

Decline of DDT Residues in Beef Fat After 8 Years of DDT Moratorium in Arizona¹

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The U.S. Food and Drug Administration in early 1968 proposed to reduce the tolerance for DDT and DDE (DDTR) in the fat of beef from 7.0 to 1.0 ppm. This laboratory immediately began to analyze for DDTR in carcass fat from the major feedlots in Arizona, and repeated the process in 1969 and 1970 (Ware et al., 1971). Arizona then began in 1969 a moratorium on the use of DDT in agriculture which was continued through 1972, followed with the cancellation of most registered uses for DDT by the U.S. Environmental Protection Agency in 1973, giving Arizona the longest continuous ban on the use of DDT of any state.

In January of 1977, we proceeded once again to examine the DDTR residues in beef fat following its absence from the agricultural environment for 8 years. This paper reports the results of that survey.

MATERIALS AND METHODS

Individual 50-100 gram beef fat samples were collected from the kidney knobs of chilled carcasses in a Phoenix meat packing plant, placed in small storage jars and frozen. Five carcasses from each of 5 Arizona and one Imperial Valley, California feedlots were sampled. Additionally, 17 carcasses from the Arizona annual 4-H beef cattle contest in January were sampled following carcass judging.

DDTR analyses were conducted by electron capture gas chromatography following the on-column, extraction-cleanup method of Cahill, et al. (1970). Recovery rates were 88% for p,p'-DDE and 100% for p,p'-DDT.

The results are presented in Table 1, indicating a 25% drop in total DDTR, from 1970, including the virtual disappearance of

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p,p'-DDT. Of 42 Arizona samples, only 2 contained p,p'-DDT above the 0.04 ppm minimum detectable level. No measurable DDD or toxaphene was found in any of the samples. In the specific feedlots where sampling covered all three years, 1968, 1970, and 1977, Feedlot #1 dropped 42%, while Feedlot #2 dropped 24% in total DDTR since 1970.

Notably the 4-H project steers contained substantially greater residues than the average feedlot steers, due in part to diets varying greatly from feedlot rations. The animals from the California feedlot contained DDTR residues 57% higher than the average feedlot in Arizona, including detectable levels of p,p'-DDT.

In summary, it appears that DDTR residues in Arizona beef animals are comprised almost totally of DDE, and these have declined 25% during the 6 years elapsed since the last sampling, and 62% since the initiation of the DDT moratorium in 1969.

REFERENCES

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Table 1. DDT/R residues in beef fat from selected Arizona and California feedlots and Arizona 4-H Show Animals.

Residues in PPML/											
Feedlot No.	1968 ²				1970 ³				1977		
	DDE	DDD	DDT	TOTAL	DDE	DDD	DDT	TOTAL	DDE	DDT	TOTAL
1	0.99	0.10	0.25	1.34	0.56	<0.03	0.04	0.60	0.35	<0.04	0.35
2	0.82	0.05	0.19	1.06	0.40	<0.04	0.04	0.44	0.38	<0.04	0.38
4	--	--	--	--	--	--	--	--	0.30	0.04	0.34
6	0.94	0.05	0.17	1.16	--	--	--	--	0.58	<0.04	0.58
9	0.60	0.09	0.12	0.81	--	--	--	--	--	--	--
12	0.35	0.05	0.08	0.48	0.43	<0.03	0.03	0.46	--	--	--
13	--	--	--	--	--	--	--	--	0.20	<0.04	0.20
Average	0.74	0.07	0.16	0.97	0.46	<0.03	0.04	0.50	0.36	<0.04	0.37
California	0.78 0.07 0.85										
4-H	0.57 <0.04 0.57										

1. Average of 5 animals per feedlot.
2. Cahill et al. 1970.
3. Ware et al. 1971.