

## SALMONELLA INFECTION IN MARKET SWINE, TRINIDAD AND TOBAGO<sup>1</sup>

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*An unusual outbreak of gastroenteritis among children in Trinidad and Tobago led to the investigation of porcine carcasses at a local abattoir. Salmonella organisms were isolated from 18.4 per cent of the samples taken over a 12-month period.*

### Introduction

Salmonellosis, a disease of man and lower animals, is manifested clinically by one of three major syndromes: peracute septicemia, acute enteritis, or chronic enteritis. The main source of infection among animals is the infected domestic or wild animal or bird, which contaminates pasture, feed, or drinking water with feces containing the organism (1). The major vehicles of infection for humans are foods of animal origin, particularly frozen or dried egg products, dried milk, poultry, and packaged boneless meats (7).

The disease has been reported in animals and man in Trinidad and Tobago (2,8). In 1973 there was an unusual outbreak of gastroenteritis among children, and *Salmonella* organisms were isolated from feces or rectal swabs in a number of cases (10). Accordingly, a study was undertaken to examine the prevalence of *Salmonella* infection in market swine slaughtered at an abattoir in the city of Port-of-Spain.

The present note summarizes the results of this investigation, which was carried out over the 12-month period from May 1974 to May 1975.

### Materials and Methods

The abattoir selected was visited once a week on the day that the largest kill was expected. Mesenteric lymph nodes from each pig sampled were placed in separate plastic bags and transmitted to the Ministry of Agriculture's Veterinary Diagnostic Laboratory. For various reasons it was impossible to collect samples on certain days. During the period of investigation a total of 2,511 pigs were slaughtered, of which 869, or 34.6 per cent, were studied. The corresponding data for each of the 36 days on which samples were taken are presented in Table 1.

At the Laboratory 5.0 grams of finely divided lymph node from each sample were placed in 50 cc Selenite F broth and incubated at 43.5°C for 72 hours, after which brilliant green agar plates were inoculated and incubated at 37°C.

The plates were examined at 24 and 48 hours for the presence of typical *Salmonella* colonies (12). Suspicious colonies were subjected to biochemical tests (4), and the ones showing typical reactions were tested with *Salmonella* polyvalent O and H antisera. Those that gave positive results were then subcultured onto blood-heart infusion (BHI) agar slants and incubated at 37°C for 24 hours. The inoculated BHI agar slants were sent to the *Salmonella* and *Shigella*

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Table 1. Number of pigs slaughtered and number and percentage sampled on 36 visits to an abattoir in Port-of-Spain, Trinidad and Tobago, May 1974-May 1975.

Day	No. slaughtered	No. sampled	% sampled
1	74	25	33.8
2	60	25	41.7
3	60	25	41.7
4	70	25	35.7
5	100	25	25.0
6	82	19	23.2
7	90	25	27.8
8	67	20	29.9
9	72	25	34.7
10	59	17	28.8
11	66	25	37.9
12	99	25	25.3
13	66	25	37.9
14	77	25	32.5
15	116	25	21.6
16	62	25	40.3
17	79	25	31.6
18	71	25	35.2
19	69	25	35.2
20	57	24	42.1
21	66	25	37.9
22	68	24	35.3
23	74	25	33.8
24	77	25	32.5
25	96	25	26.0
26	57	16	28.1
27	41	25	61.0
28	52	25	48.1
29	81	25	30.9
30	48	25	52.1
31	60	25	41.7
32	33	25	75.8
33	81	25	30.9
34	61	25	41.0
35	61	24	39.3
36	59	25	42.4
Total	2,511	869	34.6

Table 2. Isolations of *Salmonella* from swine mesenteric lymph nodes on 36 visits to an abattoir in Port-of-Spain, Trinidad and Tobago, 1974-1975.

Day	No. sampled	No. positive	% positive
1	25	0	0
2	25	0	0
3	25	0	0
4	25	2	8.0
5	25	3	12.0
6	19	3	15.8
7	25	2	8.0
8	20	5	25.0
9	25	8	32.0
10	17	8	47.1
11	25	5	20.0
12	25	2	8.0
13	25	3	12.0
14	25	13	52.0
15	25	15	60.0
16	25	0	0
17	25	16	64.0
18	25	17	68.0
19	25	0	0
20	24	8	33.3
21	25	8	32.0
22	24	3	12.5
23	25	2	8.0
24	25	6	24.0
25	25	0	0
26	16	0	0
27	25	3	12.0
28	25	3	12.0
29	25	3	12.0
30	25	0	0
31	25	8	32.0
32	25	6	24.0
33	25	0	0
34	25	4	16.0
35	24	2	8.3
36	25	2	8.0
Total	869	160	18.4

Reference Laboratory in London for serotyping.

### Results

Of the 869 samples tested, 160, or 18.4 per cent, were positive for *Salmonella*. Table 2 shows the percentage of successful isolations for the various days on which sampling was done.

The serotypes isolated, a total of 19, are

listed in Table 3. The most prevalent ones were *S. agona*, *S. anatum*, and *S. derby*. *S. agona*, the most frequent of them all, was first isolated in Trinidad in 1972 (3). In no case was there infection of lymph nodes with more than one serotype.

Table 4 shows the monthly rates of isolations over the study period. The lowest incidence (2 per cent of the samples examined) was recorded in May 1974 and the highest (66 per cent) in October of that year.

Table 3. Serotypes of *Salmonella* isolated, Port-of-Spain, 1974-1975.

Serotype	No. isolated	% isolated
<i>S. agona</i>	61	37.4
<i>S. anatum</i>	31	19.0
<i>S. derby</i>	14	8.6
<i>S. infantis</i>	9	5.5
<i>S. oranienburg</i>	8	4.9
<i>S. muenster</i>	7	4.3
<i>S. newport</i>	7	4.3
<i>S. typhimurium</i>	7	4.3
<i>S. panama</i>	6	3.7
<i>S. rubislaw</i>	2	1.2
<i>S. give</i>	2	1.2
<i>S. cubana</i>	2	1.2
<i>S. javianca</i>	1	0.6
<i>S. eimsbuettel</i>	1	0.6
<i>S. albany</i>	1	0.6
<i>S. uganda</i>	1	0.6
<i>S. saint-paul</i>	1	0.6
<i>S. san-diego</i>	1	0.6
<i>S. charmeleon</i>	1	0.6

## Discussion

*Salmonella* has been isolated from apparently normal market swine by workers elsewhere (5,9,11). In one study, conducted in Bradford, England, there was evidence to incriminate the abattoir as the most important source of *Salmonella* infection in man, and the pig as the main animal reservoir (9).

Riley, working in Australia (11), showed that 27 per cent of normal slaughtered pigs were positive for *Salmonella* infection when intestinal contents and mesenteric lymph nodes were examined.

In a survey conducted in southwestern Ontario, Canada, Groves et al. (5) found

Table 4. *Salmonella* isolations by month, Port-of-Spain, May 1974-May 1975.

Month	% <i>Salmonella</i>
May 1974	2.0
June	15.0
July	33.0
August	10.0
September	37.3
October	66.0
November	19.5
December	10.7
January 1975	13.2
February	16.0
March	24.0
April	8.0
May	8.2

19.5 per cent of swine mesenteric lymph nodes to be infected with *Salmonella*. This proportion is similar to the 18.4 per cent observed in the Trinidad investigation being reported here. Their work extended from March to August: the lowest incidence was in July (10.3 per cent) and the highest in August (27.1 per cent), but there were no variations that were significant. They cite the work of Bovre, however, in which significantly higher incidences were observed in May and June. The peak incidence noted in Trinidad during October will be correlated in another study with the incidence of salmonellosis in humans over the same period.

McDowall, in his survey of gastroenteritis among children in Trinidad (10), found that the most prevalent serotype was *S. derby*. It might not be insignificant, therefore, that this was the third most frequent serotype isolated from porcine mesenteric lymph nodes in the work reported here.

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Shigella Reference Laboratory in London were responsible for the laboratory work, and for the cooperation of these agencies the authors are grateful.

## SUMMARY

*Salmonella* organisms were isolated from samples of mesenteric lymph nodes taken from healthy market swine at an abattoir in Port-of-Spain, Trinidad and Tobago, on 36 different visits over a 12-month period. Of the 869 samples

examined, 160, or 18.4 per cent, were positive for *Salmonella*. A total of 19 serotypes were isolated, of which *S. agona* was the most prevalent.

The findings are compared with observations by other workers.

## REFERENCES

- (1) Blood, D.C., and T. A. Henderson. *Veterinary Medicine*. London, Bailliere, Trindall and Cassell, 1968.
- (2) Cazabon, E.P.I. *Annual Report of the Veterinary Diagnostic Laboratory, 1971*. Port-of-Spain, Ministry of Agriculture, Lands, and Fisheries, 1972.
- (3) Cazabon, E.P.I. Possible introduction of *Salmonella agona* into Trinidad by a shipment of baby chicks. In press.
- (4) Edwards, P.R., and W. H. Ewing. *Identification of Enterobacteriaceae*. Minneapolis, Burgess Publishing Company, 1962.
- (5) Groves, B. I., N. A. Fish, and W. R. Mitchell. The occurrence of *Salmonella* infection in market swine in southwestern Ontario. *Can Vet J* 12(1):11, 1971.
- (6) Groves, B. I., N. A. Fish, and D. A. Barnum. An epidemiological study of *Salmonella* infection in swine in Ontario. *Can J Public Health* 61:396, 1970.
- (7) Gould, K. L., J. M. Gooch, and G. Q. Ching. Epidemiologic aspects of salmonellosis in Hawaii. *Am J Public Health* 62(9):1216, 1972.
- (8) Massiah, V. I. Principal Pathologist, Ministry of Health, Government of Trinidad and Tobago. Personal communication.
- (9) McDonagh, V. P., and H. G. Smith. The significance of the abattoir in *Salmonella* infection in Bradford. *J Hyg (Camb)* 56:274, 1958.
- (10) McDowall, M. F. The changing pattern of childhood gastroenteritis in Trinidad. In press.
- (11) Riley, M.G.I. The incidence of *Salmonella* in normal slaughtered pigs. *Aust Vet J* 46:40, 1970.
- (12) Thatcher, F. S., and D. S. Clark. *Microorganisms in Food*. Toronto, University of Toronto Press, 1968.