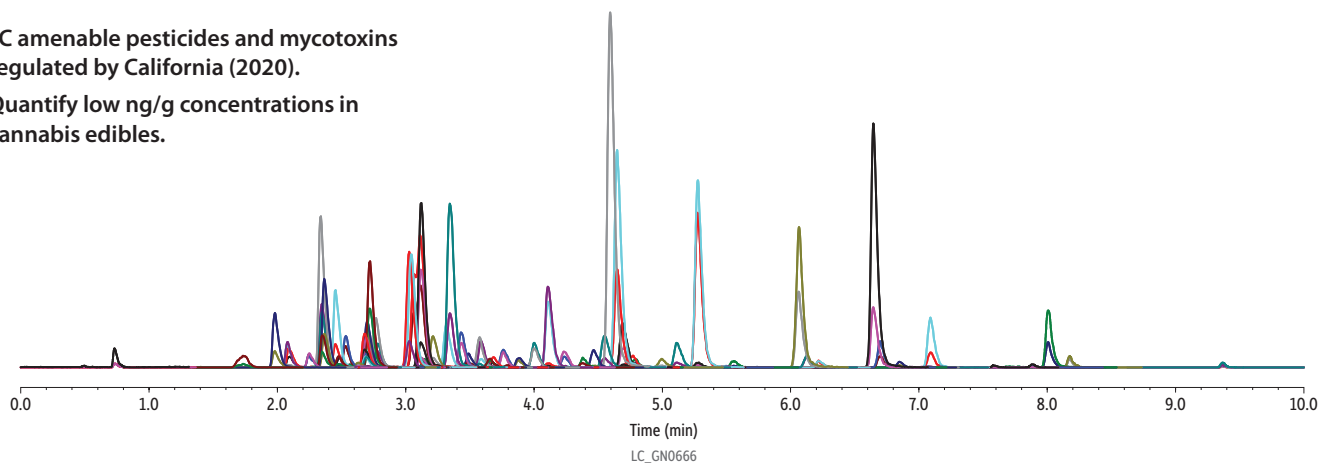


# California Cannabis Pesticides and Mycotoxins in Gummy Edibles on Raptor ARC-18

- LC amenable pesticides and mycotoxins regulated by California (2020).
- Quantify low ng/g concentrations in cannabis edibles.



Peaks	tr (min)	Precursor Ion	Product Ion 1	Product Ion 2	Polarity	Peaks	tr (min)	Precursor Ion	Product Ion 1	Product Ion 2	Polarity
1. Daminozide-d6	0.7	167.0	149.3	49.3	+	62. Pyrethrin II	5.5	373.1	161.1	133.2	+
2. Daminozide	0.7	161.1	44.1	143.2	+	63. Spinosyn L (Spinetoram)	5.6	760.5	142.2	98.1	+
3. Acephate	1.7	184.0	143.1	95.1	+	64. Piperonyl butoxide	6.0	356.3	177.2	119.2	+
4. Oxamyl	2.0	237.1	72.1	90.1	+	65. Chlorpyrifos	6.1	349.9	198.0	97.1	+
5. Flonicamid	2.1	230.1	203.1	174.1	+	66. Hexythiazox	6.2	353.1	228.1	168.1	+
6. Methomyl	2.1	163.1	88.1	106.1	+	67. Etoxazole	6.6	360.2	141.1	304.2	+
7. Thiamethoxam	2.1	292.0	211.1	181.1	+	68. Spiromesifen	6.7	273.2	255.2	187.2	+
8. Imidacloprid	2.3	256.1	209.1	175.1	+	69. Pyrethrin I	6.9	329.2	161.2	105.2	+
9. Mevinphos	2.4	225.1	127.1	193.2	+	70. Cyfluthrin (qualifier)	6.9	453.1	193.2	-	+
10. Acetamiprid	2.4	223.0	126.1	56.1	+	71. Cyfluthrin	6.9	451.1	191.2	-	+
11. Dimethoate-d6	2.4	236.1	205.1	-	+	72. Cypermethrin	7.1	433.1	191.0	416.0	+
12. Dimethoate	2.4	230.0	199.1	125.1	+	73. Fenpyroximate	7.1	422.2	366.1	138.1	+
13. Thiacloprid	2.5	253.0	126.0	90.1	+	74. trans-Permethrin	7.6	408.3	183.2	355.1	+
14. Aflatoxin G2	2.5	331.2	189.3	115.2	+	75. cis-Permethrin	7.9	408.3	183.2	355.1	+
15. Aflatoxin G1	2.5	329.2	243.2	215.3	+	76. Avermectin B1a	7.9	890.5	305.4	567.4	+
16. Aldicarb	2.6	116.0	89.2	70.2	+	77. Etofenprox	8.0	394.3	177.2	359.3	+
17. Aflatoxin B2	2.6	315.3	287.2	243.3	+	78. Bifenthrin	8.2	440.0	181.2	166.2	+
18. Dichlorvos	2.7	220.9	109.1	79.2	+	79. Acequinocyl (precursor ion 1)	9.4	402.3	343.2	189.0	+
19. Dichlorvos-d6	2.7	227.0	115.1	-	+	80. Acequinocyl (precursor ion 2)	9.4	386.0	344.2	189.1	+
20. Aflatoxin B1	2.7	313.2	241.2	128.2	+						
21. Imazalil	2.7	297.0	159.0	201.0	+						
22. Carbofuran	2.7	222.1	123.1	165.2	+						
23. Propoxur	2.7	210.1	111.1	93.1	+						
24. Carbaryl-d7	2.8	209.2	152.2	-	+						
25. Carbaryl	2.8	202.1	145.1	127.1	+						
26. Diuron-d6	3.0	239.1	78.2	-	+						
27. Atrazine-d5	3.0	221.2	179.1	-	+						
28. Naled	3.1	397.8	127.1	109.1	+						
29. Metalaxyl	3.1	280.2	220.2	192.2	+						
30. Spiroxamine	3.1	298.3	144.2	100.2	+						
31. Chlorantraniliprole	3.2	483.9	452.9	285.9	+						
32. Phosmet	3.2	318.0	160.1	77.2	+						
33. Azoxystrobin	3.3	404.0	372.1	344.1	+						
34. Linuron-d6	3.3	255.1	160.1	-	+						
35. Fludioxonil	3.4	247.0	180.0	126.0	-						
36. Methiocarb	3.4	226.1	169.1	121.1	+						
37. Dimethomorph	3.5	388.2	301.2	165.3	+						
38. Boscalid	3.5	342.9	307.1	140.1	+						
39. Paclobutrazol	3.6	294.3	70.1	125.1	+						
40. Malathion	3.6	331.0	127.2	285.2	+						
41. Myclobutanil	3.7	289.1	70.1	125.1	+						
42. Bifenazate	3.7	301.0	198.1	170.2	+						
43. Ochratoxin A	3.8	404.2	239.1	358.3	+						
44. Fenhexamid	3.9	302.1	97.1	55.2	+						
45. Spirotetramat	4.0	374.2	302.1	216.1	+						
46. Ethoprophos	4.1	243.1	131.1	97.1	+						
47. Fipronil	4.1	436.8	331.8	251.9	-						
48. Fenoxycarb	4.2	302.1	88.1	116.1	+						
49. Kresoxim-methyl	4.4	314.2	267.2	222.2	+						
50. Tebuconazole	4.4	308.1	70.1	125.1	+						
51. Diazinon-d10	4.6	315.2	170.2	-	+						
52. Spinosyn A (Spinosad)	4.6	732.4	142.2	98.1	+						
53. Diazinon	4.6	305.1	169.2	153.2	+						
54. Coumaphos	4.7	363.1	227.1	307.1	+						
55. Pyridaben	4.7	365.1	309.2	147.2	+						
56. Propiconazole	4.7	342.0	159.0	69.2	+						
57. Clofentezine	4.8	303.0	138.1	102.1	+						
58. Spinosyn D (Spinosad)	5.0	746.5	142.3	98.4	+						
59. Spinosyn J (Spinetoram)	5.1	748.5	142.3	98.3	+						
60. Trifloxystrobin	5.3	409.2	186.1	145.1	+						
61. Prallethrin	5.3	301.2	123.2	105.2	+						

**Column** Raptor ARC-18 (cat.# 9314A12)  
**Dimensions:** 100 mm x 2.1 mm ID  
**Particle Size:** 2.7 µm  
**Pore Size:** 90 Å  
**Guard Column:** Raptor ARC-18 EXP guard column cartridge 5 mm, 2.1 mm ID, 2.7 µm (cat.# 9314A0252)  
**Temp.:** 40 °C  
**Sample** California pesticide standard #1 (cat.# 34124); California pesticide standard #2 (cat.# 34125); California pesticide standard #3 (cat.# 34126); California pesticide standard #4 (cat.# 34127); California pesticide standard #5 (cat.# 34128); California pesticide standard #6 (cat.# 34129); Dimethoate-d6 (cat.# 31988); Dichlorvos-d6 (cat.# 31987); Carbaryl-d7 (cat.# 31985); Diazinon-d10 (cat.# 31986); Atrazine-d5 (cat.# 31984); Diuron-d6 (cat.# 31989); Liuron-d6 (cat.# 31990); Aflatoxins standard (cat.# 34121); Ochratoxin A (cat.# 34122); Compounds not present in these mixes were obtained separately.  
**Diluent:** 75:25 Acetonitrile:water  
**Conc.:** 3.75-15 ng/mL (Expected concentration range in extract of gummy initially spiked at 100 ng/g.)  
**Inj. Vol.:** 2 µL  
**Mobile Phase**  
**A:** Water, 2 mM ammonium formate, 0.1% formic acid  
**B:** Methanol, 2 mM ammonium formate, 0.1% formic acid

Time (min)	Flow (mL/min)	%A	%B
0.00	0.5	95	5
1.5	0.5	35	65
8.5	0.5	5	95
9.5	0.5	0	100
10.5	0.5	0	100
10.6	0.5	95	5
12.0	0.5	95	5

**Detector** MS/MS  
**Ion Mode:** ESI+/ESI-  
**Mode:** MRM  
**Instrument** UHPLC  
**Notes** Gummies were manually chopped into small pieces, and 1 g of sample was weighed in a 50 mL polypropylene tube. The sample was mixed with 5 mL of water and then vigorously vortexed until all gummy pieces were fully solubilized. The sample was fortified with pesticides and mycotoxins at 100 ng/g. A mix of internal standards was added at 200 ng/g. The spiked sample was further vortexed for 30 sec. 5 mL of acetonitrile acidified with 1% acetic acid was added to the sample, and this was followed by a 30 sec vortex agitation. Then, a pouch of European EN 15662 QuEChERS extraction salts (cat.# 25849) was added to the sample. The sample was vortexed for 30 sec and then centrifuged for 5 min. 750 µL of organic extract was mixed with 250 µL of water. 2 µL of final extract was injected into the LC-MS/MS system.