.08%	111.20%	2.14%	84.94%	7.22%
9	脱乙基莠去津	79.07%	8.54%	102.50%	3.03%	78.52%	7.11%
7	β-硫丹	82.55%	7.47%	109.10%	3.22%	79.36%	5.46%
10	联苯菊酯	86.57%	5.70%	115.85%	2.04%	86.54%	5.56%
11	啶酰菌胺	77.36%	4.38%	106.53%	1.83%	80.40%	5.03%
12	除草定	79.38%	10.70%	102.75%	2.15%	81.36%	8.10%
13	溴苯烯磷	81.63%	5.89%	108.32%	1.30%	84.47%	7.90%
14	溴硫磷	83.01%	8.79%	103.17%	2.04%	80.17%	6.27%
15	溴螨酯	81.65%	6.58%	107.35%	2.80%	79.60%	7.62%
16	乙嘧啶磺酸酯	80.61%	5.31%	103.57%	0.89%	79.75%	3.54%
17	三硫磷	111.75%	11.48%	107.55%	7.32%	114.39%	7.68%
18	虫螨磷 1	102.54%	8.14%	99.35%	1.96%	107.81%	4.50%
18	虫螨磷 2	94.73%	10.87%	115.34%	3.30%	109.57%	6.48%
19	环草敌	78.99%	3.29%	101.49%	2.15%	78.53%	3.92%
20	环氟菌胺	78.64%	6.48%	108.07%	1.81%	84.59%	5.15%
21	氯氰菊酯	84.46%	5.54%	115.68%	3.13%	87.61%	7.72%
22	脱叶磷	92.80%	11.48%	117.83%	2.31%	85.64%	9.17%
23	溴氰菊酯	85.00%	6.52%	113.48%	2.16%	90.84%	10.60%
24	除线磷	81.48%	8.34%	106.83%	0.63%	81.54%	6.80%
25	敌草腈	74.07%	7.76%	78.49%	7.72%	68.71%	4.35%
26	敌敌畏	89.25%	6.81%	88.76%	5.90%	74.03%	5.55%
27	氯硝胺	68.46%	6.36%	92.12%	2.78%	70.27%	7.54%
28	三氯杀螨醇	79.70%	7.82%	102.75%	0.67%	77.31%	7.37%
29	乐果	81.25%	5.86%	108.45%	1.98%	80.98%	5.42%
30	敌噁磷	69.68%	8.78%	111.06%	4.33%	78.12%	7.02%
31	灭菌磷	77.64%	9.43%	104.48%	6.27%	82.69%	8.09%
32	敌瘟磷	84.80%	8.06%	116.00%	3.64%	89.92%	8.33%
33	异狄氏剂	82.59%	5.09%	106.78%	3.56%	81.36%	4.75%

34	苯硫磷	79.50%	7.36%	109.14%	4.56%	85.55%	7.78%
35	氟环唑	80.65%	3.79%	108.22%	2.04%	83.99%	4.55%
36	乙丁烯氟灵	77.54%	5.38%	103.36%	1.65%	80.00%	2.48%
37	灭线磷	79.94%	8.33%	103.38%	3.15%	80.27%	6.73%
38	咪唑菌酮	82.54%	8.96%	111.88%	3.50%	85.98%	7.87%
39	氯苯嘧啶醇	79.59%	7.42%	110.93%	1.27%	82.27%	6.52%
40	苯硫威	79.28%	7.34%	107.16%	2.54%	83.47%	8.02%
41	丰索磷	85.38%	6.66%	106.52%	3.11%	77.16%	3.71%
42	倍硫磷	117.16%	7.83%	107.37%	14.66%	110.58%	7.08%
43	氰戊菊酯 1	85.55%	9.07%	114.16%	0.66%	94.18%	6.73%
43	氰戊菊酯 2	78.12%	8.27%	101.46%	7.77%	85.92%	10.52%
44	氟酰胺	86.43%	3.50%	110.97%	0.92%	86.14%	4.87%
45	地虫硫磷	96.47%	6.43%	82.04%	3.71%	95.61%	7.78%
46	安硫磷	76.68%	14.95%	110.16%	2.55%	82.74%	7.98%
47	噻唑磷	92.19%	5.75%	114.88%	2.38%	93.98%	6.84%
48	六氯苯	60.03%	5.58%	75.49%	2.11%	60.71%	4.98%
49	环嗪酮	77.95%	4.87%	104.57%	1.83%	80.47%	4.68%
50	抑霉唑	78.13%	8.34%	104.75%	0.98%	81.60%	5.56%
51	异稻瘟净	83.88%	4.50%	111.23%	0.80%	84.56%	3.70%
52	异柳磷	108.39%	3.33%	97.02%	1.39%	106.68%	4.60%
53	甲基异柳磷	97.83%	7.51%	87.92%	1.69%	100.02%	7.97%
54	异丙威	97.77%	6.83%	101.67%	1.15%	73.38%	4.14%
55	噁唑啉	80.84%	5.70%	112.42%	1.77%	86.49%	5.10%
56	醚菌酯	80.58%	9.85%	107.97%	1.33%	83.19%	7.75%
57	啞菌胺	69.01%	9.09%	94.40%	0.63%	73.92%	7.91%
58	地胺磷	81.08%	10.16%	107.79%	0.63%	84.18%	8.57%
59	甲霜灵	75.60%	6.01%	97.74%	1.57%	77.23%	7.32%
60	虫螨畏	78.11%	8.90%	91.41%	6.10%	74.31%	5.69%
61	甲胺磷	82.02%	7.62%	104.04%	5.08%	77.43%	6.09%
62	异丙甲草胺	80.18%	4.14%	107.59%	0.56%	80.62%	4.21%
63	噻草酮	88.49%	13.39%	81.46%	1.70%	86.07%	5.99%
64	速灭磷	77.61%	6.07%	95.47%	5.22%	77.62%	3.39%
65	禾草敌	84.10%	6.16%	96.37%	3.01%	78.07%	3.29%
66	久效磷	78.30%	8.76%	107.23%	4.11%	82.75%	9.04%
67	2,4'-滴滴滴	81.55%	9.79%	107.65%	1.56%	83.19%	8.03%
67	2,4'-滴滴涕	78.72%	9.63%	105.58%	2.79%	82.34%	7.37%
68	噁草酮	81.49%	6.30%	104.44%	1.18%	81.32%	5.04%
69	乙氧氟草醚	79.36%	3.85%	110.73%	1.79%	85.42%	5.51%
67	4,4'-滴滴滴	82.64%	7.78%	110.63%	0.84%	85.38%	7.64%
67	4,4'-滴滴伊	73.07%	7.21%	97.75%	5.79%	76.08%	7.77%

70	对氧磷	80.14%	6.39%	113.50%	1.90%	90.37%	5.99%
71	甲基对氧磷	91.76%	10.00%	118.85%	5.62%	90.41%	8.25%
72	对硫磷	80.60%	3.92%	100.82%	2.26%	78.26%	4.64%
73	戊菌唑	79.96%	5.53%	107.09%	1.36%	82.59%	7.03%
74	氯菊酯	81.88%	7.09%	113.26%	6.09%	84.21%	7.42%
75	甲拌磷砒	78.89%	4.96%	104.20%	1.77%	80.28%	8.31%
75	甲拌磷亚砒	101.13%	10.36%	107.05%	3.52%	94.64%	10.92%
76	增效醚	83.31%	3.83%	111.43%	1.04%	85.12%	4.52%
77	啶草磷	85.08%	6.90%	115.22%	2.11%	87.18%	7.09%
78	抗蚜威	79.43%	6.69%	102.99%	0.86%	78.52%	5.46%
79	甲基嘧啶磷	82.66%	7.69%	106.34%	3.95%	82.50%	6.85%
80	丙草胺	82.32%	8.66%	105.96%	2.53%	82.69%	8.04%
81	环丙氟灵	83.33%	1.70%	110.95%	2.77%	82.72%	5.64%
82	扑灭津	79.47%	5.78%	103.62%	1.14%	80.31%	7.08%
83	胺丙畏	90.35%	5.15%	117.66%	2.97%	92.68%	6.51%
84	残杀威	86.75%	7.86%	111.40%	3.25%	85.61%	6.26%
85	吡菌磷	79.11%	8.09%	109.50%	2.91%	84.11%	9.64%
86	哒螨灵	85.16%	7.71%	111.93%	2.04%	88.20%	8.13%
87	吡丙醚	76.67%	6.38%	109.27%	2.61%	82.79%	8.05%
88	啶硫磷	79.93%	5.50%	107.70%	1.12%	82.43%	5.59%
89	啶氧灵	65.77%	5.63%	94.02%	1.06%	72.36%	5.86%
90	治螟磷	82.86%	3.19%	104.08%	2.14%	79.99%	3.75%
91	戊唑醇	82.60%	6.92%	108.08%	3.18%	84.47%	6.72%
92	吡螨胺	80.93%	8.80%	107.64%	2.66%	82.91%	6.87%
93	丁基嘧啶磷	80.74%	3.66%	109.36%	1.44%	83.91%	4.02%
94	特丁硫磷	97.37%	6.29%	96.50%	4.74%	93.04%	5.24%
94	特丁硫磷砒	100.02%	9.32%	108.45%	3.45%	83.01%	8.05%
95	三氯杀螨砒	88.55%	2.27%	113.47%	2.04%	83.77%	7.78%
96	胺菊酯 1	87.14%	8.74%	112.36%	3.22%	84.19%	7.04%
96	胺菊酯 2	82.52%	7.21%	113.48%	2.75%	86.43%	7.36%
97	禾草丹	87.46%	4.55%	115.35%	0.38%	87.12%	4.62%
98	三唑酮	82.54%	6.60%	103.48%	2.67%	81.20%	6.02%
99	三唑醇	79.69%	6.77%	101.92%	1.66%	81.13%	4.95%
100	野麦畏	82.24%	6.80%	104.77%	2.83%	80.89%	7.00%
101	三唑磷	81.88%	5.92%	111.78%	2.14%	86.09%	6.08%
102	肟菌酯	81.75%	7.66%	111.22%	2.72%	85.00%	8.19%
103	乙炔菌核利	79.40%	4.27%	104.84%	2.82%	78.42%	4.84%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD

104	氟丙菊酯	107.03%	8.06%	105.50%	8.65%	105.21%	2.66%
105	艾氏剂	85.57%	10.52%	95.96%	3.98%	82.92%	8.17%
106	莠灭净	69.92%	12.83%	103.29%	11.02%	74.58%	6.29%
107	阿特拉通	84.22%	8.13%	100.94%	13.21%	81.62%	7.56%
108	莠去津	77.12%	6.85%	99.16%	12.66%	78.57%	8.72%
109	益棉磷	106.53%	10.70%	100.01%	9.32%	102.42%	3.96%
110	氟丁酰草胺	72.20%	8.40%	92.81%	8.84%	75.23%	8.12%
111	苯霜灵	105.70%	8.36%	106.21%	8.36%	100.07%	3.61%
112	乙丁氟灵	90.71%	14.21%	76.19%	14.19%	87.01%	11.38%
6	β-六六六	72.72%	9.85%	117.79%	4.89%	76.12%	8.03%
113	甲羧除草醚	106.33%	9.56%	86.03%	5.11%	90.27%	11.99%
114	联苯	75.10%	8.30%	102.91%	10.28%	78.21%	4.14%
115	乙基溴硫磷	92.41%	12.48%	93.75%	11.53%	88.27%	5.51%
116	丁草胺	89.22%	6.43%	97.69%	8.08%	85.50%	4.05%
117	抑草磷	87.93%	11.10%	119.62%	12.05%	84.21%	5.47%
118	克百威	72.75%	16.07%	117.39%	10.34%	76.85%	4.45%
119	氯丹-反式	89.76%	7.94%	104.93%	10.17%	85.70%	4.43%
120	杀螨酯	89.29%	8.92%	108.34%	9.83%	85.64%	4.63%
121	毒虫畏	89.18%	5.99%	109.43%	6.85%	84.68%	3.36%
122	乙酯杀螨醇	95.34%	8.94%	110.23%	9.38%	89.70%	4.23%
123	氯苯甲醚	84.70%	6.41%	99.50%	8.18%	81.77%	13.99%
124	氯苯胺灵	91.23%	15.43%	119.47%	6.17%	73.32%	10.15%
125	毒死蜱	84.77%	7.16%	99.29%	7.42%	82.05%	7.82%
126	甲基毒死蜱	88.58%	2.72%	92.68%	13.51%	84.25%	5.70%
127	异噁草酮	83.90%	13.10%	93.55%	14.79%	81.47%	13.02%
128	蝇毒磷	102.99%	7.32%	84.87%	8.55%	96.95%	4.94%
129	氟氯氰菊酯	89.84%	4.68%	76.32%	7.69%	86.29%	2.84%
130	环丙唑醇	85.65%	9.24%	85.40%	8.19%	82.56%	5.84%
131	噻菌环胺	78.55%	8.00%	99.32%	9.53%	79.36%	4.77%
6	δ-六六六	86.69%	2.92%	83.64%	11.46%	83.06%	5.07%
132	敌草净	110.00%	11.71%	102.13%	6.11%	66.05%	11.28%
133	二嗪磷	88.92%	5.30%	108.09%	10.93%	84.49%	7.32%
134	禾草灵	101.42%	6.59%	91.79%	6.23%	95.97%	2.58%
135	百治磷	76.80%	8.47%	83.40%	13.58%	78.57%	10.49%
136	狄氏剂	93.79%	3.37%	102.13%	5.61%	88.04%	2.94%
137	苯醚甲环唑	106.90%	12.32%	118.25%	9.62%	102.73%	18.82%
138	烯唑醇	106.99%	13.69%	101.71%	13.95%	105.23%	5.79%
139	二苯胺	94.33%	5.70%	83.41%	4.25%	88.85%	10.62%
140	异丙净	85.05%	10.72%	101.10%	9.34%	82.12%	3.24%
141	硫草敌	85.68%	12.67%	75.16%	10.99%	83.01%	5.46%
142	乙硫磷	104.15%	11.99%	109.23%	12.23%	91.66%	6.13%

143	乙氧呋草黄	90.53%	10.80%	83.37%	10.63%	87.14%	6.94%
144	乙螨唑	110.01%	11.13%	66.67%	10.62%	94.94%	4.66%
145	土菌灵	110.10%	12.41%	105.09%	14.10%	67.64%	14.10%
146	乙嘧硫磷	89.59%	14.24%	88.31%	15.95%	85.72%	10.43%
147	伐灭磷	106.92%	9.49%	100.60%	6.64%	104.90%	1.65%
148	腈苯唑	105.37%	9.48%	110.73%	9.57%	99.05%	3.71%
149	杀螟硫磷	91.13%	11.60%	87.90%	14.14%	87.27%	4.73%
150	仲丁威	91.31%	14.72%	84.84%	9.77%	87.45%	9.88%
151	甲氰菊酯	104.96%	11.36%	106.79%	7.14%	117.86%	3.32%
42	倍硫磷砒	108.13%	14.10%	94.75%	11.44%	103.49%	0.97%
42	倍硫磷亚砒	69.56%	12.34%	106.38%	7.98%	74.06%	6.35%
152	氟虫腈	91.64%	4.99%	106.20%	6.04%	87.47%	2.63%
153	吡氟禾草灵	89.80%	9.40%	86.83%	10.06%	86.10%	3.14%
154	氟氰戊菊酯-1	94.85%	4.88%	87.31%	6.61%	89.81%	7.71%
154	氟氰戊菊酯-2	70.50%	3.77%	119.69%	3.61%	74.97%	1.05%
155	咯菌腈	95.56%	7.61%	96.08%	6.69%	109.31%	3.23%
156	三氟硝草醚	105.16%	14.10%	98.29%	5.94%	98.61%	3.23%
157	氟啶唑	102.72%	6.11%	115.94%	7.70%	91.52%	4.03%
158	氟胺氰菊酯	108.05%	6.54%	95.33%	6.26%	101.06%	9.16%
6	γ-六六六	84.76%	6.50%	101.65%	14.98%	82.03%	7.38%
159	己唑醇	82.32%	9.91%	99.35%	13.75%	80.97%	9.39%
160	异菌脲	104.95%	13.24%	91.45%	11.16%	97.29%	5.89%
161	氯唑磷	72.61%	15.12%	92.92%	4.59%	75.18%	15.29%
162	水胺硫磷	88.70%	9.86%	102.39%	10.02%	84.40%	6.02%
163	氧异柳磷	82.48%	14.11%	117.71%	15.73%	81.29%	8.73%
164	稻瘟灵	93.47%	6.16%	100.66%	6.59%	88.59%	2.86%
165	高效氯氟氰菊酯-1	107.30%	6.13%	106.31%	2.54%	107.76%	3.32%
165	高效氯氟氰菊酯-2	109.46%	5.57%	107.81%	6.55%	93.19%	2.80%
166	溴苯腈	111.14%	12.79%	82.59%	11.05%	105.64%	3.80%
167	马拉氧磷	74.17%	5.20%	104.92%	12.30%	76.57%	2.70%
168	马拉硫磷	102.00%	7.44%	105.88%	9.94%	91.53%	4.64%
169	苯噻酰草胺	95.62%	8.30%	75.66%	8.13%	115.43%	3.99%
170	杀扑磷	85.45%	10.27%	102.27%	10.01%	82.16%	4.43%
171	烯虫酯	91.59%	5.49%	62.59%	12.22%	72.45%	3.94%
172	甲氧滴滴涕	86.96%	10.68%	93.90%	10.43%	80.65%	5.94%
173	绿谷隆	85.68%	7.64%	109.47%	9.14%	101.10%	4.92%
174	腈菌唑	79.74%	9.74%	106.80%	13.09%	77.56%	6.24%

175	二溴磷	96.83%	10.91%	104.49%	2.30%	90.23%	2.76%
176	敌草胺	80.17%	4.97%	97.50%	6.63%	80.62%	2.71%
177	除草醚	91.21%	8.33%	74.59%	7.14%	87.41%	3.46%
67	2,4'-滴滴伊	87.62%	8.03%	95.21%	8.79%	83.78%	4.30%
178	氧乐果	61.23%	6.64%	116.64%	16.07%	70.06%	9.01%
179	噁霜灵	105.80%	5.24%	70.17%	6.83%	101.04%	2.56%
67	4,4'-滴滴涕	78.51%	10.02%	73.93%	12.10%	78.72%	1.20%
180	多效唑	84.64%	5.90%	94.87%	7.09%	81.70%	2.70%
181	甲基对硫磷	66.43%	15.75%	103.16%	9.45%	71.62%	11.08%
182	二甲戊灵	84.89%	9.83%	108.73%	8.16%	81.78%	3.55%
183	五氯苯胺	68.92%	14.52%	107.99%	5.98%	72.00%	17.74%
184	五氯硝基苯	69.46%	10.84%	83.74%	7.33%	73.27%	8.84%
75	甲拌磷	77.61%	15.83%	99.39%	9.07%	75.59%	11.16%
185	伏杀硫磷	95.65%	8.18%	114.79%	6.29%	116.29%	1.58%
186	硫环磷	64.68%	15.36%	85.39%	13.96%	70.11%	12.63%
187	亚胺硫磷	106.68%	18.05%	105.68%	17.55%	118.73%	5.08%
188	磷胺	81.09%	13.58%	97.27%	5.29%	80.93%	8.21%
189	嘧啶磷	89.17%	3.40%	85.61%	11.82%	84.48%	4.83%
190	腐霉利	105.32%	5.45%	69.73%	7.97%	91.85%	10.36%
191	丙溴磷	88.76%	4.66%	76.15%	8.90%	84.47%	3.11%
192	扑草净	83.92%	12.96%	102.30%	9.79%	81.58%	12.51%
193	炔苯酰草胺	74.78%	15.70%	69.97%	7.79%	78.11%	17.59%
194	敌稗	84.37%	4.95%	104.95%	5.58%	81.70%	3.41%
195	丙环唑	118.03%	10.98%	97.14%	9.36%	114.23%	3.89%
196	丙硫磷	87.87%	5.80%	110.08%	6.98%	83.82%	3.28%
197	哒嗪硫磷	115.31%	6.89%	89.10%	6.08%	108.21%	1.99%
198	嘧霉胺	76.10%	6.53%	100.28%	12.47%	78.37%	10.76%
199	皮蝇磷	79.39%	15.06%	99.14%	9.02%	79.98%	12.81%
200	西玛津	75.07%	12.06%	96.70%	18.36%	78.19%	10.25%
201	四氯硝基苯	105.51%	6.18%	93.52%	12.53%	92.03%	4.89%
202	特丁津	69.81%	11.85%	93.14%	14.37%	71.92%	14.10%
203	特丁净	79.26%	12.13%	118.27%	9.38%	79.36%	10.92%
204	杀虫畏	79.59%	9.20%	94.51%	8.43%	80.47%	3.92%
205	四氟醚唑	90.10%	6.67%	99.36%	8.89%	86.52%	5.03%
206	虫线磷	94.74%	3.05%	89.21%	5.09%	88.94%	10.24%

表 A.5 大米 A、B 组农残加标回收率及相对标准偏差结果 (n=6)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	90.04%	5.01%	68.42%	1.72%	76.19%	1.17%
2	乙草胺	95.87%	3.06%	78.84%	2.53%	85.14%	0.97%
3	苯草醚	107.40%	4.85%	80.98%	5.89%	84.93%	0.41%
4	甲草胺	98.11%	7.70%	79.32%	4.93%	86.05%	1.02%
5	烯丙菊酯	76.70%	2.60%	77.20%	6.11%	91.83%	3.64%
6	α-六六六	105.23%	4.36%	80.32%	2.08%	90.07%	1.27%
7	α-硫丹	107.89%	6.06%	75.86%	3.45%	87.31%	1.77%
8	莎稗磷	108.09%	1.90%	83.41%	2.13%	88.46%	0.59%
9	脱乙基莠去津	97.28%	6.65%	81.32%	4.17%	85.15%	1.53%
7	β-硫丹	109.97%	7.66%	88.29%	0.18%	88.44%	1.12%
10	联苯菊酯	106.51%	5.98%	85.67%	3.59%	88.83%	1.61%
11	啶酰菌胺	95.56%	5.85%	79.48%	5.46%	83.77%	1.06%
12	除草定	118.93%	5.07%	91.69%	0.58%	101.51%	0.24%
13	溴苯烯磷	115.97%	6.92%	82.50%	4.68%	93.58%	0.75%
14	溴硫磷	101.31%	4.78%	73.98%	1.08%	85.74%	1.40%
15	溴螨酯	117.17%	3.55%	90.10%	1.58%	95.33%	0.76%
16	乙嘧酚磺酸酯	117.47%	3.70%	83.51%	2.24%	90.53%	0.68%
17	三硫磷	115.39%	1.70%	84.48%	1.16%	101.44%	0.67%
18	虫螨磷 1	117.30%	4.75%	86.20%	3.91%	101.72%	2.11%
	虫螨磷 2	94.66%	2.26%	89.36%	4.64%	108.01%	2.03%
19	环草敌	88.11%	4.74%	68.06%	1.27%	69.31%	0.58%
20	环氟菌胺	113.73%	3.07%	85.39%	1.58%	90.97%	1.24%
21	氯氰菊酯	108.78%	9.47%	81.79%	1.21%	94.38%	0.51%
22	脱叶磷	114.58%	5.53%	90.67%	3.18%	100.85%	1.63%
23	溴氰菊酯	103.23%	6.13%	80.80%	1.57%	88.51%	3.28%
24	除线磷	94.71%	3.75%	76.02%	0.71%	83.31%	0.76%
25	敌草腈	90.25%	6.08%	63.35%	1.37%	102.59%	2.96%
26	敌敌畏	108.49%	4.41%	75.66%	3.25%	84.72%	2.83%
27	氯硝胺	75.45%	4.54%	82.72%	5.59%	81.53%	1.63%
28	三氯杀螨醇	96.12%	2.75%	77.97%	2.17%	82.66%	0.54%
29	乐果	97.51%	5.70%	75.94%	4.25%	79.14%	1.41%
30	敌噁磷	98.06%	12.82%	67.69%	7.80%	85.81%	3.08%
31	灭菌磷	107.98%	6.78%	78.36%	4.29%	85.71%	5.02%
32	敌瘟磷	116.86%	6.49%	86.93%	3.90%	95.82%	1.26%
33	异狄氏剂	107.32%	5.31%	80.07%	1.70%	92.38%	0.52%
34	苯硫磷	111.20%	7.65%	86.24%	5.69%	91.12%	2.01%

35	氟环唑	99.79%	4.09%	82.43%	4.10%	83.95%	1.77%
36	乙丁烯氟灵	97.67%	3.24%	76.22%	1.51%	84.80%	1.25%
37	灭线磷	97.24%	4.11%	76.47%	2.82%	83.28%	0.91%
38	咪唑菌酮	107.60%	3.42%	87.19%	3.68%	90.08%	0.49%
39	氯苯嘧啶醇	101.31%	3.20%	82.85%	6.06%	87.01%	1.16%
40	苯硫威	102.08%	3.11%	75.70%	4.08%	84.16%	0.64%
41	丰索磷	118.89%	4.56%	97.79%	4.58%	107.07%	4.35%
42	倍硫磷	108.59%	6.52%	109.33%	9.48%	110.55%	7.01%
43	氰戊菊酯 1	110.73%	3.02%	87.96%	1.23%	90.37%	0.98%
	氰戊菊酯 2	87.07%	5.42%	70.13%	1.89%	72.55%	0.84%
44	氟酰胺	115.50%	4.63%	89.40%	4.07%	97.71%	0.39%
45	地虫硫磷	93.57%	7.53%	72.57%	2.59%	80.47%	1.73%
46	安硫磷	98.24%	3.74%	82.56%	5.93%	90.57%	5.87%
47	噻唑磷	116.23%	1.70%	99.56%	2.68%	107.67%	0.58%
48	六氯苯	77.20%	5.97%	69.81%	0.48%	73.69%	1.19%
49	环嗪酮	106.91%	3.62%	85.47%	2.95%	88.01%	0.86%
50	抑霉唑	79.22%	3.32%	98.66%	3.24%	69.89%	0.75%
51	异稻瘟净	100.31%	3.69%	77.81%	3.77%	88.45%	1.76%
52	异柳磷	107.40%	1.92%	80.89%	2.76%	88.83%	0.68%
53	甲基异柳磷	101.55%	5.45%	78.47%	4.22%	83.42%	0.54%
54	异丙威	117.41%	2.03%	87.14%	0.55%	88.05%	1.25%
55	噁唑啉	115.19%	7.71%	83.09%	4.18%	82.94%	0.75%
56	醚菌酯	106.56%	4.91%	80.03%	2.77%	85.98%	0.33%
57	啶菌胺	77.88%	3.52%	89.80%	2.90%	92.23%	0.59%
58	地胺磷	118.16%	7.42%	82.40%	9.84%	92.32%	1.33%
59	甲霜灵	99.87%	6.31%	82.29%	5.27%	89.73%	3.45%
60	虫螨畏	100.16%	3.56%	77.45%	1.65%	82.74%	0.97%
61	甲胺磷	83.42%	4.48%	62.90%	2.90%	99.00%	3.61%
62	异丙甲草胺	99.65%	2.81%	81.05%	2.81%	85.89%	0.57%
63	噻草酮	87.33%	4.95%	67.60%	2.33%	78.74%	0.86%
64	速灭磷	105.47%	3.08%	81.13%	2.31%	87.05%	0.67%
65	禾草敌	96.64%	4.73%	73.08%	2.58%	79.22%	3.00%
66	久效磷	93.02%	6.15%	71.65%	5.18%	77.13%	2.05%
67	2,4'-滴滴滴	103.78%	6.33%	81.13%	3.85%	85.57%	0.49%
67	2,4'-滴滴涕	107.63%	7.05%	83.05%	4.28%	88.64%	0.66%
68	噁草酮	106.87%	6.38%	82.19%	3.79%	86.09%	2.50%
69	乙氧氟草醚	118.02%	2.59%	84.58%	2.53%	97.78%	1.86%
67	4,4'-滴滴滴	112.61%	6.32%	86.37%	3.55%	92.47%	0.82%
67	4,4'-滴滴伊	100.26%	5.60%	81.59%	1.97%	85.92%	0.81%
70	对氧磷	96.69%	2.43%	79.61%	7.23%	89.45%	0.99%
71	甲基对氧磷	95.28%	8.05%	81.02%	5.72%	101.82%	2.41%

72	对硫磷	101.29%	6.63%	78.32%	6.76%	87.44%	1.73%
73	戊菌唑	101.75%	5.07%	79.39%	4.93%	87.09%	0.52%
74	氯菊酯	116.15%	6.31%	86.25%	3.43%	102.21%	1.68%
75	甲拌磷砒	108.65%	4.99%	80.62%	4.92%	91.94%	0.79%
75	甲拌磷亚砒	107.59%	6.21%	83.28%	11.42%	98.36%	0.96%
76	增效醚	113.55%	3.77%	81.90%	1.76%	93.43%	0.50%
77	哌草磷	111.16%	3.75%	82.56%	3.92%	90.48%	0.70%
78	抗蚜威	100.28%	7.27%	80.64%	3.40%	82.91%	1.30%
79	甲基嘧啶磷	94.37%	7.13%	73.62%	2.55%	81.14%	0.98%
80	丙草胺	112.31%	8.62%	82.96%	3.66%	90.66%	0.30%
81	环丙氟灵	93.44%	5.43%	75.01%	3.46%	81.01%	1.71%
82	扑灭津	99.31%	3.58%	81.25%	2.28%	86.43%	0.32%
83	胺丙畏	91.82%	7.91%	73.61%	5.19%	79.01%	1.28%
84	残杀威	92.49%	6.70%	102.59%	2.21%	116.04%	6.26%
85	吡菌磷	100.50%	4.24%	79.54%	5.42%	81.30%	1.94%
86	哒螨灵	104.41%	3.61%	82.57%	3.10%	86.00%	0.71%
87	吡丙醚	102.96%	5.37%	81.24%	2.39%	83.64%	1.28%
88	啶硫磷	102.99%	7.19%	75.41%	3.88%	83.63%	0.80%
89	啶氧灵	64.06%	5.11%	83.97%	2.62%	83.60%	0.70%
90	治螟磷	95.20%	3.47%	75.92%	2.00%	85.55%	0.44%
91	戊唑醇	104.92%	6.66%	82.58%	4.71%	89.44%	1.21%
92	吡螨胺	116.57%	7.97%	89.84%	3.33%	100.11%	4.21%
93	丁基嘧啶磷	93.27%	7.65%	73.83%	0.77%	83.48%	1.28%
94	特丁硫磷	109.58%	11.46%	105.86%	14.25%	109.25%	15.17%
94	特丁硫磷砒	113.08%	3.40%	83.20%	5.01%	89.62%	0.69%
95	三氯杀螨砒	105.96%	2.59%	86.25%	0.99%	86.60%	0.46%
96	胺菊酯 1	113.85%	7.39%	86.15%	4.17%	85.61%	0.60%
	胺菊酯 2	111.78%	9.72%	83.00%	3.76%	95.86%	0.25%
97	禾草丹	94.10%	3.77%	73.22%	1.61%	81.33%	0.34%
98	三唑酮	101.63%	2.83%	79.16%	3.13%	87.36%	0.13%
99	三唑醇	114.76%	3.12%	83.27%	3.69%	85.83%	0.34%
100	野麦畏	93.90%	3.57%	74.70%	0.60%	82.08%	0.53%
101	三唑磷	96.47%	3.35%	77.69%	2.78%	78.26%	1.05%
102	肟菌酯	105.29%	6.78%	80.12%	5.26%	78.43%	0.90%
103	乙烯菌核利	100.24%	3.09%	81.91%	1.51%	85.51%	0.23%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
104	氟丙菊酯	86.01%	7.57%	97.33%	4.62%	105.55%	5.04%
105	艾氏剂	109.68%	2.71%	105.42%	3.39%	106.02%	2.67%
106	莠灭净	79.33%	6.67%	87.85%	2.43%	96.88%	2.99%

107	阿特拉通	67.07%	5.91%	107.28%	1.89%	104.48%	2.10%
108	莠去津	101.93%	3.09%	101.65%	1.00%	101.58%	1.45%
109	益棉磷	105.28%	5.26%	99.60%	5.97%	85.27%	1.95%
110	氟丁酰草胺	75.09%	3.87%	104.79%	1.04%	105.79%	2.61%
111	苯霜灵	106.46%	3.49%	93.31%	2.59%	113.40%	2.39%
112	乙丁氟灵	87.15%	6.10%	109.05%	1.17%	96.18%	1.85%
6	β-六六六	93.04%	4.92%	108.69%	2.09%	116.83%	2.28%
113	甲羧除草醚	94.58%	0.50%	91.22%	1.83%	115.59%	2.19%
114	联苯	70.44%	4.39%	98.69%	3.28%	104.22%	7.66%
115	乙基溴硫磷	75.05%	4.11%	94.25%	2.37%	99.09%	1.77%
116	丁草胺	71.68%	5.92%	89.41%	2.67%	100.26%	3.21%
117	抑草磷	90.80%	8.47%	109.54%	4.91%	98.30%	6.23%
118	克百威	108.43%	2.85%	95.70%	5.08%	85.97%	6.44%
119	氯丹-反式	98.44%	3.32%	91.69%	2.60%	115.92%	1.41%
120	杀螨酯	80.42%	3.23%	108.51%	2.68%	116.85%	1.95%
121	毒虫畏	88.43%	6.74%	101.03%	1.73%	108.92%	3.59%
122	乙酯杀螨醇	84.14%	2.97%	108.34%	1.61%	108.44%	1.97%
123	氯苯甲醚	114.26%	3.87%	105.24%	0.95%	103.74%	2.76%
124	氯苯胺灵	100.70%	4.23%	110.91%	2.68%	89.78%	1.15%
125	毒死蜱	90.88%	5.07%	108.05%	2.90%	95.12%	1.86%
126	甲基毒死蜱	78.90%	4.65%	108.71%	2.29%	106.57%	2.48%
127	异噁草酮	109.33%	6.48%	100.54%	1.98%	101.47%	3.11%
128	蝇毒磷	63.56%	3.76%	96.88%	6.51%	111.33%	2.53%
129	氟氯氰菊酯	91.25%	1.10%	92.69%	1.29%	104.67%	2.66%
130	环丙唑醇	105.48%	2.40%	101.61%	1.28%	100.45%	2.40%
131	噻菌环胺	88.42%	4.66%	94.37%	1.41%	90.80%	1.88%
6	δ-六六六	110.26%	3.26%	97.89%	3.24%	102.70%	2.95%
132	敌草净	104.51%	5.44%	109.61%	1.08%	97.46%	3.24%
133	二嗪磷	75.04%	9.62%	87.51%	4.14%	98.16%	3.89%
134	禾草灵	94.26%	2.92%	108.20%	2.80%	118.83%	1.63%
135	百治磷	79.86%	6.48%	95.32%	2.76%	113.18%	3.39%
136	狄氏剂	101.56%	2.58%	113.34%	0.40%	110.87%	2.01%
137	苯醚甲环唑	87.58%	4.85%	97.05%	2.29%	95.93%	1.44%
138	烯唑醇	80.93%	8.72%	97.47%	3.58%	95.28%	4.99%
139	二苯胺	69.13%	3.98%	93.57%	0.70%	92.02%	2.50%
140	异丙净	104.17%	4.91%	109.69%	1.77%	98.36%	2.06%
141	硫草敌	64.12%	2.18%	97.78%	2.29%	95.54%	6.46%
142	乙硫磷	92.79%	3.39%	95.03%	1.89%	97.01%	1.99%
143	乙氧呋草黄	108.39%	3.61%	108.57%	1.50%	106.41%	2.01%
144	乙螨唑	114.47%	2.89%	107.79%	1.99%	106.27%	1.35%
145	土菌灵	71.08%	2.80%	98.35%	1.64%	98.71%	3.80%

146	乙嘧硫磷	71.83%	4.46%	106.48%	1.64%	102.00%	2.20%
147	伐灭磷	105.22%	5.38%	94.90%	4.35%	89.51%	3.94%
148	腈苯唑	79.10%	4.98%	103.54%	2.81%	99.75%	2.54%
149	杀螟硫磷	99.24%	7.04%	92.91%	1.74%	102.04%	2.75%
150	仲丁威	98.66%	3.11%	113.82%	0.76%	116.90%	2.49%
151	甲氰菊酯	92.72%	1.81%	107.76%	2.17%	113.01%	1.58%
42	倍硫磷砒	104.87%	6.38%	95.10%	2.10%	93.64%	1.91%
42	倍硫磷亚砒	104.47%	6.13%	102.79%	5.74%	97.24%	0.97%
152	氟虫腈	112.96%	3.09%	98.87%	1.64%	110.98%	2.42%
153	吡氟禾草灵	93.87%	4.45%	102.11%	2.84%	107.80%	2.58%
154	氟氰戊菊酯-1	106.62%	7.14%	103.92%	1.82%	99.06%	3.22%
	氟氰戊菊酯-2	104.07%	5.94%	104.45%	2.22%	106.18%	0.99%
155	咯菌腈	102.92%	2.82%	103.74%	1.55%	101.55%	1.75%
156	三氟硝草醚	95.22%	8.82%	102.12%	3.80%	103.19%	6.45%
157	氟啶唑	71.28%	3.47%	103.72%	1.52%	103.26%	1.47%
158	氟胺氰菊酯	105.33%	5.60%	109.99%	3.96%	100.29%	5.84%
6	γ-六六六	92.97%	2.93%	106.48%	1.93%	98.70%	2.34%
159	己唑醇	90.06%	8.40%	95.26%	0.71%	107.71%	3.21%
160	异菌脲	98.01%	4.88%	94.93%	1.72%	96.37%	4.97%
161	氯唑磷	93.85%	5.29%	111.32%	1.73%	95.10%	2.07%
162	水胺硫磷	92.97%	8.29%	91.35%	2.83%	111.48%	8.62%
163	氧异柳磷	87.66%	16.05%	106.88%	3.71%	98.02%	8.67%
164	稻瘟灵	108.27%	3.29%	106.34%	2.41%	108.02%	2.53%
165	高效氯氟氰菊酯-1	104.23%	4.12%	97.57%	6.49%	95.42%	5.17%
	高效氯氟氰菊酯-2	108.83%	3.39%	93.25%	4.33%	90.24%	2.86%
166	溴苯腈	72.51%	4.16%	93.18%	5.29%	94.54%	4.23%
167	马拉氧磷	87.88%	5.46%	91.10%	1.44%	93.56%	4.59%
168	马拉硫磷	83.06%	5.04%	94.39%	2.12%	102.79%	2.17%
169	苯噻酰草胺	96.41%	2.96%	100.87%	2.46%	100.43%	2.03%
170	杀扑磷	91.06%	4.76%	96.14%	1.72%	103.34%	3.84%
171	烯虫酯	76.06%	10.61%	104.26%	4.66%	94.73%	6.52%
172	甲氧滴滴涕	72.00%	9.70%	109.29%	5.97%	104.04%	4.11%
173	绿谷隆	69.08%	5.10%	96.44%	2.30%	105.23%	1.08%
174	腈菌唑	95.17%	3.84%	106.77%	3.39%	107.51%	2.53%
175	二溴磷	116.34%	0.61%	82.99%	6.73%	79.25%	8.55%
176	敌草胺	109.26%	2.87%	99.96%	1.46%	106.21%	2.15%
177	除草醚	78.69%	6.66%	98.35%	3.50%	106.82%	4.13%
67	2,4'-滴滴伊	105.47%	3.06%	105.03%	3.28%	106.00%	1.98%
178	氧乐果	101.26%	4.91%	109.92%	4.32%	101.27%	7.65%

179	噁霜灵	79.91%	1.68%	94.12%	2.19%	107.55%	1.96%
67	4,4'-滴滴涕	114.72%	2.30%	102.01%	2.46%	107.13%	2.66%
180	多效唑	78.44%	4.49%	106.60%	1.38%	107.99%	2.55%
181	甲基对硫磷	87.99%	7.10%	103.09%	2.83%	94.29%	2.56%
182	二甲戊灵	102.84%	7.58%	98.65%	3.03%	102.80%	2.16%
183	五氯苯胺	85.52%	3.52%	83.24%	2.49%	75.14%	1.40%
184	五氯硝基苯	101.56%	4.69%	107.50%	1.98%	103.66%	2.28%
75	甲拌磷	97.48%	4.14%	88.03%	1.12%	83.83%	10.10%
185	伏杀硫磷	91.92%	6.06%	90.73%	5.82%	92.96%	3.53%
186	硫环磷	72.89%	6.39%	98.00%	1.65%	103.63%	3.42%
187	亚胺硫磷	100.91%	6.41%	108.70%	6.72%	100.24%	3.82%
188	磷胺	65.95%	11.19%	101.72%	5.35%	91.40%	5.64%
189	噻啉磷	75.10%	6.63%	101.18%	4.74%	88.07%	2.15%
190	腐霉利	92.22%	7.05%	108.97%	1.72%	110.80%	2.18%
191	丙溴磷	90.45%	6.09%	88.36%	3.35%	108.28%	5.82%
192	扑草净	92.82%	8.86%	98.79%	2.50%	101.71%	4.44%
193	炔苯酰草胺	79.58%	6.51%	94.69%	1.88%	97.66%	2.42%
194	敌稗	101.95%	6.03%	87.44%	1.43%	97.76%	1.88%
195	丙环唑	110.09%	3.83%	107.49%	2.37%	110.17%	1.75%
196	丙硫磷	75.99%	8.33%	108.24%	3.67%	95.30%	4.90%
197	哒嗪硫磷	75.36%	7.46%	97.66%	7.59%	105.25%	1.64%
198	噻霉胺	68.86%	8.03%	75.56%	4.03%	74.55%	3.61%
199	皮蝇磷	101.49%	8.01%	98.86%	5.36%	106.24%	4.58%
200	西玛津	103.47%	4.01%	100.41%	1.38%	108.98%	1.83%
201	四氯硝基苯	80.02%	9.16%	106.67%	0.54%	104.35%	5.43%
202	特丁津	104.95%	4.36%	102.62%	1.66%	105.37%	1.17%
203	特丁净	87.77%	5.30%	97.75%	2.71%	99.98%	2.70%
204	杀虫畏	90.12%	2.91%	104.29%	2.33%	93.20%	5.66%
205	四氟醚唑	91.35%	7.59%	101.51%	3.78%	104.05%	3.97%
206	虫线磷	81.81%	7.90%	96.83%	1.03%	96.94%	3.90%
207	甲基立枯磷	96.25%	4.81%	109.05%	2.52%	96.77%	1.89%
208	毒壤磷	102.69%	5.78%	107.77%	3.41%	96.14%	2.53%

表 A.6 茶叶 A、B 组农残加标回收率及相对标准偏差结果 (n=9)

序号	检测项目	A 组加标回收率结果 (上机检测浓度)					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
1	乙酰甲胺磷	85.71%	8.44%	107.82%	7.55%	116.38%	3.40%
2	乙草胺	92.05%	1.16%	96.54%	2.24%	87.55%	0.19%
3	苯草醚	80.94%	3.37%	84.90%	4.64%	81.26%	1.57%
4	甲草胺	91.65%	5.11%	91.82%	4.65%	89.17%	2.25%
5	烯丙菊酯	106.24%	8.37%	100.66%	1.23%	99.85%	3.06%
6	α-六六六	92.26%	2.17%	84.71%	4.98%	85.54%	1.71%
7	α-硫丹	91.86%	1.21%	85.98%	3.80%	87.59%	1.46%
8	莎稗磷	83.52%	5.33%	64.81%	4.51%	94.56%	2.13%
9	脱乙基莠去津	70.96%	0.58%	79.42%	8.61%	76.21%	3.87%
7	β-硫丹	81.93%	1.74%	86.84%	4.89%	84.25%	2.40%
10	联苯菊酯	96.39%	2.02%	102.47%	2.92%	91.59%	1.11%
11	啶酰菌胺	89.31%	1.96%	80.17%	1.28%	86.22%	7.00%
12	除草定	88.60%	0.86%	99.09%	3.63%	92.00%	1.90%
13	溴苯烯磷	93.75%	3.55%	105.29%	4.92%	110.41%	2.59%
14	溴硫磷	89.18%	3.57%	84.75%	6.43%	88.47%	3.70%
15	溴螨酯	87.47%	1.48%	88.41%	4.89%	81.35%	0.85%
16	乙嘧酚磺酸酯	99.39%	5.63%	85.15%	5.90%	75.45%	8.38%
17	三硫磷	95.31%	4.80%	92.74%	10.04%	88.62%	3.36%
18	虫螨磷 1	85.70%	2.12%	88.27%	6.94%	113.65%	0.49%
	虫螨磷 2	100.40%	3.65%	108.30%	4.99%	100.42%	2.75%
19	环草敌	88.36%	1.51%	96.76%	5.05%	92.58%	2.26%
20	环氟菌胺	110.17%	2.12%	102.39%	3.59%	93.22%	0.55%
21	氯氰菊酯	78.60%	1.64%	80.68%	3.28%	77.58%	0.52%
22	脱叶磷	89.45%	2.74%	95.05%	5.73%	88.19%	1.38%
23	溴氰菊酯	94.97%	2.10%	90.88%	3.46%	87.05%	2.43%
24	除线磷	91.65%	3.42%	93.85%	6.46%	88.55%	2.82%
25	敌草腈	90.77%	1.21%	96.29%	3.90%	86.01%	1.01%
26	敌敌畏	109.27%	5.26%	112.81%	5.41%	111.08%	4.27%
27	氯硝胺	95.43%	2.72%	99.91%	3.14%	95.82%	0.81%
28	三氯杀螨醇	91.43%	1.70%	85.47%	2.48%	87.48%	2.94%
29	乐果	95.01%	2.59%	100.59%	2.98%	94.43%	2.59%
30	敌噁磷	112.16%	10.85%	114.56%	11.14%	105.74%	3.16%
31	灭菌磷	92.50%	6.33%	97.43%	7.59%	87.70%	3.01%
32	敌瘟磷	90.02%	3.23%	95.88%	6.57%	114.02%	1.16%
33	异狄氏剂	104.09%	0.89%	88.54%	6.35%	97.05%	1.70%
34	苯硫磷	76.49%	3.43%	72.66%	3.89%	84.55%	0.33%

35	氟环唑	93.80%	0.84%	96.32%	7.32%	91.01%	1.36%
36	乙丁烯氟灵	94.13%	1.98%	90.56%	4.49%	87.59%	1.73%
37	灭线磷	87.98%	0.57%	93.88%	3.00%	92.13%	0.26%
38	咪唑菌酮	97.84%	2.64%	101.59%	6.77%	94.60%	0.40%
39	氯苯嘧啶醇	89.56%	3.67%	91.83%	6.33%	90.82%	1.22%
40	苯硫威	116.14%	2.99%	109.90%	5.75%	113.69%	1.74%
41	丰索磷	98.30%	4.15%	95.76%	5.75%	103.68%	3.42%
42	倍硫磷	100.06%	9.84%	107.78%	8.31%	113.24%	7.16%
43	氰戊菊酯 1	81.31%	4.97%	82.99%	3.44%	78.40%	1.17%
	氰戊菊酯 2	97.57%	4.61%	100.50%	3.89%	114.53%	3.28%
44	氟酰胺	94.12%	1.84%	99.38%	2.99%	91.77%	1.52%
45	地虫硫磷	97.46%	2.74%	112.05%	6.76%	102.51%	1.48%
46	安硫磷	91.76%	10.97%	75.87%	11.22%	104.08%	2.63%
47	噻唑膦	115.21%	5.54%	95.23%	5.10%	95.23%	2.01%
48	六氯苯	76.92%	2.38%	75.81%	6.09%	70.94%	2.26%
49	环嗪酮	111.98%	2.83%	93.65%	8.54%	99.41%	6.45%
50	抑霉唑	90.24%	1.54%	83.70%	3.37%	81.73%	1.65%
51	异稻瘟净	93.65%	2.63%	94.65%	3.80%	94.29%	1.79%
52	异柳磷	97.51%	3.58%	109.80%	4.04%	105.51%	2.67%
53	甲基异柳磷	115.80%	3.20%	106.51%	3.90%	117.26%	0.79%
54	异丙威	92.15%	2.79%	91.36%	5.47%	86.21%	1.53%
55	噁唑啉	76.01%	3.28%	81.54%	3.50%	76.45%	2.28%
56	醚菌酯	100.42%	1.04%	101.92%	3.93%	95.84%	0.93%
57	啞菌胺	98.63%	1.57%	97.63%	3.77%	94.06%	3.03%
58	地胺磷	96.94%	5.19%	107.89%	9.22%	113.63%	3.51%
59	甲霜灵	91.62%	3.84%	113.15%	4.84%	118.73%	3.20%
60	虫螨畏	94.65%	1.74%	87.94%	8.62%	91.00%	3.12%
61	甲胺磷	92.57%	10.28%	96.31%	18.84%	103.46%	15.95%
62	异丙甲草胺	88.75%	2.04%	100.18%	2.90%	93.25%	1.17%
63	噻草酮	89.81%	3.43%	85.13%	7.31%	82.80%	0.40%
64	速灭磷	104.07%	9.24%	105.47%	9.15%	118.45%	8.27%
65	禾草敌	106.85%	0.62%	102.65%	5.93%	98.75%	1.01%
66	久效磷	111.08%	10.65%	78.47%	15.85%	114.48%	8.99%
67	2,4'-滴滴滴	91.10%	1.63%	91.66%	3.54%	87.46%	2.82%
67	2,4'-滴滴涕	106.48%	9.83%	109.91%	4.71%	99.10%	5.58%
68	噁草酮	99.57%	1.42%	95.47%	4.32%	97.11%	1.04%
69	乙氧氟草醚	77.91%	2.13%	89.88%	2.71%	80.58%	1.80%
67	4,4'-滴滴滴	93.03%	4.21%	105.28%	4.23%	93.11%	3.43%
67	4,4'-滴滴伊	93.04%	7.49%	97.73%	6.43%	90.26%	3.37%
70	对氧磷	112.91%	8.16%	95.59%	7.78%	114.25%	8.71%
71	甲基对氧磷	82.32%	7.70%	97.85%	11.43%	105.36%	5.14%

72	对硫磷	81.66%	2.88%	88.42%	2.64%	82.58%	1.09%
73	戊菌唑	92.00%	0.75%	94.77%	3.85%	88.27%	2.89%
74	氯菊酯	93.42%	2.34%	92.94%	7.62%	89.49%	5.23%
75	甲拌磷砒	87.41%	2.89%	91.37%	2.42%	76.67%	1.27%
75	甲拌磷亚砒	83.90%	3.88%	97.50%	10.73%	102.90%	7.98%
76	增效醚	109.69%	3.29%	104.00%	6.94%	101.07%	3.24%
77	哌草磷	87.22%	3.00%	90.39%	9.00%	99.43%	8.39%
78	抗蚜威	104.42%	3.02%	101.86%	8.15%	96.14%	4.49%
79	甲基嘧啶磷	111.59%	5.88%	113.15%	6.24%	104.15%	2.69%
80	丙草胺	86.89%	1.51%	98.66%	2.45%	94.03%	1.52%
81	环丙氟灵	93.19%	0.73%	81.38%	3.78%	85.72%	1.37%
82	扑灭津	99.47%	3.23%	91.09%	6.94%	113.05%	3.70%
83	胺丙畏	88.25%	1.78%	100.83%	4.97%	89.75%	6.94%
84	残杀威	74.54%	6.69%	73.67%	10.79%	91.37%	17.30%
85	吡菌磷	91.07%	2.01%	90.17%	3.39%	91.48%	2.62%
86	哒螨灵	96.52%	0.85%	97.68%	4.02%	93.97%	1.82%
87	吡丙醚	91.53%	2.18%	97.04%	7.19%	89.05%	2.18%
88	啶硫磷	105.61%	2.00%	106.71%	6.55%	101.88%	4.03%
89	啶氧灵	91.95%	2.52%	78.90%	4.94%	77.78%	7.80%
90	治螟磷	98.21%	1.96%	100.35%	4.02%	95.27%	1.52%
91	戊唑醇	84.16%	0.57%	92.20%	5.66%	89.94%	1.54%
92	吡螨胺	92.86%	5.53%	95.69%	3.44%	88.82%	2.48%
93	丁基嘧啶磷	96.55%	1.57%	93.80%	2.83%	81.12%	1.56%
94	特丁硫磷	96.50%	11.08%	101.31%	5.24%	112.97%	9.30%
94	特丁硫磷砒	98.22%	3.61%	91.60%	4.56%	87.34%	0.70%
95	三氯杀螨砒	87.65%	5.17%	95.96%	3.56%	88.12%	2.75%
96	胺菊酯 1	99.65%	4.26%	101.54%	4.46%	82.40%	1.56%
	胺菊酯 2	98.38%	3.42%	104.10%	7.09%	100.53%	1.37%
97	禾草丹	94.22%	4.48%	96.95%	12.76%	115.13%	6.69%
98	三唑酮	80.67%	1.78%	78.84%	7.73%	90.08%	3.47%
99	三唑醇	93.90%	2.49%	97.09%	2.27%	92.61%	2.58%
100	野麦畏	94.89%	4.82%	90.06%	7.10%	89.24%	5.69%
101	三唑磷	89.12%	5.08%	97.55%	2.08%	90.54%	1.36%
102	肟菌酯	89.95%	2.80%	95.16%	5.15%	90.07%	2.52%
103	乙烯菌核利	88.26%	1.01%	98.58%	3.16%	81.67%	0.69%
序号	检测项目	B 组加标回收率结果（上机检测浓度）					
		20 µg/L		40 µg/L		100 µg/L	
		AVG.	RSD	AVG.	RSD	AVG.	RSD
104	氟丙菊酯	93.31%	5.66%	73.22%	2.88%	74.68%	0.87%
105	艾氏剂	75.76%	3.73%	80.70%	2.27%	108.41%	1.88%
106	莠灭净	109.17%	1.09%	114.55%	1.00%	109.42%	3.39%

107	阿特拉通	114.43%	0.93%	88.80%	2.77%	109.02%	3.59%
108	莠去津	99.53%	4.58%	92.48%	3.33%	108.49%	6.89%
109	益棉磷	88.79%	9.29%	77.93%	4.65%	68.75%	9.69%
110	氟丁酰草胺	80.25%	1.16%	92.62%	2.45%	111.14%	2.76%
111	苯霜灵	103.58%	2.77%	95.26%	1.22%	111.02%	2.38%
112	乙丁氟灵	99.20%	1.74%	112.59%	1.91%	110.91%	1.73%
6	β-六六六	93.27%	1.34%	96.67%	2.39%	86.35%	2.74%
113	甲羧除草醚	99.21%	4.79%	104.84%	8.65%	97.03%	8.31%
114	联苯	91.06%	4.43%	87.65%	2.42%	71.27%	1.70%
115	乙基溴硫磷	81.06%	1.12%	87.58%	1.11%	107.26%	1.86%
116	丁草胺	100.27%	0.67%	90.03%	3.82%	108.32%	1.44%
117	抑草磷	77.30%	1.96%	90.96%	0.92%	78.69%	0.97%
118	克百威	75.66%	9.45%	83.51%	9.12%	88.55%	14.87%
119	氯丹-反式	89.66%	1.39%	93.31%	2.84%	86.20%	1.23%
120	杀螨酯	85.26%	3.23%	94.48%	6.90%	110.41%	0.52%
121	毒虫畏	99.39%	6.29%	80.48%	9.78%	81.13%	2.65%
122	乙酯杀螨醇	91.25%	0.60%	96.86%	2.32%	88.47%	1.67%
123	氯苯甲醚	102.70%	4.21%	100.68%	2.87%	85.69%	3.03%
124	氯苯胺灵	91.47%	7.96%	102.33%	4.18%	91.72%	11.47%
125	毒死蜱	100.57%	5.68%	114.30%	5.72%	117.23%	3.97%
126	甲基毒死蜱	79.10%	4.34%	81.57%	3.01%	79.04%	1.95%
127	异噁草酮	99.85%	3.48%	90.64%	1.24%	110.62%	2.08%
128	蝇毒磷	88.38%	5.47%	68.68%	2.86%	66.24%	2.77%
129	氟氯氰菊酯	98.35%	2.91%	81.78%	4.87%	111.44%	3.21%
130	环丙唑醇	94.28%	3.86%	97.83%	1.20%	111.67%	3.56%
131	噻菌环胺	83.97%	2.80%	93.80%	3.14%	75.41%	1.81%
6	δ-六六六	110.18%	2.52%	103.90%	4.82%	85.78%	2.16%
132	敌草净	87.67%	3.31%	105.56%	3.55%	96.99%	2.95%
133	二嗪磷	96.46%	6.93%	79.89%	4.51%	72.65%	2.98%
134	禾草灵	103.29%	2.11%	93.78%	1.38%	86.79%	1.23%
135	百治磷	95.55%	9.34%	100.33%	1.79%	113.65%	11.17%
136	狄氏剂	103.00%	9.80%	95.88%	8.16%	108.87%	3.19%
137	苯醚甲环唑	99.14%	5.16%	79.70%	1.21%	74.88%	1.18%
138	烯唑醇	100.76%	2.05%	87.24%	4.34%	106.07%	1.79%
139	二苯胺	98.64%	3.77%	93.86%	2.49%	108.47%	0.74%
140	异丙净	110.28%	1.58%	106.72%	0.79%	108.86%	1.60%
141	硫草敌	114.02%	1.23%	93.68%	2.14%	86.09%	3.49%
142	乙硫磷	99.42%	2.69%	112.26%	1.33%	81.23%	2.27%
143	乙氧呋草黄	100.18%	0.76%	101.54%	1.03%	108.86%	2.28%
144	乙螨唑	102.33%	0.78%	94.78%	2.19%	87.08%	1.91%
145	土菌灵	78.46%	3.59%	84.03%	2.18%	76.04%	0.79%

146	乙嘧硫磷	82.12%	3.82%	94.87%	2.18%	88.43%	0.94%
147	伐灭磷	113.75%	9.46%	75.56%	3.00%	106.13%	11.45%
148	腈苯唑	95.16%	4.05%	74.99%	1.79%	68.97%	5.11%
149	杀螟硫磷	75.97%	7.38%	87.85%	4.08%	78.81%	4.56%
150	仲丁威	76.57%	1.90%	69.67%	0.71%	65.58%	2.17%
151	甲氰菊酯	103.13%	1.20%	93.83%	1.22%	87.73%	2.84%
42	倍硫磷砒	76.08%	8.37%	73.45%	2.97%	69.65%	5.08%
42	倍硫磷亚砒	77.35%	8.78%	83.02%	8.73%	106.27%	2.37%
152	氟虫腈	104.35%	3.94%	92.48%	1.90%	98.21%	3.15%
153	吡氟禾草灵	90.98%	3.80%	97.99%	2.72%	86.46%	1.01%
154	氟氰戊菊酯-1	99.80%	6.03%	81.19%	6.10%	78.12%	2.02%
	氟氰戊菊酯-2	99.24%	5.00%	80.59%	4.59%	79.08%	1.68%
155	咯菌腈	85.01%	1.76%	91.05%	1.67%	111.85%	2.60%
156	三氟硝草醚	76.85%	13.44%	87.84%	14.45%	77.91%	18.14%
157	氟啶唑	92.68%	2.93%	106.47%	2.69%	92.87%	8.18%
158	氟胺氰菊酯	83.64%	10.33%	67.74%	3.26%	66.52%	5.28%
6	γ -六六六	87.59%	3.68%	92.86%	1.73%	111.26%	2.62%
159	己唑醇	82.13%	0.63%	91.91%	1.07%	84.08%	1.22%
160	异菌脲	103.07%	2.74%	93.52%	8.09%	110.95%	2.40%
161	氯唑磷	96.38%	2.66%	89.45%	2.21%	109.64%	0.62%
162	水胺硫磷	107.44%	11.65%	110.37%	4.84%	99.00%	4.08%
163	氧异柳磷	92.33%	7.24%	108.41%	11.23%	104.64%	2.97%
164	稻瘟灵	96.97%	3.22%	99.58%	2.12%	91.90%	1.79%
165	高效氯氟氰菊酯-1	87.49%	3.85%	110.92%	5.46%	82.37%	1.74%
	高效氯氟氰菊酯-2	96.15%	4.49%	82.40%	1.55%	82.54%	2.43%
166	溴苯腈	79.16%	7.63%	79.14%	6.59%	73.69%	5.17%
167	马拉氧磷	105.53%	8.80%	98.22%	9.19%	109.80%	8.15%
168	马拉硫磷	99.39%	4.18%	109.81%	3.13%	79.20%	4.06%
169	苯噻酰草胺	78.91%	3.88%	87.76%	3.17%	71.42%	3.31%
170	杀扑磷	96.02%	14.72%	110.18%	4.03%	89.71%	8.70%
171	烯虫酯	112.32%	6.19%	102.79%	4.06%	83.89%	5.25%
172	甲氧滴滴涕	102.25%	4.96%	105.62%	2.39%	107.12%	5.49%
173	绿谷隆	103.29%	9.58%	111.95%	1.99%	106.16%	9.32%
174	腈菌唑	104.28%	2.82%	93.99%	2.91%	81.08%	5.20%
175	二溴磷	98.45%	5.87%	101.76%	3.10%	99.79%	1.70%
176	敌草胺	96.77%	3.65%	99.46%	1.64%	83.25%	1.81%
177	除草醚	98.99%	6.39%	80.46%	6.60%	107.16%	6.54%
67	2,4'-滴滴伊	102.85%	1.52%	91.20%	1.38%	108.32%	1.29%

178	氧乐果	74.79%	15.35%	107.37%	6.21%	91.45%	11.07%
179	噁霜灵	93.07%	3.57%	90.77%	3.73%	81.91%	6.52%
67	4,4'-滴滴涕	98.12%	0.77%	82.71%	5.14%	111.84%	2.10%
180	多效唑	85.04%	4.43%	95.91%	5.91%	98.06%	1.24%
181	甲基对硫磷	98.72%	4.86%	86.71%	2.40%	82.57%	2.82%
182	二甲戊灵	80.77%	4.49%	83.36%	3.53%	73.13%	2.90%
183	五氯苯胺	97.42%	1.64%	73.96%	1.97%	71.37%	0.52%
184	五氯硝基苯	80.65%	1.15%	86.86%	3.60%	76.19%	1.84%
75	甲拌磷	114.28%	9.17%	105.00%	10.25%	99.49%	2.59%
185	伏杀硫磷	80.49%	9.69%	80.73%	4.12%	70.12%	6.48%
186	硫环磷	76.20%	5.70%	71.06%	2.88%	62.62%	5.35%
187	亚胺硫磷	84.15%	13.26%	73.99%	8.31%	64.69%	12.41%
188	磷胺	105.28%	6.23%	91.00%	8.87%	94.04%	2.20%
189	噻啉磷	94.85%	0.38%	101.08%	2.31%	88.70%	0.69%
190	腐霉利	88.16%	3.66%	105.91%	2.17%	90.82%	1.83%
191	丙溴磷	97.71%	4.37%	83.66%	9.03%	94.01%	5.39%
192	扑草净	116.82%	5.42%	105.99%	0.37%	104.98%	3.26%
193	炔苯酰草胺	81.11%	3.63%	112.64%	5.82%	97.92%	6.41%
194	敌稗	84.75%	1.72%	93.49%	3.19%	111.87%	1.52%
195	丙环唑	72.12%	3.18%	81.32%	3.64%	106.67%	3.22%
196	丙硫磷	100.01%	5.16%	90.58%	4.94%	98.29%	2.30%
197	哒嗪硫磷	98.14%	4.99%	76.91%	6.36%	71.79%	11.11%
198	噻霉胺	114.67%	2.67%	89.00%	1.38%	107.46%	2.46%
199	皮蝇磷	114.62%	6.19%	81.31%	1.13%	80.43%	0.56%
200	西玛津	99.86%	3.45%	111.03%	3.29%	108.36%	8.83%
201	四氯硝基苯	80.23%	3.50%	110.07%	0.66%	107.59%	3.37%
202	特丁津	98.76%	3.37%	91.60%	2.10%	108.58%	4.85%
203	特丁净	102.48%	1.52%	112.78%	4.07%	104.26%	4.31%
204	杀虫畏	104.46%	4.02%	93.32%	11.32%	95.78%	18.50%
205	四氟醚唑	103.08%	4.93%	95.19%	5.61%	83.25%	1.33%
206	虫线磷	99.54%	4.08%	92.75%	2.10%	110.43%	0.20%
207	甲基枯磷	99.83%	2.36%	89.05%	1.01%	108.95%	1.12%
208	毒壤磷	89.75%	4.27%	100.29%	4.04%	91.07%	4.80%

附录 B

表 B 208 种农药及其代谢物的定性、定量离子及保留时间表

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
1	乙酰甲胺磷	Acephate	15.09	136.0 - 94.0	136.0 - 42.0
2	乙草胺	Acetochlor	21.33	222.9 - 132.2	222.9 - 147.2
3	苯草醚	Aclonifen	28.94	212.1 - 182.2	264.1 - 194.2
4	甲草胺	Alachlor	21.71	188.1 - 160.2	160.0 - 132.1
5	烯丙菊酯	Allethrin	23.54	123.0 - 81.0	107.0 - 91.0
6	α -六六六	alpha-BHC	17.65	218.9 - 183.0	216.9 - 181.0
7	α -硫丹	alpha-Endosulfan	24.95	194.9 - 159	194.9 - 125.0
8	莎稗磷	Anilofos	31.64	225.9 - 184.0	225.9 - 157.0
9	脱乙基莠去津	Atrazine-desethyl	18.54	172.0 - 94.0	187.0 - 172.0
7	β -硫丹	beta-Endosulfan	28.57	206.9 - 172	194.9 - 124.9
10	联苯菊酯	Bifenthrin	29.79	181.2 - 165.2	181.2 - 166.2
11	啶酰菌胺	Boscalid	34.77	140.0 - 112.0	140.0 - 76.0
12	除草定	Bromacil	26.37	205.0 - 188.0	207.0 - 190.0
13	溴苯烯磷	Bromfenvinfos	26.50	266.9 - 159.1	268.9 - 161.1
14	溴硫磷	Bromophos	23.48	330.8 - 315.8	328.8 - 313.8
15	溴螨酯	Bromopropylate	30.50	185.0 - 157.0	183.0 - 155.0
16	乙嘧啶磺酸酯	Bupirimate	27.88	272.9 - 193.1	272.9 - 108.0
17	三硫磷	Carbophenothion	29.01	153.0 - 96.9	199.0 - 143.0
18	虫螨磷-1	Chlorthiophos-1	27.80	324.8 - 268.9	296.8 - 268.9
	虫螨磷-2	Chlorthiophos-2	28.27	324.8 - 268.9	296.8 - 268.9
19	环草敌	Cycloate	14.94	154.1 - 83.1	154.1 - 72.1
20	环氟菌胺	Cyflufenamid	27.67	118.1 - 90.0	118.1 - 89.0
21	氯氰菊酯-1	Cypermethrin-1	33.85	163.0 - 91.0	163.0 - 127.0
	氯氰菊酯-2	Cypermethrin-2	34.13	163.0 - 91.0	163.0 - 127.0
	氯氰菊酯-3	Cypermethrin-3	34.19	163.0 - 91.0	163.0 - 127.0
	氯氰菊酯-4	Cypermethrin-4	34.32	163.0 - 91.0	163.0 - 127.0
22	脱叶磷	DEF	26.10	202.0 - 147.0	169.0 - 57.1
23	溴氰菊酯	Deltamethrin	36.97	252.9 - 93.0	250.7 - 172.0
24	除线磷	Dichlofenthion	20.43	278.9 - 222.9	222.9 - 204.9
25	敌草腈	Dichlorobenzonitrile	10.79	171.0 - 100.0	171.0 - 136.1
26	敌敌畏	Dichlorvos	8.46	109.0 - 79.0	184.9 - 93.0
27	氯硝胺	Dicloran	19.74	206.1 - 176.0	160.1 - 124.1
28	三氯杀螨醇	Dicofol	23.38	139.0 - 111.0	250.9 - 138.9
29	乐果	Dimethoate	21.04	86.9 - 46.0	142.9 - 111.0
30	敌噁磷	Dioxathion	19.33	271.0 - 96.9	152.9 - 96.9
31	灭菌磷	Ditalimfos	26.99	130.0 - 102.1	148.0 - 130.1

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
32	敌瘟磷	Edifenphos	29.52	172.9 - 109.0	201.0 - 109.0
33	异狄氏剂	Endrin	27.00	262.8 - 193.0	244.8 - 173.0
34	苯硫磷	EPN	31.16	169.0 - 141.1	169.0 - 77.1
35	氟环唑-1	Epoxiconazole-1	29.73	192.0 - 138.1	192.0 - 111.0
	氟环唑-2	Epoxiconazole-2	30.56	192.0 - 138.1	192.0 - 111.0
36	乙丁烯氟灵	Ethalfuralin	16.29	275.9 - 202.1	315.9 - 275.9
37	灭线磷	Ethoprophos	15.98	157.9 - 97.0	157.9 - 114.0
38	咪唑菌酮	Fenamidone	31.26	238.0 - 237.2	268.0 - 180.2
39	氯苯嘧啶醇	Fenarimol	32.28	219.0 - 107.1	251.0 - 139.1
40	苯硫威	Fenothiocarb	25.95	160.1 - 72.1	72.0 - 56.0
41	丰索磷	Fensulfothion	29.58	291.8 - 156.0	291.8 - 108.8
42	倍硫磷	Fenthion	23.44	278.0 - 109.0	278.0 - 169.0
43	氰戊菊酯-1	Fenvalerate-1	35.32	167.0 - 125.1	224.9 - 119.0
	氰戊菊酯-2	Fenvalerate-2	35.76	167.0 - 125.1	224.9 - 119.0
44	氟酰胺	Flutolanil	28.33	173.0 - 145.1	280.9 - 173.0
45	地虫硫磷	Fonofos	19.02	136.9 - 109.0	245.9 - 137.0
46	安硫磷	Formothion	23.19	170.0 - 93.0	197.9 - 92.9
47	噻唑膦-1	Fosthiazate-1	25.71	195.0 - 103.0	195.0 - 60.0
	噻唑膦-2	Fosthiazate-2	25.82	195.0 - 103.0	195.0 - 60.0
48	六氯苯	Hexachlorobenzene	15.49	283.8 - 213.9	283.8 - 248.8
49	环嗪酮	Hexazinone	31.20	171.0 - 71.1	171.0 - 85.1
50	抑霉唑	Imazalil	27.4	214.9 - 173.0	216.8 - 175.0
51	异稻瘟净	Iprobenfos	20.32	203.9 - 91.0	121.9 - 121.0
52	异柳磷	Isofenphos	24.80	212.9 - 121.1	212.9 - 185.1
53	甲基异柳磷	Isofenphos-methyl	24.47	199.0 - 121.0	241.1 - 199.1
54	异丙威	Isoprocab	15.07	121.0 - 77.1	136.0 - 121.1
55	噁唑啉	Isoxathion	28.29	177.1 - 130.0	177.1 - 116.1
56	醚菌酯	Kresoxim-methyl	26.94	116.0 - 89.0	116.0 - 63.0
57	嘧菌胺	Mepanipyrim	26.11	223.2 - 222.2	222.2 - 207.2
58	地胺磷	Mephosfolan	27.71	196.0 - 139.9	168.0 - 139.9
59	甲霜灵	Metalaxyl	22.44	234.0 - 146.1	220.0 - 192.1
60	虫螨畏	Methacrifos	12.89	207.9 - 180.1	207.9 - 93.0
61	甲胺磷	Methamidophos	10.21	141.0 - 95.0	141.0 - 79.0
62	异丙甲草胺	Metolachlor	23.08	238.0 - 162.2	162.2 - 133.2
63	噻草酮	Metribuzin	22.38	198.0 - 82.0	198.0 - 55.0
64	速灭磷	Mevinphos	12.58	127.0 - 109.0	127.0 - 95.0
65	禾草敌	Molinate	13.37	126.2 - 55.1	126.2 - 83.1
66	久效磷	Monocrotophos	20.75	127.1 - 109.0	127.1 - 95.0
67	2,4'-滴滴滴	o,p'-DDD	26.84	235.0 - 165.2	237.0 - 165.2
67	2,4'-滴滴涕	o,p'-DDT	27.38	235.0 - 165.2	237.0 - 165.2

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
68	噁草酮	Oxadiazon	26.99	174.9 - 112.0	174.9 - 76.0
69	乙氧氟草醚	Oxyfluorfen	28.19	252.0 - 196.0	252.0 - 146.0
67	4,4'-滴滴滴	p,p'-DDD	28.47	234.9 - 165.1	236.9 - 165.2
67	4,4'-滴滴伊	p,p'-DDE	25.77	246.1 - 176.2	315.8 - 246.0
70	对氧磷	Paraoxon	23.74	148.9 - 119.0	108.9 - 91.0
71	甲基对氧磷	Paraoxon-methyl	22.09	229.9 - 106.1	229.9 - 136.1
72	对硫磷	Parathion	24.42	290.9 - 109.0	138.9 - 109.0
73	戊菌唑	Penconazole	25.24	248.0 - 157.1	248.0 - 192.1
74	氯菊酯-1	Permethrin-1	32.04	183.1 - 168.1	183.1 - 153.0
	氯菊酯-2	Permethrin-2	32.25	183.1 - 168.1	183.1 - 153.0
75	甲拌磷砒	Phorate sulfone	25.32	153.0 - 97.0	124.9 - 96.9
75	甲拌磷亚砒	Phorate sulfoxide	24.76	96.9 - 64.9	199.0 - 142.9
76	增效醚	Piperonyl butoxide	29.18	176.1 - 103.1	176.1 - 131.1
77	哌草磷	Piperophos	31.07	320.0 - 122.0	140.0 - 98.1
78	抗蚜威	Pirimicarb	20.51	238.0 - 166.2	166.0 - 55.1
79	甲基嘧啶磷	Pirimiphos-methyl	21.92	290.0 - 125.0	232.9 - 151.0
80	丙草胺	Pretilachlor	26.64	162.1 - 132.2	262.0 - 202.0
81	环丙氟灵	Profluralin	18.81	317.9 - 199.0	317.9 - 54.8
82	扑灭津	Propazine	19.50	214.2 - 172.2	229.1 - 58.1
83	胺丙畏	Propetamphos	19.83	138.0 - 110.0	138.0 - 64.0
84	残杀威	Propoxur	16.94	110.0 - 63.0	110.0 - 64.0
85	吡菌磷	Pyrazophos	32.12	221.0 - 193.1	232.0 - 204.1
86	哒螨灵	Pyridaben	32.59	147.2 - 117.1	147.2 - 132.2
87	吡丙醚	Pyriproxyfen	30.98	136.1 - 96.0	136.1 - 78.1
88	喹硫磷	Quinalphos	24.89	146.0 - 118.0	146.0 - 91.0
89	喹氧灵	Quinoxifen	28.77	237.0 - 208.1	271.9 - 237.1
90	治螟磷	Sulfotep	17.08	201.8 - 145.9	237.8 - 145.9
91	戊唑醇	Tebuconazole	30.73	250.0 - 125.0	250.0 - 153.0
92	吡螨胺	Tebufenpyrad	30.31	275.9 - 171.1	332.9 - 171.0
93	丁基嘧啶磷	Tebupirimfos	19.11	233.9 - 110.1	260.8 - 137.2
94	特丁硫磷	Terbufos	18.55	230.9 - 175.0	230.9 - 129.0
94	特丁硫磷砒	Terbufos sulfone	26.29	152.9 - 96.9	198.9 - 96.9
95	三氯杀螨砒	Tetradifon	31.55	226.9 - 199.0	158.9 - 131.0
96	胺菊酯-1	Tetramethrin-1	30.51	164.0 - 107.1	164.0 - 77.1
	胺菊酯-2	Tetramethrin-2	30.70	164.0 - 107.1	164.0 - 77.1
97	禾草丹	Thiobencarb	22.66	100.0 - 72.0	124.9 - 89.0
98	三唑酮	Triadimefon	24.25	208.0 - 181.1	208.0 - 111.0
99	三唑醇	Triadimenol	26.48	168.0 - 70.0	128.0 - 65.0
100	野麦畏	Triallate	18.74	268.0 - 184.1	142.9 - 83.0
101	三唑磷	Triazophos	29.81	161.2 - 134.2	161.2 - 106.1

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
102	肟菌酯	Trifloxystrobin	28.94	116.0 - 89.0	131.0 - 89.0
103	乙烯菌核利	Vinclozolin	22.18	187.0 - 124.0	197.9 - 145.0
104	氟丙菊酯	Acrinathrin	31.86	288.9 - 92.8	207.8 - 181.1
105	艾氏剂	Aldrin	21.20	262.9 - 192.9	254.9 - 220.0
106	莠灭净	Ametryn	22.11	227.0 - 58.1	227.0 - 170.1
107	阿特拉通	Atraton	18.53	211.0 - 169.1	169.0 - 154.1
108	莠去津	Atrazine	19.64	214.9 - 58.1	214.9 - 200.2
109	益棉磷	Azinphos-ethyl	32.67	132.0 - 77.1	160.0 - 77.1
110	氟丁酰草胺	Beflubutamid	26.39	176.1 - 91.1	221.0 - 193.1
111	苯霜灵	Benalaxyl	29.11	148.0 - 77.0	148.0 - 105.1
112	乙丁氟灵	Benfluralin	16.73	292.0 - 264.0	292.0 - 206.0
6	β-六六六	beta-BHC	22.27	181.0 - 145.0	216.9 - 181.0
113	甲羧除草醚	Bifenox	31.58	340.9 - 309.9	189.1 - 126.0
114	联苯	Biphenyl	9.88	154.1 - 153.1	153.1 - 152.1
115	乙基溴硫磷	Bromophos-ethyl	24.74	358.7 - 302.8	302.8 - 284.7
116	丁草胺	Butachlor	25.61	188.1 - 160.2	236.9 - 160.2
117	抑草磷	Butamifos	27.00	285.9 - 202.0	200.0 - 92.0
118	克百威	Carbofuran	19.54	164.2 - 149.1	164.2 - 131.1
119	氯丹-反式	Chlordane-trans	25.07	372.8 - 265.8	271.7 - 236.9
120	杀螨酯	Chlorfenson	27.32	175.0 - 111.0	111.0 - 75.0
121	毒虫畏	Chlorfenvinphos	24.98	266.9 - 159.1	322.8 - 266.8
122	乙酯杀螨醇	Chlorobenzilate	27.92	139.1 - 111.0	251.1 - 139.1
123	氯苯甲醚	Chloroneb	13.04	191.0 - 113.0	191.0 - 141.0
124	氯苯胺灵	Chlorpropham	17.25	153.0 - 90.0	153.0 - 125.1
125	毒死蜱	Chlorpyrifos	22.44	196.9 - 169.0	198.9 - 171.0
126	甲基毒死蜱	Chlorpyrifos-methyl	20.80	285.9 - 92.9	287.9 - 92.9
127	异噁草酮	Clomazone	18.76	125.0 - 89.0	204.1 - 107.1
128	蝇毒磷	Coumaphos	33.91	210.0 - 182.0	361.9 - 109.0
129	氟氯氰菊酯-1	Cyfluthrin-1	33.65	226.0 - 206.0	198.9 - 170.1
	氟氯氰菊酯-2	Cyfluthrin-2	33.89	226.0 - 206.0	198.9 - 170.1
	氟氯氰菊酯-3	Cyfluthrin-3	33.95	226.0 - 206.0	198.9 - 170.1
	氟氯氰菊酯-4	Cyfluthrin-4	34.09	226.0 - 206.0	198.9 - 170.1
130	环丙唑醇-1	Cyproconazole-1	29.09	139.0 - 111.0	222.0 - 125.1
	环丙唑醇-2	Cyproconazole-2	29.10	139.0 - 111.0	222.0 - 125.1
131	啞菌环胺	Cyprodinil	23.83	225.2 - 224.3	224.2 - 208.2
6	δ-六六六	delta-BHC	23.17	217.0 - 181.1	181.1 - 145.1
132	敌草净	Desmetryn	21.50	213.0 - 58.1	213.0 - 171.2
133	二嗪磷	Diazinon	18.58	137.1 - 84.0	137.1 - 54.0
134	禾草灵	Diclofop-methyl	29.57	253.0 - 162.1	339.9 - 252.9
135	百治磷	Dicrotofos	18.90	127.0 - 109.0	127.0 - 95.0

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
136	狄氏剂	Dieldrin	26.25	262.9 - 193.0	277.0 - 241.0
137	苯醚甲环唑-1	Difenoconazole-1	36.56	322.8 - 264.8	264.9 - 202.0
	苯醚甲环唑-2	Difenoconazole-2	36.64	322.8 - 264.8	264.9 - 202.0
138	烯唑醇	Diniconazole	28.87	267.9 - 232.1	269.9 - 232.0
139	二苯胺	Diphenylamine	16.18	169.0 - 168.2	168.0 - 167.2
140	异丙净	Dipropetryn	22.84	255.1 - 222.1	255.1 - 180.1
141	硫草敌	Ethiolate	6.82	100.0 - 72.0	161.0 - 100.0
142	乙硫磷	Ethion	28.52	230.9 - 129.0	230.9 - 175.0
143	乙氧呋草黄	Ethofumesate	23.94	206.9 - 161.1	161.0 - 105.1
144	乙螨唑	Etoxazole	30.49	141.0 - 113.0	141.0 - 63.1
145	土菌灵	Etridiazole	11.29	211.1 - 183.0	183.0 - 140.0
146	乙嘧硫磷	Etrimfos	19.47	181.0 - 153.1	168.0 - 153.1
147	伐灭磷	Famphur	30.71	218.0 - 109.0	218.0 - 79.0
148	腈苯唑	Fenbuconazole	34.99	128.9 - 102.1	197.9 - 129.0
149	杀螟硫磷	Fenitrothion	23.67	277.0 - 260.0	277.0 - 109.0
150	仲丁威	Fenobucarb	16.38	121.0 - 77.0	121.0 - 103.1
151	甲氰菊酯	Fenpropathrin	30.75	207.9 - 181.0	264.9 - 210.0
42	倍硫磷砒	Fenthion sulfone	30.20	309.9 - 105.0	135.9 - 92.0
42	倍硫磷亚砒	Fenthion sulfoxide	29.80	278.0 - 109.0	278.0 - 169.0
152	氟虫腈	Fipronil	29.13	366.8 - 212.8	368.8 - 214.8
153	吡氟禾草灵	Fluazifop-butyl	27.45	281.9 - 91.0	281.9 - 238.0
154	氟氰戊菊酯-1	Flucythrinate-1	34.45	156.9 - 107.1	198.9 - 157.0
	氟氰戊菊酯-2	Flucythrinate-2	34.80	156.9 - 107.1	198.9 - 157.0
155	咯菌腈	Fludioxonil	30.44	248.0 - 154.1	248.0 - 182.1
156	三氟硝草醚	Fluorodifen	28.82	190.0 - 126.1	190.0 - 75.0
157	氟啶唑	Fluquinconazole	33.08	340.0 - 298.0	108.0 - 57.0
158	氟胺氰菊酯-1	Fluvalinate-1	35.92	250.0 - 55.0	250.0 - 200.0
	氟胺氰菊酯-2	Fluvalinate-2	36.05	250.0 - 55.0	250.0 - 200.0
6	γ-六六六	gamma-BHC	19.31	181.0 - 145.0	216.9 - 181.0
159	己唑醇	Hexaconazole	26.98	231.0 - 175.0	256.0 - 82.1
160	异菌脲	Iprodione	31.17	187.0 - 124.0	243.9 - 187.0
161	氯唑磷	Isazofos	20.40	161.0 - 119.1	161.0 - 146.0
162	水胺硫磷	Isocarbophos	25.09	135.9 - 108.0	135.9 - 69.0
163	氧异柳磷	Isofenphos oxon	24.05	229.0 - 200.9	229.0 - 121.0
164	稻瘟灵	Isoprothiolane	27.61	162.1 - 85.0	162.1 - 134.0
165	高效氯氟氰菊酯-1	lambda-Cyhalothrin-1	31.70	197.0 - 141.0	197.0 - 161.0
	高效氯氟氰菊酯-2	lambda-Cyhalothrin-2	31.97	197.0 - 141.0	197.0 - 161.0
166	溴苯腈	Leptophos	31.01	171.0 - 77.1	154.9 - 77.1
167	马拉氧磷	Malaoxon	22.60	126.9 - 99.0	126.9 - 55.0
168	马拉硫磷	Malathion	23.45	126.9 - 99.0	172.9 - 99.0

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
169	苯噻酰草胺	Mefenacet	32.14	192.0 - 136.1	192.0 - 109.1
170	杀扑磷	Methidathion	26.55	144.9 - 85.0	144.9 - 58.1
171	烯虫酯	Methoprene	23.63	153.0 - 111.1	111.1 - 55.0
172	甲氧滴滴涕	Methoxychlor	29.17	227.1 - 121.1	227.1 - 91.1
173	绿谷隆	Monolinuron	20.03	214.0 - 61.0	126.0 - 99.0
174	腈菌唑	Myclobutanil	29.03	179.0 - 125.1	179.0 - 90.0
175	二溴磷	Naled	16.83	108.9 - 79.0	144.9 - 109.0
176	敌草胺	Napropamide	26.84	128.0 - 72.1	128.0 - 100.1
177	除草醚	Nitrofen	28.25	202.0 - 139.1	282.9 - 253.0
67	2,4'-滴滴伊	o,p'-DDE	24.50	246.0 - 176.2	248.0 - 176.2
178	氧乐果	Omethoate	18.37	155.9 - 110.0	109.9 - 79.0
179	噁霜灵	Oxadixyl	30.49	163.0 - 132.1	163.0 - 117.1
67	4,4'-滴滴涕	p,p'-DDT	28.94	235.0 - 165.2	237.0 - 165.2
180	多效唑	Pacllobutrazol	27.39	236.0 - 125.1	236.0 - 167.0
181	甲基对硫磷	Parathion-methyl	22.82	262.9 - 109.0	232.9 - 109.0
182	二甲戊灵	Pendimethalin	24.27	251.8 - 162.2	251.8 - 161.1
183	五氯苯胺	Pentachloroaniline	20.46	262.8 - 192.0	264.9 - 194.0
184	五氯硝基苯	Pentachloronitrobenzene	17.74	295.0 - 237.0	236.9 - 142.9
75	甲拌磷	Phorate	17.07	260.0 - 75.0	230.9 - 128.9
185	伏杀硫磷	Phosalone	31.98	182.0 - 111.0	182.0 - 102.1
186	硫环磷	Phosfolan	27.72	196.0 - 140.0	168.0 - 140.0
187	亚胺硫磷	Phosmet	31.44	160.0 - 77.1	160.0 - 133.1
188	磷胺-1	Phosphamidon-1	22.72	127.0 - 109.0	127.0 - 95.0
	磷胺-2	Phosphamidon-2	22.85	127.0 - 109.0	127.0 - 95.0
189	嘧啶磷	Pirimiphos-ethyl	23.19	318.1 - 166.1	318.1 - 182.0
190	腐霉利	Procymidone	26.36	96.0 - 67.1	96.0 - 53.1
191	丙溴磷	Profenofos	26.62	207.9 - 63.0	338.8 - 268.7
192	扑草净	Prometryn	21.96	226.0 - 184.2	199.0 - 184.1
193	炔苯酰草胺	Pronamide	20.58	173.0 - 145.0	175.0 - 147.0
194	敌稗	Propanil	24.98	161.0 - 99.0	161.0 - 90.0
195	丙环唑-1	Propiconazole-1	29.39	172.9 - 145.0	172.9 - 74.0
	丙环唑-2	Propiconazole-2	29.51	172.9 - 145.0	172.9 - 74.0
196	丙硫磷	Prothiofos	25.88	266.9 - 239.0	308.9 - 238.9
197	哒嗪硫磷	Pyridaphenthion	31.13	340.0 - 199.0	204.0 - 203.1
198	嘧霉胺	Pyrimethanil	19.08	198.0 - 183.1	198.0 - 118.0
199	皮蝇磷	Ronnel	21.41	285.0 - 269.9	286.9 - 272.0
200	西玛津	Simazine	19.75	201.1 - 173.1	201.1 - 186.2
201	四氯硝基苯	Tecnazene	14.57	260.9 - 203.0	214.9 - 179.0
202	特丁津	Terbutylazine	19.90	228.9 - 173.1	172.9 - 172.0
203	特丁净	Terbutryn	22.46	185.0 - 170.1	241.1 - 170.2

序号	中文名称	英文名称	保留时间 /min	定量离子对	定性离子对
204	杀虫畏	Tetrachlorvinphose	26.18	328.9 - 109.0	330.9 - 109.0
205	四氟醚唑	Tetraconazole	25.54	336.0 - 217.9	336.0 - 203.8
206	虫线磷	Thionazin	15.55	143.0 - 79.0	175.0 - 79.0
207	甲基立枯磷	Tolclofos-methyl	21.55	265.0 - 250.0	265.0 - 93.0
208	毒壤磷	Trichloronat	22.78	296.8 - 268.9	298.8 - 270.9

附录 C

208 种农药及其代谢物总离子流图

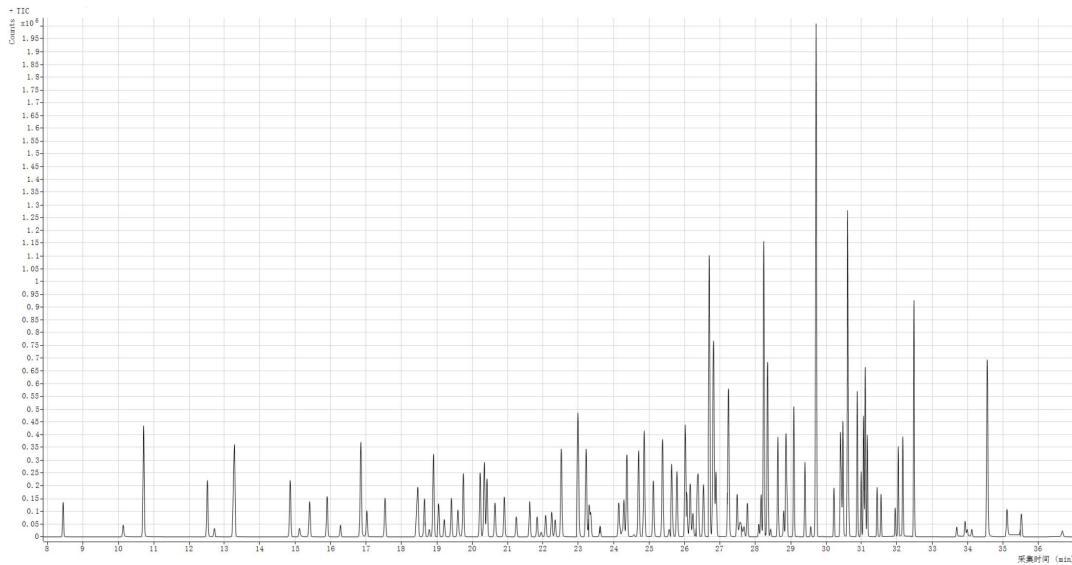


图 C.1 A 组农药及其代谢化合物标准品的 (SIM) 总离子流图

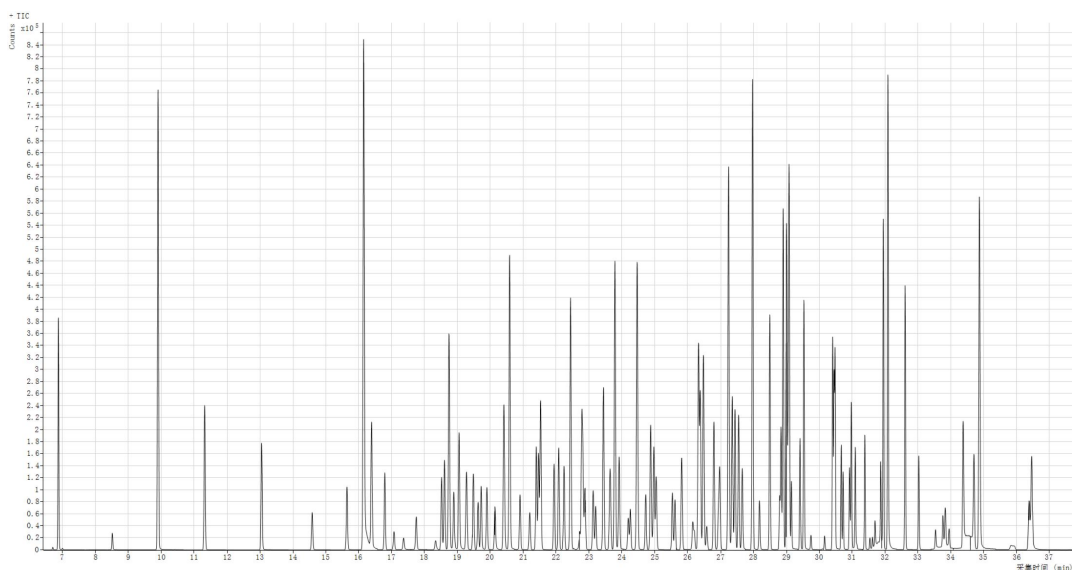


图 C.2 B 组农药及其代谢化合物标准品的 (SIM) 总离子流图

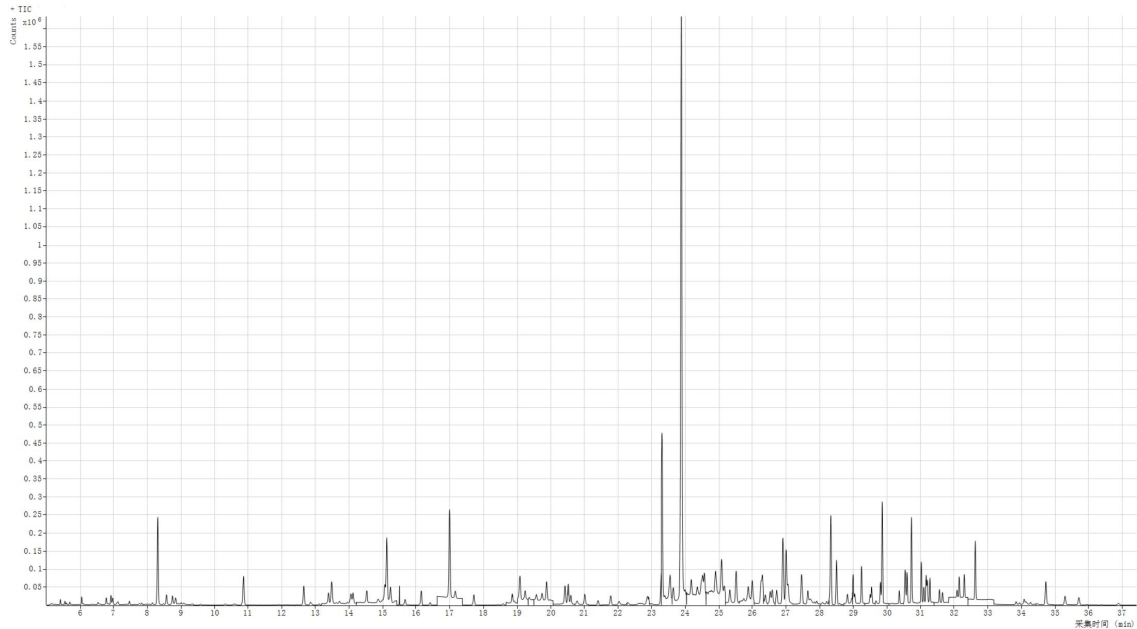


图 C.3 茶叶基质 A 组农药及其代谢化合物标准品的 (SIM) 总离子流图

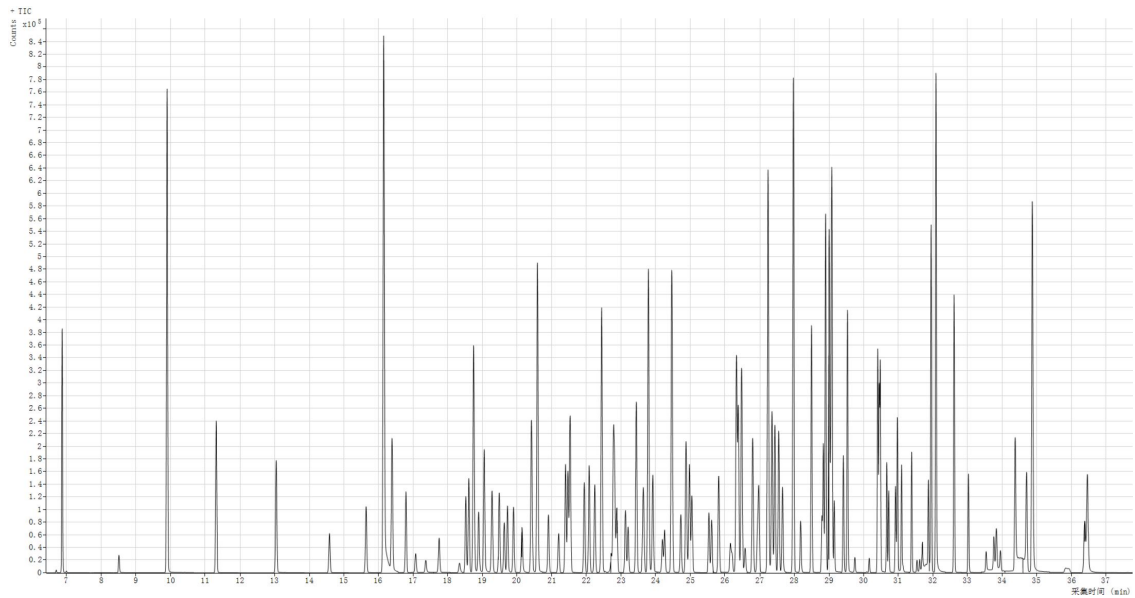


图 C.4 金针菇基质 B 组农药及其代谢化合物标准品的 (SIM) 总离子流图

7. 总结

本方法参考《GB 23200.113-2018 食品安全国家标准 植物源性食品中 208 种农药及其代谢物残留量的测定气相色谱-质谱联用法》，采用睿科 QS 60 全自动 QuEChERS 净化仪-液相色谱质谱手段，样

品经乙腈提取、盐析萃取和 m-PFC 净化后直接上机分析检测，应注意的是前处理过程中需要准确添加乙腈的提取体积，否则会造成回收率结果不佳。在 m-PFC 净化柱洗脱过程中控制液体过柱流速在 1 滴/min 为宜，流速过快易造成杂质没有被吸附于小柱上而被收集。

基质会对化合物进行增强或者抑制，因此需要使用对应的基质混合标准工作溶液进行定量；在多基质样品加标回收实验中，选取有代表性的基质进行实验。

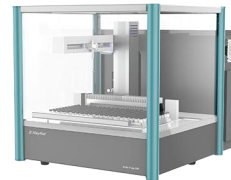
在使用新的衬管时，如出现响应变低甚至骤降的情况，可先将混合标液的进行多次检测，使石英棉达到饱和后再进行样品的测定。对于较复杂的基质，如菠菜、茶叶等可能出现保留时间延迟的情况，可在下一个扫描时间段里加上保留时间延迟的目标物再进行分析检测，或使用动态 MRM 的模式进行检测分析。



全自动 QuEChERS 净化仪
净化



全自动平行浓缩仪
浓缩



全自动液体样品处理工作站
标曲配制



睿科集团股份有限公司
RayKol Group Corp., Ltd.

智能化、自动化实验室整体解决方案

网址: www.raykol.com

电话: 400-885-1816

邮箱: info@raykol.com



本文中的信息、说明和技术指标如有变更, 恕不另行通知

© 睿科集团股份有限公司

2021年9月版