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INCIDENCE OF CAMPYLOBACTER JEJUNI AND FAECAL COLIFORM IN SOME WATER SOURCES

(With 3 Tables)

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مدى تواجد ميكروب الكمبيلوبكترجيجيني والميكروب القولوني في بعض مصادر المياه

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تم جمع ٦٠ عينة مياه من ثلاث مصادر هي ترعة المحمودية ٢٠ عينة ، المياه الجوفية ٢٠ عينة ، بحيرة مريوط ٢٠ عينة وفحصت لوجود ميكروب الكمبيلوبكترجيجيني والميكروب القولوني بإستخدام طريقة الأغشية المرشحة والعدد الإحتمالي الأكبر . كانت نسبة وجود ميكروب الكمبيلوبكترجيجيني في مياه ترعة المحمودية ، المياه الجوفية ، بحيرة مريوط هي ١٣ر٣ ، ٣ر٣ ، ٧ر٦٪ على الترتيب . كما كان العدد الإحتمالي الأكبر لميكروب الكمبيلوبكترجيجيني هي (ر٤٩ ± ٤ر٣ ، ٥ر١٨ ± ٦ر٧ و ٨ر٢٤ ± ٧ر٤) ميكروب في ١٠٠ سم٣ من المصادر الثلاثة على الترتيب ، أما العدد الإحتمالي الأكبر للميكروب القولوني هو ٨ر١١٥٣ ± ٩ر٢٩٤ ، ٥ر٨١٦ ± ٩ر٥٨٩ ، ١٨٥ ± (ر٤١٧) ميكروب لكل ١٠٠ سم٣ من المصادر الثلاثة على الترتيب . وجد أن طريقة الأغشية المرشحة أفضل طريقة لعزل ميكروب الكمبيلوبكتر من مصادر المياه المختلفة . بالإضافة إلى هذا وجدت علاقة إيجابية بين ميكروب الكمبيلوبكتر والميكروب القولوني (r= 0.53)

SUMMARY

60 water samples were collected from 3 sources (Mahmoudia Canal, 20; Ground Water, 20; and Mariout Lake, 20) and examined for detection of Campylobacter jejuni and faecal Coliform organisms using membrane filter technique and most probable number (MPM). The incidence of Campylobacter jejuni in Mahmoudia canal, ground water and Mariout lake were 13.3, 3.3; and 6.7% respectively. The most probable number of Campylobacter jejuni in Mahmoudia canal, ground water and Mariout lake were 49.1±3.4; 18.5±6.7 and 24.8±4.7 organisms/100 ml of water while for faecal Coliform were 1153.8±294.9, 816.5±589.9 and 185.0±417.1 organisms/100 ml of water.

Membrane filter technique was found to be efficient in the isolation of Campylobacter from different sources. Moreover, a positive correlation between Campylobacter jejuni and faecal Coliform bacteria (r= 0.53) was revealed.

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INTRODUCTION

Campylobacter jejuni is now recognized as a world wide existence as a cause of bacterial enteritis. It was evident that water can act as a vehicle o infection (PEARSON et al., 1977; KNILL et al., 1978; BOLTON et al., 1982; EL-ATTAR et al., 1982 and MURAD, 1983). Many outbreaks of Campylobacter infection were observed after consumption of water (MENTZING, 1981; VOGT et al., 1972 and PALMER et al., 1983). So, the present study was aimed for detection of Campylobacter jejuni and faecal coliform in some water sources.

MATERIAL and METHODS

60 water samples were collected from 3 sources (Mahmoudia canal, 20; ground water, 20; and Mariout lake, 20). Collection, transprtation and storage of the samples were carried out according to APHA (1980).

I- Isolation of Campylobacter jejuni using membrane filter technique:

Membrane filter technique was used for detection of Campylobacter (0.45 um millipore membrane filter). The membrane filter was placed on the Campy BAP selective plate and incubated in an atmosphere of 5% oxygen and 10% carbon dioxide (Gas pak without catalyst was used to provide such atmosphere) at 42°C. After 24 hours of incubation the membrane was removed and the plate was reincubated for another 24 hours at the same atmosphere and temperature (VOGT et al., 1982).

Presumptive identification of Campylobacter jejuni :

Oxidase and catalase tests were performed for identification of Campylobacter jejuni.

Confirmatory tests :

Growth at 1% glycine, growth at 3.5-6.5% sodium chloride temperature tolerance test, hydrogen sulphide production and antibiotic sensitivity tests using discs of nalidixic acid, erythromycin (15 mg) cephalothin (30 mg) and tetracycline (30 mg) were used for confirmation.

II- Detection of the most probable number of Campylbacter Jejuni :

The most probable number of Campylobacter jejuni in each water sample was determined by using the multiple -tube technique proposed by OBLINGER and KOBURGER (1975) using Campy BAP selective broth medium. The required temperature and atmosphere of incubation was as previousely mentioned in the isolation of Campylobacter jejuni.

III- Detection of Faecal Coliform (MPN) :

Faecal Coliform (MPN) was etermined according to APHA (1980).

RESULTS

Presented in tables (1, 2 & 3).

DISCUSSION

From the results illustrated in Table (1), it can be observed that Campylobacter jejuni was isolated from the water samples collected from Mahmoudia canal at an incidence of 13.3% which lower than the results obtained by KNILL et al. (1978) and PALMER et al. (1983). The presence of Campylobacter jejuni in Mahmoudia canal might be due to the sewage drainage into the canl that increase the chance of its contamination with human faecal matter, through the bad habit of the people in the rural community nearby the canal. In addition, faecal droplets from ducks and geese might contaminate the canal through their excreta. Furthermore, domestic animals also participate in canal pollution through their excreta. The isolation rate of Campylobacter jejuni from ground water (3.3%) was illustrated in Table (1). The presence of C. jejuni in the examined ground water samples indicated faecal poilution (KNILL et al., 1978 and EL-ATTAR et al., 1982). Moreover, C. jejuni was isolated at an incidence of 6.7% from lake Mariout Table (1). The detection of C. jejuni from Mariout lake might be due to faecal contamination from fishers and faecal droplets from birds and seagulls.

It has been found from results achieved that the overall mean of the most probable numbers of C. jejuni (MPN) in the examined water sample was 37.8±16.3 organisms per 100 ml (Table 2). This results is considered nearly similar to results obtained by BOLTON et al. (1982). On the other hand, the overall mean of the most probable numbers of faecal Coliform in the water samples examined was 828.8±883.9 bacteria per 100 ml of water which much lower than SAMAHA (1980). As illustrated in Table (2) the higher count of C. jejuni and Faecal Coliform bacteria were observed in Mahmoudia canal followed by Mariout lake and ground water.

From the results achieved in this study a significant correlation between Campylobacter jejuni and Faecal Coliform bacteria (r= 0.53) since in all the examined water samples yielding Campylobacter, Faecal Coliforms were detected. This results was in agreement with those obtained by STEINGRIMSSON and ALFREOSSON (1982) who isolated C. jejuni from fresh water and reported that faecal coliform had always been isolated from specimens containing Campylobacter organisms. Moreover, C. jejuni was isoalted from the different water sources only in the presence of Faecal Coliform (PALMER et al., 1983) who suggested that the Campylobacter were derived from faeces of animals, birds and man.

In the present study, membrane filter technique was found to be efficient and satisfactory method for the isolation of Campylobacter jejuni from different types of water which was also recommended by BOLTON et al. (1982).

From the epidemiological point of view, drinking water containing Campylobcter jejuni may cause gastro-enteritis in man and animals (DOYLE, 1981) which necessitate

disinfection of water before use.

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Table (1): Incidence percentage of Campylobacter jejuni in the examined water samples using membrane filter technique.

Water source	No. of samples	No. of possitive	Incidence %
Mahmoudia canal	20	8	13.3
Ground water	20	2	3.3
Mariout lake	20	4	6.7
Total	60	14	23.3

Table (2) : Statistical analysis of data obtained from bacteriological examination of water collected from Mahmoudia canal , ground water and Mariout lake using MPN/100 ml of water .

Variable	Mahmoudia canal			Ground water			Mariout lake			Total		
	Max.	Min.	$\bar{X}$ ± SE	Max.	Min.	$\bar{X}$ ± SE	Max.	Min.	$\bar{X}$ ± SE	Max.	Min.	$\bar{X}$ ± SE
C.Jejuni	70	38	49.1 ± 3.4	20	17	18.5± 6.7	35	16	24.8±4.7	70	16	37.8± 16.3
F.Coliform	2400	180	1153.8±294.9	1600	33	816.5±589.9	350	110	185±417.1	2400	33	828.8±883.9

Table (3): Analysis of variance of the effect of water source on isolation C. Jejuni and Faecal Colifoems bacteria.

Type of M.Os	SOV	d.f	MS	F value
C. jejuni	Water sources	2	1226.12	13.62 **
	Error	11	90.01	
F. Coliform	Water sources	2	1551478.2	1.8
	Error	11	695948.4	

** Highly significant .