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مدى تواجد الميكروبات الهوائية واللاهوائية في روث الأغنام المخزون

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قيست درجة الحرارة ونسبة الرطوبه في روث الاغنام المخزون كما فحصت عينات من مسطح الروث وعلى عمق ١٠٠ سم من السطح .

وقد وجد من الفحص أن درجة الحرارة على السطح تتراوح مابين ١٥ - ٢٠°م والرطوبة مابين ٢٠ - ٣٠ ٪ بينما وجد أن الحرارة في الاعماق (١٠٠ سم) تتراوح مابين ٣٠ - ٣٩° ونسبة الرطوبة ٣٠ - ٦٦٪ .

ومن الفحص البكتريولوجي وجد أن عدد الميكروبات في الاعماق أكثر من عددها على السطح . كما تم عزل عديد من الميكروبات الهوائية واللاهوائية من كوم الروث .

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THE PERSISTANCE OF AEROBIC AND ANAEROBIC BACTERIA IN SEMISOLID SHEEP MANURE

(With Two Tables)

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SUMMARY

Bacterial population, temperature and moisture content were determined from the surface and at a depth of 100 cm from the manure heaps. At 100 cm depth the survival of bacteria (mean count: 1670000) is somewhat higher than the exposed surface (mean count: 953500). At 100 cm depth the anaerobic bacteria and streptococcus faecalis persist longer than E. coli and shigella sp. The moisture content at the surface varied from (0.2-20%) while at 100 cm depth was (30-66%). The temperature recovered from manure heaps at 100 cm depth was between 30°C- 39°C and at the surface was from 15°C-20°C.

INTRODUCTION

The hygienic problems involved in the removal and storage of sheep manure must be considered as a major problems in the epicemiology of infectious disease.

It is generally accepted that the survival time of pathogenic and potentially pathogenic bacteria in different types of manure is ranged between 1 to 7 month depending upon the type of bacteria from one side and the environmental factors from the other (BLUM, 1968; STRAUSH and HAHN, 1968; BURROWS & RANKIN, 1970; BEST, et al. 1971; JEFFERY, 1971; FINDAY. 1972 and TANNOCK & SMITH, 1972).

Moisture is considered as one of the most important factors favouring the survival of pathogenic and potentially pathogenic bacteria in different types of manure. CARROLL and JASPER (1978) found a great reduction in the coliform count to few or zero in stored manure. On the other hand, GRESHOEV and KLOCHKOVA (1981) found the total bacterial count 1300 million bacteria per germs of fresh sheep manure containing 67.5% moisture. They were also found a great difference in the total bacterial count per germs in deep and surface layers of liquid manure stored for one month. They could also isolate enterococci, staphylococci, E. coli and anaerobic bacteria.

Temperature of stored manure was found to be a significant factor in the survival of the bacteria in the manure. The temperature below 18°C independant of the amount of organic matter present favour the survival of the bacteria but not their multiplication (MACFE-TERS & STUART, 1972).

This work was conducted in Bani Sand sheep farm. This station was selected because of the high mortality rate of sheep which occur annually after gradual removal of manure at the beganing of spring season.

MATERIAL and METHODS

Plot of semisolid manure of one meter depth was prepared at a distance of 5 meters away from the farm.

Six hallow perforated containers containing fresh manure was embeded at a distance of 100 cm from the surface of the plot. The containers were removed at one week interval. The content of each was bacterialogically examined after immediatly detection of the temperature and estimation of moisture content of each one according to (GRESHOEV & KLOCHKOVA, 1981).

The bacteriological examination of the content of each container was carried out and entailed the following:

1- Total bacterial count:

The plate count was carried out by complete emulsification of 10 gm of the manure content of each container in 90 ml sterile saline solution.

2- Isolation and identification of bacteria:

Part of manure content was thoroughly mixed in 10 ml sterile saline solution. The mixture was bacteriologically investigated according to MERCHANT & PACKER, 1961; CRUICKSHANK, et al. 1974 and TANERVARES WILLIAMS, 1977 and entailed the following:

a) Enterococci:

S.F. broth was used as enrichment media. The inoculated broth was subcultured on MacConkey agar. Identification of the microorganisms was done after the biochemical reactions.

b) Enterobacteria:

Part of emulsion was inoculated in each of selenit F. broth & MacConkey broth. The inoculated tubes were incubated at 37°C for 18-24 hrs.. S.S. agar as well as Maconkey agar were subcultured and incubated at 37°C for 24 hrs.

c) Anaerobic bacteria:

Thioglycollate broth was inoculated with part of the prepared emuslion, incubated at 37°C for 48 hrs.. Neomycin glucose blood agar was subcultured and incubated at 46-47°C for 48 hrs. Suspected colonies were identified biochemically and biologically by inoculation of white mice.

RESULTS and DISCUSSION

The potential animal health hazards of bacterial contamination in manure has previously been reported by many workers as WAKSMAN, 1945 and BULLEN & BATTEYL, 1957.

The significance of the bacterial isolates from manure heaps has been greatly intensified in recent years.

Our results revealed that moisture content values for the manure heaps from exposed surface gave a mean of 5.5% (range: 0.2-20%) while samples at 100 cm depth gave a mean of 36% (range: 30-66%).

It is also shown from tables I and II that temperatures recovered from the manure heaps at 100 cm were generally 16.8 higher than those obtained from the exposed surface of the heaps.

Examination of the samples for total bacterial count showed that a high temperature and moisture content in deep layers of the heaps (33.3°C & 36%) the survival of bacteria tend to be somewhat higher (mean count 1670,000 per grm.) than on the exposed surface (mean count 953500) where temperature and moisture content were 16.5°C & 5.5% respectively.

The bacteriological examination of the heaps at the surface and at 100 cm depth revealed the isolation of different species of anaerobic and aerobic bacteria including clostridium perferingens, clostridium botulinum, cl. butyricum, streptococcus faecalis, E. coli, shigella and klebsiella species, a result which more or less agree with SEDDON & EDGAR, 1930; MAcCLUNG, 1938; GILLILAND & VAUGHN, 1943; BASSO, 1962; ABD EL KARIM, 1968; MILEV, 1976 and GRESHOEV & KLOCHKOVA, 1981. On the other hand no isolates of staph. aureus, Proteus species, Providancia and citrobacter were detected, a result which agree with ANUSZ, 1966; ABD EL KARIM, 1968; KAPOUR, et al. 1973 and GRESHOEV & KLOCHKOVA, 1981.

Under the condition of our investigation and as shown in table I, the survival of the bacteria onthe exposed surface appeared to be low. The marked reduction in the survival of anaerobic and aerobic bacteria on the surface may be attributed to the dissecating effect of the sun light, radiation and low humidity as well as other environmental conditions.

It is clearly evident from our results in table II that the anaerobic bacteria and strept. faecalis are the only isolates which persisted for 6 weeks at 100 cm, whearse E. coli and shigella sp. persisted only for 3 to 4 weeks. On the other hand klebsiella sp. failed detection in any of samples examined from such depth.

From the epidemiological point of view, the isolation of clostridium is of great hazard to animal health. Cl. perferingens type B is considered as the causative agent of lamb desentry, while Cl. perferingens type C & D is responsible for enterotoxaemia and pulpy kidney in sheep. Moreover Cl. botulinum is the causative agent of food poisoning in different species of animals specially cattle.

Anywho and under the condition of our experiments it appears that temperature and humidity of the manure heaps provide a satisfactory medium for survival but not multiplication of the bacteria. It is also evident from our results that clostridium sp. and enterococci persisted in the manure heaps longer than did the enterobacteria. The survival of these bacteria in this experiments is agree with that found by other workers as KOVAIENKO, 1956; SAFOROV, 1965 and RANKIN & TAYLOR, 1965.

For reducing the number of aerobic and anaerobic bacteria in sheep manure and to decrease the risk of microbial infection, it is necessary to move animals from their shelters before removal of mnure. Meanwhile the floor should be covered with quick lime and left for sufficient period of time before their removal outside the building.

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Table (I)

The persistance of Anaerobic and aerobic bacteria at the surface of manure heaps

Time of storage	Temperature °C	Moisture %	Total colony count			Anaerobic isolates			Aerobic isolates			
			Min.	Max.	Mean	cl.perferinges	cl.bolulinum	cl.butryicum	Str. fae.	E.coli	Shigella	Klebsiella
1st week	15	20	3.10^5	42.10^5	26.10^5	+	+	+	+	+	+	+
2nd week	20	10	4.10^5	20.10^5	17.10^5	+	-	+	+	+	-	-
3rd week	18	1.8	12.10^4	15.10^5	13.10^5	-	-	-	+	-	-	-
4th week	15	0.65	6.10^4	22.10^4	9.10^4	-	-	-	+	-	-	-
5th week	15	0.2	16.10^3	6.10^4	27.10^3	-	-	-	+	-	-	-
6th week	15	0.2	2.10^4	24.10^3	4.10^3	-	-	-	-	-	-	-
Mean	16.5	5.5	-	-	953500							

Table (II)

The persistance of anaerobic and aerobic bacteria at 100 cm deapth of manure heaps

Time of storage	Temperature °C	Moisture %	Total colony count			Anaerobic isolates			Aerobic isolates			
			Min.	Max.	Mean	cl.per. f.	cl.bolulinum	butryicum	Str. faer-	E.coli	Shigella	Klebsiella
1st week	39	66	9.10^5	20.10^6	31.10^5	+	+	+	+	+	+	-
2nd week	39	40	35.10^4	23.10^5	37.10^5	+	+	+	+	+	+	-
3rd week	35	38	25.10^4	45.10^6	22.16^5	+	+	+	+	+	+	-
4th week	30	32	5.10^4	27.10^6	71.10^4	+	+	+	+	-	-	-
5th week	30	32	16.10^4	30.10^6	19.10^4	+	+	+	+	-	-	-
6th week	30	30	27.10^4	18.10^4	12.10^4	+	+	+	+	-	-	-
Mean	33.3	36	-	-	1670,000							