TESTING OF DIMETHYLDISULFIDE (DMDS) AIR CONCENTRATIONS AT BUFFER ZONE DISTANCE

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In response to a request from the Florida Department of Agriculture, Arkema sponsored the conduct of a field study in Ocala Florida in November, 2013. The objective was to monitor the emissions of Dimethyldisulfide (DMDS), the active ingredient of Paladin® and TriFecta®, at breathing height at the buffer zone distance of approximately 25 ft. There were four air monitors around each field, i.e. one per quadrant approximately equally spaced. Different application rates, chemicals, and tarping materials were tested in this research.

This research was conducted at the University of Florida Citra research station. The soil at this location is classified as sand, with the percent of sand across the test plots ranging from 91 to 97 percent. Soil temperatures within the 0-12 inch soil profile were in the range of 60 to 85 F throughout the test that was conducted over a six-day experimental test period. Soil moisture at the time of application was 7.6, 5.8, and 9.2 percent moisture (by mass) for Fields 1, 3, and 4, respectively. Table 1 summarizes the applications, tarp types, and products that were tested in this research.

Table 1: Research Summary for Applications on November 14, 2013

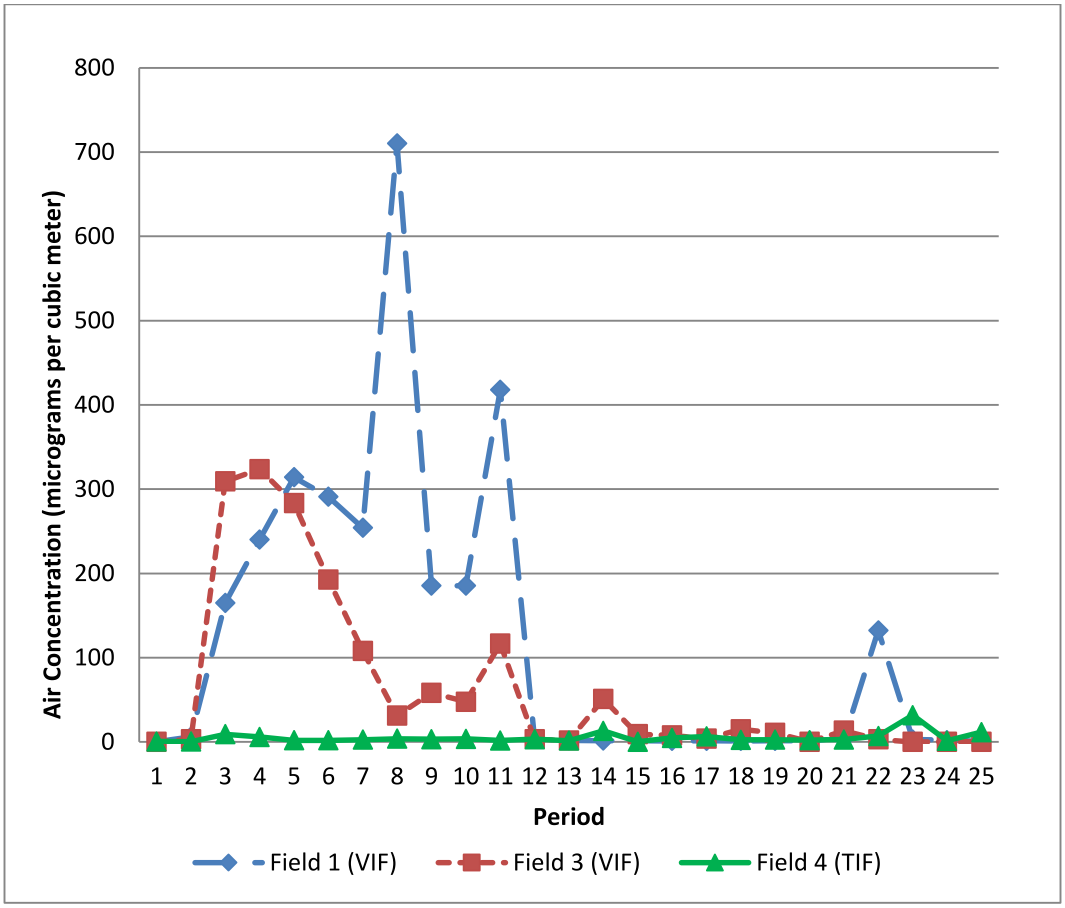
Field #	Tarp	Product	Approximate Pounds of Product Applied (lbs)	Start Application (time)	End Application (time)
1	VIF	Paladin®	260	1418	~1525
2	TIF	Paladin®	Misapplication	0825	~1030
3	VIF	TriFecta®	120	1605	1702
4	TIF	Paladin®	280	1139	1234

Figure 1 presents the peak measured concentrations (from among the four monitors at each field) for each of the three fields. Table 2 presents the measured data from each field and each period.

The results of this research show that buffer zone concentrations of DMDS on Fields 1 and 3 (VIF tarped fields) were relatively high for the first three days, then generally fell to relatively low levels for the duration of this research program. Air concentrations of DMDS on Field 4 (with TIF tarp material), on the other hand, were low for the duration of the study. This research shows that large improvements in flux management can be obtained for DMDS with the use of TIF tarp material.

To achieve the endpoint concentration of 55 ppb (212 $\mu g/m^3$) at 25 ft., this study indicates for the soil type and field conditions tested that a TIF tarp would be required. Other research has demonstrated that the use of TIF tarp materials is efficacious at lower application rates than when VIF tarp material is used, which acts to help offset the cost differential. An additional benefit of the TIF material is that odors are managed more effectively.

Figure 1: Peak DMDS Concentrations at the Buffer Zone[1]



[1] The highest value of the four monitoring locations is presented here.

Table 2: Peak Concentrations of DMDS (μg/m³)[2]

Period	Field 1 (Paladin VIF)	Field 3 (TriFecta VIF)	Field 4 (Paladin TIF)
1	0.23	0.25	0.56
2	5.99	3.13	0.41
3	164.79	309.17	9.09
4	240.29	323.78	5.89
5	314.15	283.41	1.95
6	290.91	192.74	1.81
7	254.07	108.06	2.62
8	710.27	31.15	3.77
9	185.56	58.23	3.19
10	185.39	47.58	3.57
11	417.91	116.68	1.73
12	2.98	3.11	3.30
13	1.63	1.68	1.56
14	1.61	50.80	13.17
15	1.30	9.04	0.23
16	1.22	7.70	4.84
17	1.30	3.90	6.44
18	1.18	15.00	2.55
19	1.30	10.63	2.75
20	1.46	0.14	2.17
21	3.68	13.23	2.91
22	132.39	3.00	6.99
23	2.81	0.02	31.71
24	2.05	0.29	1.27
25	0.72	0.15	11.57

[2] Highest value of the four monitoring locations per period, per field