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STUDIES ON AEROBIC PATHOGENS OF MEDICAL IMPORTANCE IN THE SOIL

(With One Table)

By

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دراسة عن الميكروبات الهوائية ذات الأهمية الطبية في التربة

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تم تحديد نسبة البكتريا الهوائية الممرضة في محافظة أسيوط . كانت البكتريا المعزولة من ٣٠ عينة تربة كالآتي : الميكروب القولوني ٣٠ (١٠٠٪) ، الميكروب البروتيس ٢٦ (٨٦٫٦٪) ، الميكروب العنقودي الذهبي ٩ (٣٠٪) ، الميكروب السبحي ٨ (٢٦٫٦٪) ، الميكروب السيدوموناس ٣ (١٠٪) . بينما لم تتمكن من عزل ميكروب السالمونيلا والشجيلا . تمت مناقشة خطورة هذه الميكروبات على الصحة العامة .

SUMMARY

The incidence of some aerobic pathogenic bacteria was investigated in Assiut Governorate. Bacterial isolates found in 30 soil samples, belonged to E.coli, 30 (100%), Proteus sp., 26 (86.6%), Staphylococcus aureus, 9 (30%), Streptococci sp., 8 (26.6%), Pseudomonas aeruginosa, 3 (10%) while Salmonellae and Shigella could not be detected. The public health hazards of these isolates were discussed.

INTRODUCTION

Soil is one of the most important source of infection as the causative agents of disease are widely spread in nature and soil is responsible for their spread. Many human and animal diseases are endemic in soil which means that soil plays an important role in epidemiology of these human or animal disease and exhibits an economic importance in case of farm animals.

The pathogenic organism from the soil may cause infection through contamination of food, water and wound or even inhalation of dust arising from contaminated soil or through subjects working in infected soil (ABD EL KARIM, 1968, SAMAHA, 1983).

The aim of this study was to look for some organisms of medical importance in the soil of animal caring centres as caring, treating and operations may done which aid in control program of animal diseases.

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MATERIAL and METHODS

Sampling:

Soil samples were collected during the period between October 1991 to January 1992 from 30 animal caring center in Asšiut Governorate. Each sample (about 50 gms) was collected by scraping a superficial layer of the soil with a sterile spatula and transferring the material to a sterile covered container. Samples were sent to the laboratory with in the shortest posible time where they were subjected to bacterial examination.

Bacterial examination:

After thorough mixing of the sample, one gram was weighed, then triturated well in a sterile morter with 99 ml sterile saline solution before being aseptically strained through sterile gauze. The filterate, collected in a sterile flask, was subjected to the following bacteriological tests.

One loopful from the original filtrate was streaked on the surface of blood agar, nutrient agar and MacConkey agar plates then, incubated at 37°C for 24-48 hrs. Suspected colonies were picked up, inoculated on nutrient agar slopes for further identification by different tests. Identification was carried out by standard methods of morphological examination and biochemical tests according to MERCHANT and PAKER (1961) and CRUICKSHANK, et al. (1975).

Special methods for some organisms:

Salmonella organism:

8 ml from the original soil filterate were inoculated into 10 ml of selenite F broth, mixed thoroughly, and incubated at 37°C for 8-16 hrs. A loopful from this enrichment media was then streaked on S.S. agar plates which were incubated at 37°C for 24 hrs. Suspected colonies were transferred to agar slopes for further identification.

Streptococci:

Loopfuls from original filterate were streaked on the surface of sodium azide crystal violet blood agar plates and incubated at 37°C for 48 hrs. Suspected colonies were subjected to microscopical examination and biochemical reaction according to CRUICKSHANK, et al. (1975).

Staphylococci:

Loopfuls from the original filterate were streaked on the surface of salt mannitol agar plates and incubated at 37°C for 24 hrs. Suspected colonies were picked up and subjected to further examination.

The morphological and biochemical identification of the isolated organism was confirmed according to MERCHANT and PAKER (1961) and CRUICKSHANK, et al. (1975).

RESULTS

All results are shown in table 1.

Table 1: Incidence and percentage of isolated pathogenic bacterial strains from 30 soil samples*

Types of isolates	No. of samples giving the isolate	%
E.coli type I (IMVC ++--)	30	100%
Proteus sp.:	26	86.6%
Proteus mirabilis	15	50%
Proteus vulgaris	11	36.6%
Staphylococcus aureus	9	30%
Streptococcus sp.	8	26.6%
Strept. faecalis var faecalis		6.6%
Strept. faecium		10%
Strept faecalis var liquefaciens		3.4%
Strept pyogenes		6.6%
Pseudomonas aeruginosa	3	10%
Salmonella sp.	0	00
Shigella sp.	0	00

* Non pathogenic micrococci, anthracoids and diphthesoids were also isolated.

DISCUSSION

From the table, it is shown that from 30 examined samples, E.coli type I was isolated from all samples (100%). This result is similar to those recorded by ABDEL KARIM (1968) and SAMAHA (1983) but it is considered higher than those recorded by HAFEZ (1976) and MOWAFI, et al. (1980). The high incidence may be due to the nature of sampling since most of the samples were obtained from soil contaminated with excreta of the daily diseased animals coming for vaccination or treatment.

The role of this organism as a cause of mastitis, urogenital infection, abortion, arthritis or white scours in farm animals cannot be neglected (GILLESPIE and TIMONEY, 1981; WRAY and MORRIS, 1985). In addition, E.coli is considered as the major probable cause of infantile diarrhoae (GORBACH and KHURANA, 1972) and urinary tract infection (ABRAHAM, et al. 1983).

Proteus species were isolated from the examined soil samples at 86.6% which is nearly similar to those recorded by HAFEZ (1976) and SAMAHA (1983) but higher than those reported by ABDEL KARIM (1968).

Proteus species were incriminated in cases of severe diarrhoea and desentry in young animals (BUXTON and FRAZER, 1977). In addition Proteus species can cause food poisoning and urinary tract infection in man (BANWART, 1981).

Staphylococcus aureus was isolated at the rate of 30% which is nearly similar to the result of ABDEL KARIM (1968) but higher than those recorded by HAFEZ (1976) and lower than those of MOWAFI, et al. (1980) and SAMAHA (1983).

Staphylococcus aureus was known to be responsible for numerous suppurative lesions and mastitis in animals MERCHANT and PACKER, 1961). On the other hand, it causes pyogenic lesions and acute food poisoning in man (KATO and KUME, 1980).

Streptococcus species were isolated at an incidence of 26.6% (Strept. faecalis var faecalis, 6.6%, Strept. faecium, 10%, Strept. faecalis var liquefaciens, 3.4%, Strept. pyogenes 6.6%). A similar percentage was reported by ABDEL KARIM (1968) but it was lower than that recorded by other workers (HAFEZ, 1976; MOWAFI, et al. 1980 and SAMAHA, 1983).

Strept. faecalis was reported to cause mastitis, urinary tract and other infections in animals (WILSON and MILES, 1975) as well as food poisoning in man (LÜOND and GRASSER, 1964 and DEIBEL, 1964).

Streptococcus pyogenes was responsible for several cases of mastitis, urogenital tract infection in animal as well as sore throat, scarlet fever and adenitis in man (CRUIKSHANK, 1975).

Pseudomonas aeruginosa was isolated at the rate of 10% in this study which is nearly similar to that of ABDEL KARIM (1968) and SAMAHA (1983) but lower than that recorded by HAFEZ (1976). Pseudomonas is reported to cause mastitis, genital lesions, infertility, abortion and septicaemia in bovines (CORRADINI and BINATO, 1961, GARDINER and CRAIG, 1961). It is also responsible for septicaemia, conjunctivitis, otitis externa and media,endocarditis, mastitis, and enteritis in man (SYETOBVIDORA, 1950 and KWANTES, 1960) and lastly is also incriminated in several food poisoning outbreaks (KUBOTA and LIU, 1971).

All the examined samples were proved to be free from Salmonella, and Shigella spp.; a result which is similar to that of MOWAFI, et al. (1980) but differs from the results of ABDEL KARIM (1968), HAFEZ (1976) and SAMAHA (1983).

The other naturally, present soil bacteria which were isolated (micrococci, anthracoids, diphtheroids) are of no hygienic significance.

So, it can be concluded that the soil of animal careing center may harbour some pathogenic bacteria coming from carrier or diseased animals or even working person. The floors should therefore be made of concrete and kept dry and cleean as much as possible. Frequent disinfecting with an efficient disinfictant must be carried out.

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