TECHNICAL PAPERS

Effect of Cooking on the DDT Content of Beef

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During the spring of 1946, hay containing DDT was fed to beef cattle at the Alabama Agricultural Experiment Station. At the end of the feeding period several of the animals were slaughtered and the carcasses held in freezer storage until December, when they were shipped to the Agricultural Research Center at Beltsville, Maryland. Portions of one animal were used to determine the DDT content of the meat before and after cooking. This animal had received the following ration: from January 5 to March 17, 10 lbs of concentrate (1 part of cottonseed meal plus 4 parts of corn-cob shuck meal) and 10 lbs of clover hay containing 184 ppm of DDT residue; from March 18 to April 1, 10 lbs of concentrate (as before) and 10 lbs of clover hay containing 84 ppm of DDT residue. From April 2 to May 10 the animal was on pasture and received no DDT-treated hay. It was slaughtered on May 10.

Five methods of cooking were used—roasting, broiling, pressure cooking, braising, and frying (*1*). Samples of beef to be cooked by each method were prepared in duplicate. One portion of each sample was analyzed raw, and the other portion, including the drippings, was analyzed after cooking.

A two-rib cut with a normal amount of fat was divided into two one-rib roasts, and one portion was roasted medium done (65° C) at an average oven temperature of 186° C.

A sample of loin with a normal amount of fat was divided into two steaks of about equal weight or thickness, and one steak was broiled to the rare stage (54° C).

Several pieces of round steak were boned, cut in small pieces, and then divided into three portions. Two portions were cooked well done and tender as stews, one in a pressure sauce pan and the other braised in the more usual manner.

Several additional pieces of round were ground up as hamburger, and one was molded into cakes and fried well done (76° C). In this test the cooked meat and pan drippings were analyzed separately.

Chemical analyses for organic chlorine in both the raw and the cooked meat were made by the method described by Carter (*2*) for use with this kind of material. Colorimetric determinations of the DDT in both the raw and the cooked meats were made by the method described by Schechter, *et al.* (*3*). The samples were prepared for analysis by separating the bones from the meat and fat, which were then mixed, ground, and again mixed before analysis. Each sample therefore represents meat and fat only, and the results have been calculated on that basis, without regard for the weight of the bones.

TABLE 1
DDT CONTENT OF RAW AND COOKED BEEF FROM ANIMALS FED HAY CONTAINING THIS INSECTICIDE

Method of cooking	DDT (ppm) calculated from—			
	Organic chlorine determinations		Colorimetric determinations	
	Cooked portion	Raw portion	Cooked portion	Raw portion
Roasting	30	39	19	27
Broiling	27	24	21	18
Pressure cooking	8	9	8	15
Braising	7	..	7	..
Frying	..	..	16*	24
			33†	

* Meat alone.
† Drippings.

The results of the chemical analyses, given in Table 1, indicate that the DDT in the beef was not materially decomposed or lost during the cooking.

References

1. ALEXANDER, LUCY M., and YEATMAN, FANNY W. *U. S. Dept. Agric. Leaflet 17*, 1928; *U. S. Dept. Agric. Farmers' Bull. 1908*, 1942.
2. CARTER, R. H. *Anal. Chem.*, 1947, **19**, 54.
3. SCHECHTER, M. S., POGORELSKIN, M. A., and HALLER, H. L. *Anal. Chem.*, 1947, **19**, 51–53.

Experiments on Bird Navigation[1]

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Students of bird migration have generally assumed that birds head straight toward their goal, even when flying across wide stretches of ocean or other areas devoid of landmarks. Since natural migrations do not readily lend themselves to experimental study, most of our knowledge of bird navigation has stemmed from artificial homing experiments. In such experiments birds are captured, usually at their nests, and carried to a distance before release. Many species have returned from hundreds of miles, sometimes from territory which the individual birds had almost certainly never visited before, and to the sensory physiologist these homing flights have gen-

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