BRIEF NOTE

**Detection of *Toxoplasma* Infection in Pork by Sabin-Feldman's
Dye Test with Meat Extract**

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Some reports [5, 7, 8] emphasized that pork derived from latently infected swine having no gross lesions could serve as an important infective source of human toxoplasmosis, since the swine could not be detected or eliminated by meat inspection, except the mouse inoculation test. Since this test is rather time-consuming, it is useless for the rapid diagnosis of the infection. A test method for detection of *Brucella* infection in slaughtered animals was proposed by Schönberg and Lochman [9], and Fessel [2]. It is a rapid agglutination test with the pressed juice of muscle, udder, uterus or testicle, instead of serum of the animal.

Recently, Fuhr [3] applied Sabin-Feldman's dye test to meat extracts obtained from swine, and found that antibody against *Toxoplasma* in the extracts could be detected by the test. In the previous paper [4] it was indicated that the dye test was a reliable measure for the serological diagnosis of latent infection with *Toxoplasma* in swine and others. The dye test is less time-consuming than the mouse inoculation test. In the present paper the authors demonstrated the practical usefulness of the dye test on meat extract for detection of *Toxoplasma* infection, as compared with the results of the parasitological

examination of the meat.

Diaphragmatic and serum samples were obtained from 190 slaughtered swine having no gross lesions ascribed to *Toxoplasma* infection. They were submitted to the present experiment, as well as 51 pork samples (roast part) examined previously for *Toxoplasma gondii* [6]. Meat extract specimens were prepared in the following manner. Each 5 g of the diaphragm or roast part was cut into small pieces by a pair of scissors and homogenized in a Waring blender with 5 ml (for the diaphragm) or 15 ml (for the roast part) of physiological saline. The homogenate was centrifuged at 10,000 rpm for 20 min at 5°C. Fat was removed from the supernatant through filter paper (Toyo Roshi, No. 2). Meat extract thus obtained was stored at -20°C until use. Before examination, each specimen of meat extract was heated in a water bath at 56°C for 30 min. After that, the sediment was removed by centrifugation at 3,000 rpm for 15 min at 5°C. The supernatant and serum were examined by the dye test in the same manner as described previously [4].

Of the 190 swine tested, 4 showed a positive reaction in the dye test with meat extracts (1:2 or higher), as well as with sera

Table 1. Distribution of antibody titers in meat extract at each level of titer in serum

Titer in meat extract	Titer in serum				
	<16	16	64	256	1,024
<2	184				
2	2	1*			
4			1*		
16			1*		
64					1*

* Number of cases found to be infected parasitologically.

Table 2. Results of dye test on meat extracts prepared from pork

Number of cases examined	Recovery of <i>Toxoplasma</i>	Titer in meat extract			
		<5	5	20	80
51	+	1			1
	-	50	50		

(1:16 or higher), and 184 gave negative results with meat extracts and with sera, while the remaining 2 showed positive results with meat extracts (1:2), but not with sera (less than 1:16) (Table 1). *Toxoplasma* organisms were isolated from the diaphragm collected from the former 4 animals. In the 4 animals, the titers of meat extracts ranged from 1:2 to 1:64, and those of sera from 1:16 to 1:1,024. Therefore, the former were 1 to 2 dilutions lower than the latter. The results of the dye test on meat extracts prepared from pork (roast part) sold at meat shops are shown in Table 2. Of 51 specimens tested, 1 showed a positive dye test titer of 1:80 and the remaining 50 gave negative results (less than 1:5). *Toxoplasma* organisms were recovered from the former, but not from the latter specimens having no antibody against *Toxoplasma*.

Antibodies against *Toxoplasma* in meat extracts could be measured by the dye test in just the same manner as those in sera, although the titers of meat extracts were

1 to 2 dilutions lower than those of sera. Fuhr [3] also observed that the dye test titers of meat extracts were 1 to 2 dilutions lower than those of the corresponding sera. Fuhr's observation was confirmed by the authors'. *Toxoplasma* organisms were recovered from all, but 2, meat specimens giving positive results in the dye test. The 2 specimens giving negative parasitological results were very low in titer (1:2). From these results, it is considered that the dye test with meat extracts is a reliable measure for detection of *Toxoplasma* contamination of meat specimens. In the literature, it is generally recognized that animals which showed a dye test titer of 1:16 or higher are positive only when their serum specimens are submitted to the test. The minimum titer that is considered positive, however, should be 1 to 2 dilutions lower when meat extracts are submitted to the test than when serum specimens are. It is possible that a non-specific reaction will exert some influence upon the accuracy of the test, if the titer considered to be positive is lowered. Although more extensive studies are required to estimate the accuracy of the test, no practical problems should be encountered from the viewpoint of meat hygiene, since only 2 of 190 cases were found to be false positive.

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要 約

肉抽出液を用いた色素試験による豚肉におけるトキソプラズマ感染の摘発（短報）：萩原敏且・勝部泰次（国立予防衛生研究所獣疫部）——肉抽出液を用いた色素試験の診断的価値を検討した。予めトキソプラズマ感染の有無が検討された豚 190 頭からの血清および横隔膜筋抽出液，ならびに市販豚肉由来抽出液51検体を供試した。肉抽出液中の抗体の有無と，原虫分離成績あるいは血清を用いた色素試験の成績と良く一致した。但し抽出液中の抗体価は，血清のそれより若干低かった。本法は，豚肉におけるトキソプラズマ感染の有無を知るために使用可能と考えられた。