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EPIDEMIOLOGICAL PROPERTIES OF PUS-FORMING BACTERIA (With 2 Tables)

By

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الصفات الوبائية للميكروبات مكونه الصديد

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الخواص الوبائية لنوكارديا كميكروب قاطن فى التربة تم توضيحه من حيث وجوده بنسبة ٤٥ر٢١٪ من ٦٥ عينة تراب وكذلك تم عزله بنسبة ٣٣ر٢٣٪ من عينات الألبان الناتجة من أبقار مصابه بالتهابات الضرع. بالاضافة إلى عزل بعض الفطريات الأرضية مثل الأسبرجيليس، البنسيليوم، الميوكور والكانديدا من عينات التربة علاوة على الميكروب العنقودى والكوليفورمز التى توجد بصفة مستمرة فى حالات التهاب الضرع.

SUMMARY

The epidemiological properties of Nocardia species as a soil inhabitant organism was observed, among 65 soil samples yielded Nocardia species in a percentage (12.54%) While it was isolated in (23.33%) from mastitic milk originated from cases of bovine mastitis. In addition, some geophilic species of fungi such as Aaspergillus, Penicillum, Mucor and Candida were also isolated from soils, as well as the frequently detected bacteria in cases of mastitis as Staphlococci, Coliforms and Candida.

Key words: Epidemiology-Pusforming bacteria

INTRODUCTION

Soil is by far the most important and suitable reservoir of a great list of microorganisms potentially pathogenic to man and animals (KISHIMOTO & BAKER, 1969; ATIA, 1976 and FRANSWAR & LARSON, 1985).

Recent trends are attended to the role of soil as a wide variety of microorganisms (CARROL & JASPER, 1980), especially those organisms highly pathogenic to both man and animals.

Nocardia as a species belonging to Actinomycetes, has been well known as soil inhabitants (KURUP, 1971; PIER & FICHTNER, 1981; BEAMAN, 1992; PHILPOTT-HOWARD, 1993; LOPEZ-MARTINES *et al.*, 1993 and CARSON & HELIYAR, 1994). These organisms are account for many pyogenic diseases of animals (OTCENASEK & VITOVEC, 1982; TESTI, *et al.* 1982; HARVEY, *et al.* 1993 and LOBETTI, *et al.* 1993), of these nocardial mastitis in cattle is very important and it is obvious that soil plays the main role in the epidemiology of the disease as it is the source of infection (HIBBS, *et al.*, 1980; WILLETT, *et al.*, 1982; VAISSAIRE, *et al.*, 1984; PELLERIN, *et al.*, 1987 and DOHOO, 1989).

High incidence of bovine mastitis due to *Nocardia* has been reported all over the world (SEARS, 1983; ARGENTE, *et al.*, 1983; NICOLAS *et al.*, 1984; and SRARK & ANDERSON 1990), though some epidemics of nocardia mastitis were also recorded (OLUBUMNI & AYENI 1983 and RIVARD & TURGEON 1984). The problem arises here not only belongs to the economic costs to control nocardial mastitis (WILLETT, *et al.*, 1982) but mention is made of the potential risk to human health from contamination of milk, in addition to the cross reaction to tuberculin test in cases of pulmonary nocardiosis (COSTA, *et al.*, 1987 and SCHOONDERWORD, *et al.*, 1990). *Nocardia asteroides* is responsible for the majority of bovine nocardial infections (SALMAN, *et al.*, 1982 and SEARS, 1986).

The study is designed in order to screen the soil for *Nocardia* species and the relation to the frequent disease such as mastitis in Assiut milk production farm.

MATERIAL and METHODS

1- Collection of Samples

A sum of 65 soil samples representing the whole area of Assiut milk production farm, were collected by scrapping about 15 gms of the upper most layer of the soil with sterile spatula and transferred to a sterile bag.

A total of 30 mastitic milk samples evacuated in sterile test tubes were collected from cases of bovine mastitis in the farm.

2-Examination of specimens

Two sets of solid media were used, Sabouraud dextrose agar (SDA) and blood agar (CRUIKSHANK, *et al.*, 1975). Gentamycine 25 mg/1. was added to blood agar in order to reduce background bacteria and allow *Nocardia* species to be detected more easily. 1-2 gms. of the soil sample were transferred to a test tube containing 5ml. sterile saline. The tube was thoroughly, mixed and left to stand for about 10 min. 3 loopfuls of supernatant fluid of saline-soil suspension were streaked onto the surface of the two media. The same culture technique was performed on the sediment of mastitic milk samples after centrifugation.

The inoculated plates were incubated at 37°C for up to 7 days and inspected daily for any microbial growth. Suspected cultures were identified according to its colonial features and staining reaction using Gram and Modified Ziehl-Neelson (MZN) stains (CHEESBROUGH, 1984).

Positive cultures of *Nocardia* were identified as non-haemolytic whitish powdery coloured colonies on blood agar and a light orange colour on SDA. They are microscopically identified as G.+ve and acid fast small rods, or branched filaments.

RESULTS

The results are illustrated in Tables 1,2.

DISCUSSION

Current epidemiological researches are concerned the environmental factors favouring the spreading of infections in a community. Soil is one of the most important reservoir of many pathogens. (KISHIMOTO & BAKER 1969).

The recovery of *Nocardia* species as omnipresence and versatile potential agents.

Isolation of *Nocardia* species from soil (21.54%) indicate the habitual characters of this species as soil inhabitants. This findings agree with that previously recorded by many authors who predicted *Nocardia* as one of the major pathogens which naturally occurring in the soil in many regions and responsible for serious diseases (KISHIMOTO & BAKER, 1969; ATIA, 1976; PIER & FICHTNER, 1981; PHILPOTT-HOARED, 1993 and LOPEZ-MARTINZ *et al.*, 1993).

EPIDEMIOLOGY OF PUS-FORMING BACTERIA.

Nocardia species was detected from the milk of mastitic animals with an incidence percentage of (23.33%). This tendency was reported previously by many authors as SEARS, (1983); ARGENTE, *et al.* (1983); RIVARD & TURGEON, (1984); PELLERIN, *et al.* (1987); DOHOO, (1989) and MANNINEN, (1993). During the survey on the role of Nocardia in the aetiology of bovine mastitis, VAISSAIRE, *et al.* (1984) recorded the mobility rate ranged to about 50%.

The epidemiological role of nocardia infection was studied by PIER & FICHTNER (1981), who indicated the wide distribution of serotypes of Nocardia in animals, human and soil sources.

The rather low difference in the rate of isolation of Nocardia species between the two media used, explains the high enrichment constituents of blood agar which initiates maximum growth of the organism (NESBIT & GUNASKARAN 1993).

Isolation of some fungi such as Aspergillus (49.23%), Penicillium (20%), Mucor (6.15%) and Candida (1.54%) from soil samples which reported in this investigation is agreed with that detected by many authors, as DABROWA, *et al.* (1964); AJELLO & CHENG, (1967) and KISHIMOTO BAKER, (1969). However in addition to their common occurrence in soil, some of them were detected in cases of bovine mastitis (SHARMA, 1983).

The low frequency of recovery of coliforms and Staphylococci may be due to inhibitory effect of the antibiotic contained in the media. However these organisms are most frequently encountered in cases of bovine mastitis (HOWELL, 1972; COUSINS, *et al.*, 1980 and FARNSWORTH & LARSON 1985).

The argument of soil pathogens as an environmental problem indicate that it is difficult if not impossible to superimpose Nocardia infections from other infections. Therefore, Nocardia mastitis is not highly contagious but is more likely to occur from environmental contamination. The development of methods of controlling the environmental pathogens would have significant impact in reducing the economic importance of the disease.

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EPIDEMIOLOGY OF PUS-FORMING BACTERIA.

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Table (1) : Distribution of the isolated speices from soil samples on the 2 utilized Media

species of the organism	Blood agar		SDA	
	No.	%	No.	%
Nocardia sp.	12	18.46	11	16.93
Aspergillus sp.	5	7.69	32	49.23
Penicillum sp.	-	-	13	20.00
Mucor sp.	-	-	4	6.15
Candida sp.	8	12.31	1	1.54
Mixed culture	2	3.08	4	6.15
- ve culture	38	58.46	-	-
Total	65	100%	65	100%

- Total % of Nocardia species isolated from soil samples = 21.54 %

Table (2) Distribution of the isolated species from mastitic milk samples on the two utilized media

species of the organisms	Blood agar		SDA	
	No	%	No	%
Nocardia sp.	4	13.33	2	6.66
Candida sp.	-	-	21	70
Coliforms sp.	3	10	-	-
Mixed culture	13	43.33	1	3.34
	(Staph + Coliforms)		(Nocardia+Candida)	
	3	10	6	20.00
	(Nocardia+Coliforms)		(Candida+Aspergillus+Penicillium)	
	6	20		
	(Candida+Staph+coliforms)			
- Ve culture	1	3.34	-	-
Total	30	100%	30	100%

* Total % of Nocardia species isolated from mastitic milk = 23.33 %

