

## OCCURRENCE OF SALMONELLA AMONG MARKET CALVES IN ASSIUT PROVINCE (With 2 Tables)

By

**F.A. AHMED; M.A. SOBEIH and AMANI G. THABIT\***  
(Received at 2/5/1989)

دراسة عن تواجد ميكروب السالمونيلا في العجول  
المعرضة للبيع في أسواق محافظة أسيوط

فاروق أمين ، محمد عبد العال ، أمانى ثابت

مرض السالمونيلا من الأمراض المشتركة بين الإنسان والحيوان وهذا المرض يوجد في معظم بلاد العالم ومسبب المرض السريع الانتشار بين الحيوانات خاصة في ظل سوء الظروف البيئية والصحية المحيطة ... ويعتبر تلوث الغذاء الآدمي بالميكروب السبب للمرض من الأسباب الأساسية في إنتشار المرض بين الآدميين خاصة إذا كان الطعام يشتمل على مواد غذائية من مصدر حيواني حامل للميكروب السبب للمرض ويفحص ٤٥٠ مسحة برازية لمحاولة عزل ميكروب السالمونيلا من العجول الصغيرة (٦-٦٢ شهر) والمعرضة للبيع في ثلاث أسواق كبيرة حول مدينة أسيوط تعتبر مراكز تجميع لعدد كبير من الحيوانات من القرى المحيطة لكل سوق ... ومعظم العجول التي تم فحصها سليمة صحيا من الناحية الظاهرية إلا أن إحدى عشر عجلا لوحظ أن لديها إستعداد للإسهال وإستدل على ذلك من لهونة المواد الإخراجية أثناء الحصول على المسحة البرازية ... هذا وقد ثبت من الفحص الميكروبيولوجي للمسحات البرازية أن جميع العجول السليمة صحيا من الناحية الظاهرية خالية من ميكروب السالمونيلا وعددها ٢٩ عينة بينما ٦ عينات من الإحدى عشر عجلا التي ظهر عليها بداية الإسهال أثبتت الفحوصات المعملية إيجابيتها لميكروب السالمونيلا أي بنسبة ١٠٠٪ وإجراء الفحوصات المصلية على الميكروبات التي تم عزلها لتحديد كل عترة تبين أنها تنتمي إلى أربعة أصناف مختلفة هي سالمونيلا ديلسن سالمونيلا انقريتيديس ، سالمونيلا تيفيني وسالمونيلا تيفيمبوروم . ونخلص مما تقدم يمكن القول بأن مكان تجمع العجول الصغيرة في مكان محدد أسبوعيا في كل سوق يمكن أن يلعب دورا غير بسيط في تلوين العلائق المتقدمة لهذه العجول مما يترتب عليه احتمال إصابة العجول السليمة بهذا المرض ... لذلك ننصح بأن يعنى بأرضية الأسواق وتطهيرها بالمطهرات المناسبة مثل رش الجير المطفأ مرة كل أسبوعين كوقاية للعجول من احتمال إصابتها بالميكروب .

### SUMMARY

Four hundred and fifty rectal swabs were collected from apparently healthy market calves of age 3 up to 6 months offered for sale in three large animal markets around Assiut City; 150 samples were collected from each of EL-Maasara; Mankabad and El-Wasta.

\* Dept. of Bacteriology, Faculty of Med., Assiut Univ.

HODA HATEM, *et al.*

- Osteen, K.G.; Anderson, L.D.; Reichert, L.E. Jr. and Channing, C.P. (1985): Follicular fluid modulation of functional LH receptor induction in pig granulosa cells. *J. Reprod. Fert.* 74, 707-418.
- Schuurs, A.H.W.M. (1969): Agglutination inhibition reactions for the determination of gonadotrophin-Karalinske symposia in research method in reproductive endocrinology. 1st symposium, immunoassay of gonadotrophins. Stockholm. p. 95-112.
- Shemesh, M. (1979): Inhibitory action of follicular fluid on progesterone and prostaglandin synthesis in bovine follicles. *J. Endocr.* 82: 27-31.
- Soliman, F.A. (1960): Assay of luteinizing hormones. *Nature*, 185: 321.
- Vaitukaitis, J.; Robbins, J.B.; Nicschlog, E. and Ross, B. (1971): A method for producing specific antisera with small doses of immunogens. *J. Clin. Endocrinology & Metab.* 33: 988-991.

Table (1) : Intake of buffalo LH by ovarian tissue (Biological assay)

Ovarian tissues	Ug hormone/mg tissue
Cortical tissue contain Preantral follicle	1.23 ± 0.11
0.5-1.0 cm follicle (medium sized follicle)	1.28 ± 0.00
Over 1.0 cm follicle (large sized follicle)	1.88* ± 0.19
Newly formed corpus luteum	0.93 ± 0.16
Mature corpus luteum	0.75 ± 0.24
Corpus albicans	1.41 ± 0.00
Inactive ovary	1.13 ± 0.13

± Standard error

\* Significantly differs from other tissues at P &lt; 0.01.

Table (2) : Intake of buffalo LH by ovarian tissues (Immunoassay)

Ovarian tissues	Ug intake mg/tissue
Cortical tissue contain Preantral follicle	0.60 ± 0.10
0.5-1.0 cm follicle (medium sized follicle)	0.95 ± 0.31
Over 1.0 cm follicle (large sized follicle)	1.30 ± 0.20
Newly formed corpus luteum	0.23 ± 0.01
Mature corpus luteum	0.30 ± 0.06
Corpus albicans	0.28 ± 0.07
Inactive ovary	0.55 ± 0.16

± Standard error

\* Significantly differs from other tissues at P&lt;0.01.

F.A. AHMED, et al.

Most of the examined calves were apparently healthy, except eleven calves which showed a tendency to diarrhoea 4 calves in El-Wasta; 6 calves in El-Maasara and the last one in Mankabad.

Only 6(1.33%) calves were proved to harbour Salmonella in their rectal swabs and they all had the tendency to be diarrhoeotic. The isolated strains are belonged to four serological types *S.dublin* (2 strains, 0.44%); *S.enteritidis* (2 strains, 0.44%); *S.typhi* (1 strain, 0.22%) and *S.typhimurium* (1 strain, 0.22%).

### INTRODUCTION

Salmonellosis is probably the most commonly occurring zoonotic disease in most countries of the world. This is primarily due to ubiquitous nature of the organism and the ease by which it is transmitted among animals under natural conditions especially if sanitation is not adequate. It is an accepted fact that foods of animal origin are the main source of Salmonella infections among human beings, and many animal species serve as reservoirs of these organisms.

Salmonellae are frequently found in clinically healthy farm animals (MORGAN et al., 1969). Studies on large groups of cattle indicated that the percentage of such latent infections was about 13% in the United States and about 14% in Nether Land (ROTHENBACKER, 1965).

The carrier state in apparently healthy calves appears to be quite variable. Some investigators isolated Salmonella in high incidence; ARROYO and BOLANOS (1960) examined several sites in Costa Rica and found that 13.3 percent of the cattle were infected with Salmonella even though they showed no signs of disease. KEULEN and HOFSTRA (1964) in Holand carried out an investigation to determine the percentage of calves infected with Salmonella it was 14.3%. DALEEL and FOROST (1967) found Salmonella species in 7.8% of the examined apparently healthy calves. In another survey made by EDEL and KAMPelmacher (1970) 14.1% of calves were found to carry Salmonellae.

The strains of Salmonella frequently isolated from both diseased and healthy farm animals included different serotypes as *S.typhimurium*; *S.derby*; *S.dublin*; *S.oranienburg*; *S.java*; *S.choleraesuis*; *S.anatum*; *S.newington*; *S.infants*; *S.stanley*; *S.abeny*; *S.chester*; *S.typhi*; *S.enteritidis* and *S.meleagridis* (MINER, et al., 1967). A number of epidemics had been observed in human population which were caused by most of Salmonella serotypes frequently found in farm animals (Nottingham and Urselmann, 1961).

Not all infected cattle with Salmonella excrete the organism in their faeces, but do often excrete it intermittently. However, detection of infected animals by demonstrating Salmonella organism in excreta is the only reliable method available (HEARD, et al., 1972).

The investigation was undertaken to study the occurrence of Salmonella in the intestinal contents of the 450 apparently healthy calves offered for sale in markets.

## SALMONELLA AMONG MARKET CALVES

The purpose of this investigation was to determine the prevalence of Salmonella serotypes in market calves and to discuss their importance from the veterinary public health point of view.

### MATERIAL and METHODS

450 rectal swabs were collected from market calves apparently healthy of age 3 up to 6 months, using sterile cotton/wood swabs in sterile test tubes. Samples were collected from three large animal saleyards which were chosen as a major animal collection centers to which large number of animals used to come out from many villages around Assiut City, to be offered for sale. These markets are located in El-Maasara; Mankabad and El-Wasta.

For practical purposes an average of fifty rectal swabs per week were obtained for laboratory examination. Apparently healthy calves, as well as, those manifesting digestive problem, e.g. diarrhoea or sick appearance were swabed. The apparently healthy group were selected at random.

The samples collected are 150 rectal swabs from each of the 3 market as shown in table (1).

The anal region of each apparently healthy calf as well as, the diarrhoeic one was first cleaned with a piece of cotton soaked in alcohol prior to swabbing in order to minimize contamination. The swab was then placed in a test tubes containing 5 ml. physiological saline as transport medium and conveyed to the laboratory as soon as possible with a minimum delay.

Bacteriological examination of the specimens followed enteric bacteriological procedures. The swab and saline suspension were pre-enriched using selenite broth and incubated at 37°C. for 18 hrs. Then differential plates of MacConkey; S.S. agar and Brilliant green agar were streaked and aerobically incubated at 37°C. for 24 hrs.

Suspected Salmonella isolates were identified according the standard biochemical tests of the enterobacteriaceae adopted by (Edward and Ewing, 1972; Cruikshank, et al., 1975 and Bailey & Scott, 1978).

Salmonella strains were tested against "O" Group antisera. For complete identification.

### RESULTS AND DISCUSSION

The results tabulated in tables (1 & 2) show that.

439 calves, which were apparently healthy without any tendency to diarrhoea were free from Salmonella. The rest eleven calves which were apparently healthy showed slight soft faeces (enteric calves).

From table (1) it is clear that, not all enteric calves harboured Salmonella; From the 6 calves recorded in El-Maasara only 3 calves (50%) are considered carriers; the same percentage in El-Wasta (2 cases out of 4 calves), while the enteric calf of Mankabad was positive for Salmonella.

On the other hand, other investigators isolated the organism in lesser incidence. In an investigation made by RASCH (1957) Salmonella isolation was made from only 0.5% of calves. This figure corresponds with the data obtained by KAMPELMACHER (1957) who examined calves and isolated Salmonellae from 0.56% of the tested animals. In Britain only 0.4 percent carriers were found and examinations of mesenteric lymph nodes showed negative results (SMITH, 1968). MORGAN, et al. (1969) examined 675 faecal samples swabs from five Costa Rican abattoirs with negative results and out of 391 meat samples there was only one case of salmonella infection. The aforementioned investigations showing low incidences of Salmonella carriers in calves, as well as our incidence are in agreement with the results recorded by HEARD et al. (1972). The latter reported that only one specimen (1.04%) out of 96 faecal samples taken from calves, was found to be positive for Salmonella. Moreover, SHARMA et al. (1972) recorded that, a variable proportion 1% of carriers among the apparently healthy calves.

Since some investigators isolated Salmonella in higher incidence as (ARROYO & BOLANOS, 1960; KEULEN & HOFSTRA, 1964; DALEEL & FROST, 1967 and EDEL & KAMPELMACHER, 1970).

As recorded in table (2) each of Salmonella dublin and Salmonella enteritidis was isolated from two calves (0.44%); while each of Salmonella typhi and Salmonella typhimurium was isolated from one calf (0.22%), about the calf carry S.typhi considered a focus of infection among both human and animals. The preceding isolates were similarly isolated by DEDIE and SCHOENE (1974).

The main possible cause suggested to be the source of infection is ingestion of contaminated pastures (RANKIN & TAYLOR, 1969; JACK & HEPPEL, 1969 and RANKIN & BURROW, 1970).

From the veterinary public health point of view; reserved limited areas in the saleyard (markets) which is commonly reserved for calves offered for sale weekly can play a very important role in spreading the infection in aquired way, among the clinically healthy calves (HEARD, et al., 1972). Therefore, it is advisable to clean and disinfect these areas using a suitable disinfectant as slaked lime before the time of aggregation of the marking calves every two weeks in order to break down the cycle of aquired infection which is suspected to occur among the collected calves for sale.

### REFERENCES

- Arroyo, G. and Bolanos, R. (1960): "Salmonellosis problem among cattle in Costa Rica".  
Rev. Biol. Trop., 8, 49-51.

## SALMONELLA AMONG MARKET CALVES

- Bailey, W.R. and Scott, G. (1978): "Diagnostic microbiology". A text book for the isolation and identification of pathogenic micro-organisms. The C.V. Mosby Comp. Saint Lois.
- Cruickshank, R.; Duguid, J.; Marmion, B. and Swain, R. (1975): "Medical microbiology". 12th Ed. Livingstone, Edinburgh London and New York.
- Daleel, E.E. and Frost, A.J. (1967): "Salmonella typhimurium in cattle faeces". Austr. Vet. J., 43, 203.
- Dedie, K. and Schoene, W. (1974): "Results of the control campaign against Salmonellosis in cattle in Upper Swabia". Deutsche Tierärztliche Wochenschrift, 81 No. 14, 325-329, W. Germany.
- Edel, W. Guinee and Kampelmacher, E.H. (1970): "Salmonellosis as acquired infection among herd of cattle" Zbl. Vet. Med. Reihe B. 17, 479.
- Edward, P.R. and Ewing, W.H. (1972): "Identification of enterobacteriaceae". 3rd Ed. Burgess publi. Comp.
- Heard, M.; Nada, E.; Jennett, B. and Linton, M. (1972): "Changing patterns of Salmonella excretion in various cattle populations". Vet. Rec., 90, 359-364.
- Jack, E.J. and Hepper, P.T. (1969): "Salmonella infections in Cattle feeded on contaminated pastures". Vet. Rec., 84; 196-197.
- Kampelmacher, E.H. (1957): "Acquired Salmonellosis in calves". Verst. Volksgezondh., 1957, 1293.
- Keulen, G. and Hofstra, K. (1964): "Bovine Salmonellosis". Zbl. Vet. Med. Reihe B. 11, 728.
- Miner, J.; Fina, L. and Piatt, C. (1967): "Salmonellosis in cattle: An serological investigation". Appl. Microbi., 15, 627.
- Morgan, P.; Goddelfer, L.; Chavarria, M. and Hauser, G. (1969): "Studies of human Salmonellosis in relation to infection in animals". Amer. J. Trop. Med. Hyg., 18, 688.
- Nottingham, P.M. and Urselmann, A.J. (1961): "Incidence of Salmonella in faeces of calves". N.Z.J. Agric. Res., 4., 449.
- Rankin, J.D. and Burrows, M.R. (1970): "Salmonella infection among animals". Brit. Vet. J., 126, 211.
- Rankin, J.D. and Taylor, M.J. (1969): "Salmonella infection in cattle reared in yards". Vet. Rec., 85, 578.
- Rasch, K. (1957): "Salmonella in faeces of healthy calves". Berl. Munch. Tierärztl. Wschr. 70, 161.
- Rothenbacher, H. (1965): "Mortality and morbidity in calves with Salmonellosis". J.A.V. M.A., Vol. 147, No. 11, 1211-1214.
- Sharma, V.; Kaura, Y. and Singh, I. (1972): "Salmonella carriers in Indian cattle". Indian J. Med. Res., 61, 184-187.
- Smith, H.W. (1968): "Salmonellosis in calves". Vet. Rec., 83, 15.

**Table (1)**  
Incidence of Salmonella in 450 apparently healthy market calves

Market	No. of samples	No. of positive calves	Incid. %	No. of diarrh. calves	Incid. %
EI-Maasara	150	3	2	6	50
EI-Wasta	150	2	1.32	4	50
Mankabad	150	1	0.67	1	100
Total	450	6	1.33	11	54.55

**Table (2)**  
Distribution of salmonella serotypes in the tested 450 market calves

Strain	No. of isolates	Incid. %	Market
<u>Salm.typhi</u>	1	0.22	EI-Maasara
<u>Salm.dublin</u>	2	0.44	EI-Maasara & EI-Wasta
<u>Salm.typhimurium</u>	1	0.22	EI-Wasta
<u>Salm.enteritidis</u>	2	1.32	EI-Maasara & Mankabad
Total	2	1.32	