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تأثير الصرف الغير صحي للمياه المنصرفة من مجزرة الموصل على تلوث البيئة بميكروب السالمونيلا والكلستريديم بيرفرنجنز

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تم في هذا البحث جمع ٢٩ عينة من المياه المنصرفة من مجزرة الموصل لعزل ميكروب السالمونيلا وكذلك ٣٠ عينة لعزل ميكروب الكلستريديم بيرفرنجنز ٠ وتم عزل ١٤ عترة من السالمونيلا وكذلك الكلستريديم بيرفرنجنز من النوع أ ، ب ٠ كما تم عزل لميكروب السالمونيلا كورفاليز لأول مرة بالعراق في هذه الدراسة ٠ وتمت مناقشة نتائج البحث وأثر تلوث البيئة بها على الصحة العامة ٠

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EFFLUENTS DISCHARGED FROM MOSUL ABATTOIR AS A SOURCE OF SALMONELLAE AND C.PERFRINGENS TO ENVIRONMENTAL CONTAMINATION

(With One Table)

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SUMMARY

The study was concentrated on environmental contamination by Salmonella and Clostridium perfringens discharged from abattoir effluents in Mosul. 29 and 30 samples of wastewater were collected for the isolation of Salmonella and C.perfringens respectively in a five months study period.

14 serotypes of Salmonellae in a variable order of frequency were revealed, namely: Salmonella typhimurium, S.corvallis, S.anatum, S.auto agglutinable, S.montivedeo, S.jerusalem, S.chaily, S.worthington, S.cubana, S.muenchen, S.newport, S.dublin, S.molade and S.infantis.

It should be noted that Salmonella corvallis recovered in this study, is the new serotype firstly recorded in Iraq.

Clostridium perfringens type A were revealed from all the thirty samples examined and C. perfringens type B were revealed from two samples (6.66%).

The health hazards of its environmental pollution as well as the proposed means to protect the public against disease were discussed.

INTRODUCTION

Pathogenic species of microorganisms are almost always present in wastewater. Where the practice in elimination of wastewater been improper, a question often arises concerning the dispensing of disease producing organisms to the environment.

Effluents discharged from Mosul abattoir in which animals are slaughtered and eviscerated as well as secondary processes were done, are simply deposited on to the outdoor earth surroundings it in a runoff conceivable manner and to watercourses.

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Live animals entering the abattoir may be carriers of salmonellae either internally or externally on the hide or hooves (PEEL and SIMMONS, 1978). HADDAD and JEMEL (1985) revealed 7 serotypes of Salmonellae from both living and slaughtered cattle at Mosul city abattoir in Iraq, which in descending frequency were: Salmonella typhimurium, S.typhimurium var. Copenhagen, S.dublin, S.mabankada, S.cerro, S.anatum and S.montevedeo. On the other hand, S.typhimurium, S.anatum and S.newport were among the salmonellae revealed from carcasses of sheep and goat slaughtered in Mosul (HADAD, et al. 1985). Moreover, S.dublin, S.anatum and S.typhimurium were revealed by ALABOUDI, et al. (1987) in their study on the hygienic quality of beef carcasses produced at Mosul. ALI (1986) revealed also salmonellae from 9.2% of the examined beef carcasses at Dawra slaughter house in Baghdad and identified 16 serotypes of salmonella. Moreover, he revealed also 19 serotypes of salmonella from the effluents of Dawra abattoir, of which the most frequent isolates were: S.havana, S.anatum, S.molade, S.newington, S.weftenberg, S.infantis, S.dublin, and S.typhimurium.

On the other hand, although Clostridium perfringens is ubiquitous organism, disease occur when devitalized tissues are available in the host to provide the anaerobic conditions necessary for clostridial multiplication (Mc DONEL, 1979). It has been established also that C.perfringens enterotoxin can alter intestinal transport of fluids, cause tissue damage in the gut, increase capillary permiability, effect basic structure of microvillus brush borders and alter macromolecular synthesis (Mc Donel, 1979). On the basis of toxin production, these organisms are classified as types A,B,C,D,E and F (GOLDBERG, 1976).

This study focused the attention upon the presence fo salmonella and Clostridium perfringens organisms as serious contaminants of the environment from the epidemiological point of view.

MATERIAL and METHODS

Sampling: Waste water samples were collected aseptically from effluents discharged from Mosul abattoir outdoor in a runoff manner. Two visits conducted every 10 days to collect samples for a study period of approximately 5 months. 29 samples were collected for isolation of salmonella, while 30 samples were taken for C.perfringens.

Isolation of salmonella: Techniques used for isolation of salmonella including culturing, growth characteristics and biochemical reactions were carried out according to GRUICKSHANK, et al. (1980).

Isolation of C.perfringens: A small portion of the sample was placed in test tube and heated at 80°C for 10 minutes and cooled to 37°C. Approximately 1 ml of the sample was transfered into cooked meat broth and incubated anaerobically 18 hours. Techniques used for isolation of C.perfringens strains were carried out as cited by ELLNER, et al. (1973) and CRUICKSHANK, et al. (1980) included growth Characteristics on 5% sheep blood agar, litmus milk changes with stormy fermentation, Gram reaction, biochemical tests and colonial growth with Negler or lecithinase reaction on egg yolk medium. Anaerobic condition was achieved in Gas Pak jar using disposable hydrogen and carbon dioxide generator envelops as well as evacuation.

Identification of the isolates: Pure cultured strains of salmonellae were serotyped in the National Salmonella Center in Iraq. Moreover, subcultured isolates of Clostridium perfringens were typed on the basis of toxin production in the same center in Iraq.

RESULTS

Incidence of salmonellae: In this study 18 samples out of the 29 samples examined yielded salmonella organisms (62%). 52 isolates of salmonella represented 14 serotypes were yielded from the 29 samples examined in a variable order of frequency (Table 1). it should be noted that, S.corvallis recovered in this study is the new serotype firstly recorded in Iraq.

Incidence of C.perfringens: All the thirty samples examined yielded. C.perfringens type A while two samples yielded type B (6.66%).

DISCUSSION

When health hazards of the environment come under discussion, it was stated that recovery of pathogenic organism from a polluted environment indicates the associated disease to be already circulating in the adjacent community (REILLY, 1981). Of these, organisms of the salmonella group which are widely distributed in man and animals. Animals infected during life may reach the slaughter house as carrier animals even without symptoms. Salmonellae could be isolated from internal viscera or from hooves and skin (HADAD and JEMEL, 1985 and HADAD, et al. 1985). These organisms are likely to contaminate immediate environment if improper hygiene were practiced during slaughtering and eviceration (STOLLE, 1981). Where abattoir effluents are discharged directly on the the surrounding area and to watercourses and not to sewage works, it may prolong the primary incident by reinfection and may lead to secondary outbreaks. It was stated that, Salmonellosis form one of the classic trait transmitted by water and soil received wastes (REILLY, 1981).

Organisms of this group produce in man and animals a variety of infections ranging from acute septicaemic fevers to subclinical or symptomless infections (THATCHER and CLARK, 1968). The isolation of 14 serotypes of salmonella demonstrates clearly the risk on environmental contamination as a source of salmonella a infections (Table 1). Certainly, the risks are complicated when a new serotype is introduced into the area. This study revealed S.corvallis which are firstly recorded in Iraq.

It could be concluded that, the presence of salmonellae in raw wastewater discharged from effluents of Mosul abattoir disposed unproperly could affect animal and human health by two aspects: Firstly it enhances the completion of the classical trait of salmonella affection chain, and secondly it may form a direct focus of infection. Effluents discharged from such abattoir in a runoff manner directly to vegetated soil and watercourses and not to sewage works system, causes enormous pollution of the environment with great risk of health hazard. It was of interest to show that wild birds feeding on discharges of effluents and then roosting elsewhere could spread the pathogens. Salmonella anatum which were the predominant isolate revealed in the study, have been isolated from living birds (Sturnus vulgaris) in the vicinity of Mosul (HADAD and JEMEL, 1987). On the other hand, S.montivedeo, S.worthington, S.cubana and S.muenchen revealed in the study were also isolated from feed ingredients of animals by AL-HINDAWI and TAHA (1979) in Iraq. Moreever, it was of great significance that, S.typhimurium, S.meuenchen, S.anatum, S.infantis, S.newport, S.dublin and S.molade yielded in the study have been recorded in human beings in Iraq by the National Salmonella Center as cited by ALI (1986).

Such findings demonstrates clearly the cyclic chain between environmental contamination by salmonellas and health hazards to man and animals due to improper hygiene practice.

On the other hand, in this study toxigenic Clostridium perfringens type A and type B were revealed. Although C.perfringens is ubiquitous it has been isolated from diseased man and animals when predisposing factors are available (GOLDBERG, 1980). It was stated that the main concern in man is C.perfringens type A, causing food posoning while other disease processes occur with regularity are gas gangrene, cholecystitis, peritonitis and somewhat more rare are reports of infection of the eye (BROWN and PETER, 1976 and GOLDBERG, 1980). C.perfringens type B are associated with lamb dysentery affecting young lambs, which caused by rapid multiplication of the organism in the intestins with a resultant fatal toxaemia. A few cases of enterotoxaemic infections caused by C.perfringens type B have been reported in calves and in sheep and goats (BUXTON and FRASER, 1977).

There are important predisposing factors providing an environment which encourages the rapid and unusually high rate of growth of C.perfringens type B in the intestins with the conseuent production and absorbtion of relatively large amounts of toxin. It could be concluded that the existence of C.perfringens type A(100%) and C.perfringens type B(6.66%) are of great significance both epidemiologically to disease and economically.

The study demonstrates clearly a need for proper sanitation practice at Mosul abattoir with hygienic disposal of its effluents into a sewage collection system. It should be noted that surveillance is not an ending job but it serve as a firefighting the environmental sources of disease in which the pathogen could be found (SILLIKER, 1980).

Table (1)
Serotypes of salmonellae and frequency of isolation

Salmonella serotypes	Number of times isolated in samples (%)	Frequency distribution of 52 isolates (%)
S. typhimurium	3 (10.34)	5.77
S. corvallis	1 (03.44)	1.92
S. anatum	18 (62.06)	34.62
S. auto agglutinable	4 (13.79)	7.67
S. montivedeo	4 (13.79)	7.67
S. jerusalem	1 (3.44)	1.92
S. chaily	2 (6.89)	3.58
S. worthington	2 (6.89)	3.58
S. cubana	5 (17.24)	9.62
S. muenchen	1 (3.44)	1.92
S. newport	6 (20.68)	11.54
S. dublin	1 (3.44)	1.92
S. molade	2 (6.89)	3.58
S. infantis	2 (6.89)	3.58

* : No. of samples examined was 29.
** : No. of yielded isolates was 52.

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