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THE BACTERIOLOGICAL EXAMINATION OF CLAMS
(AMARADA Sp.) FROM SEA SHORES OF EGYPT

BY

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INTRODUCTION

Shell fish is used nowadays for human in many countries of the world, as a very valuable and highly nutritious food. Besides, they are considered to be one of the most delicate food stuffs which must be consumed as fresh as possible. As a result of previous work on the bacteriology of shell fish, the condition necessary to prevent and control shell fish borne infection are now well established. There is, however, an almost complete lack of information concerning the types of bacteria that are associated with shell fish, other than those derived from sewage.

Tanikawa(1937) found that the typical water

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bacteria of the genera Achromobacter, Pseudomonas, Flavobacterium, and Micrococcus were important in the spoilage of market oysters held at 0°C. The results of those spoilage studies on fine fish are similar to their bacteriological flora where the spoilage organisms are derived from the flora of the living flesh.

On the other hand, Colwell and Liston (1960) reported that the Gram-negative, asporogenous rods of Pseudomonas, Vibrio and Flavobacterium were predominating in Pacific Oysters placed in floating trays in different areas of Washington. They concluded that the bacterial flora of oysters that can be considered as commensal flora is composed essentially of typical marine psychrophilic bacteria that are well adapted physiologically to life with the microenvironment of the shell-fish.

Information about the bacteriology of shell fish in Egypt is scanty. Thus, the purpose of the current study was to determine the composition of the natural bacterial flora of shell fish (clams) in natural water resources of Arab Republic of Egypt (A.R.E.) as well as the determination of contaminating bacteria that affect the hygienic quality of these fishes. Besides, trials were made

to control these bacterial populations with the aim of getting rid off them from the living clams.

MATERIALS AND METHODS

Bacteriological examination extending from November 1979 to January 1980 was performed from tissues of 300 different species of clams collected from the area of Suez Canal at Ismailia City near the Taawon sea shores.

Primary culture was done on Nutrient Agar, MacConkey Agar and selenite F. Broth media. The identified E. coli strains were tested for sensitivity to antibiotics using Difco antibiotic standard discs of Chloramphenicol, Terramycin, Kannamycin, Doxycycline and Coly-mycin.

RESULTS

The results of primary bacterial cultures revealed the presence of bacterial growth in 250 samples out of 300 examined cases i.e. only 50 cases (16.66%) were negative for bacteria. Besides it has been found that most of the pure bacterial cultures when examined by Gram stain were negative, mostly rod shaped. Ten isolates only were pleomorphic, beaded and arranged either in pairs or short chains. Very few strains (two) showed biopolar reaction. More than 80% of the studied bacterial

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isolates showed marked fermentative reaction with the production of acid and gas from glucose, lactose, maltose and 50% of them produced detectable amount of acidity and gas from saccharose. Only 18% of the isolates produced H_2S from triple sugar iron media (T.S.I.).

More than 90% of the strains were motile by peritrichous flagella and all of them were positive for methyl red test (MR).

In (Table 1), the frequency of isolation of different bacteria harbouring the examined clams is demonstrated.

These data could be summarized as follows:

1. The most predominant bacterial species were isolated from tested shell fish as was Escherichia coli which was found harbouring 48% of cases.
2. Other organisms as Citrobacter, 25% and Proteus 25% occupied on intermediate position in recovery rate.
3. An incidental bacteria as Flavobacterium devorans and Enterobacter coloaeeae were also observed and the percentage of which never exceeded 10% examined clams.

The antibiotic sensitivity pattern of isolated E. coli strains obtained in this study after 18 hours broth cultures is demonstrated in (Table 2). The most efficient antibiotic used in the aforementioned list were Chloramphenicol and Terramycin in concentrations of 30 Mcg and 10 mcg respectively. Other antibiotics such as Kanamycin, Doxycycline and Coly-mycin were less effective on the isolated bacteria.

Table (1): Frequency of isolated bacteria from clams.

Bacterial species	No. of isolates	%
Escherichia coli	120	48
Citrobacter	62	25
Proteus	62	25
Flavobacterium devorans	25	10
Enterobacter coloaceae	25	10

Table (2): Antibiotic sensitivity pattern of isolated E. coli.

Types of antibiotics	Concentration	Time	Diameter of inhibition zone at 37°C
Chloramphenicol	30 mcg	18 hours	25 mm
Terramycin	10 mcg		20 mm
Kanamycin	5 mcg		15 mm
Doxycycline	5 mcg		10 mm
Coly-mycin	5 mcg		10 mm

DISCUSSION

The bacterial flora which was isolated from the examined clams were similar to that indicated by Amin et al. (1977), who isolated different serogroups of E. coli from Tilapia nilotica fish and Farid et al. (1978) in Tilapia fish who demonstrated the presence of Flavobacterium and Enterobacter species. In the meantime Enany (1979) reported the genera Enterobacter, Citrobacter,

Flavobacterium and Proteus in the intestine of common carp in Egypt. Furthermore, the data presented in this study, also coincide with that of Tanikawa (1937) who reported the flavobacterium and Achromobacter species predominating in shell fish as in fine fish.

On the other hand the absence of pseudomonas and Vibriobacteria as reported by Colwell and Liston (1960) and this study should be explained on the basis that geographic zone and water microenvironment of these investigation influenced the flora representatives in their locality.

One of the most important facts proved in cases of fine fish by Amin et al. (1977) was that these fishes are indicator of pollution of the area in which they are recorded. This have been also achieved in this work as most of the bacterial population obtained in this study are related to the enteric group of microorganisms which must be considered as an evidence of sewage pollution of examined area. This fact has been also proved by Guelin (1962), Allen and Hopher (1976), who stated that the presence of coliform bacteria in Salmon fish indicates a contamination of public health importance. Accordingly, as it was suggested by Amin

ey al. (1977) in a commercial waste-water fish-culture system, fish must be placed into clean water to purge them prior to processing which is of vital importance.

The antibiotic sensitivity pattern of isolated E. coli strains could be used as an aid for the elimination of coliform infection of shell fish before exportation for human consumption. The presence of such flora is contradicts the hygienic regulation of many countries where their presence indicates unfitness for human consumption.

SUMMARY

The bacteriological examination of 300 clams (Amarada Sp.), collected from the shores of Suez Canal revealed the presence of different enteric bacteria related to the genera, Escherichia, Citrobacter, Proteus, Flavobacterium and Enterobacter of which the most predominant was E. coli (48%). The presence of E. coli could be considered as an indicator of pollution which must be controlled in different ways.

This organism was found to be inhibited by Chloramphenicol and Terramycin. Among method of abolishing contamination it was suggested to add the aforementioned antibiotics. In the meantime,

The exposure of these clams to fresh water prior to consumption must be considered of vital importance from the public health point of view.

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ملخص العربي

البحث رقم ٤

الفحص البكتيريولوجي للجندوفلي (جنس الامرادا) من
شواطئ البحر المصرية

د. نور الدين امين ، د. علي عبد الرشيد سلامة، د. لييب اسماعيل موافى
د. محمد انور مرزوق

اوضحت الفحوص البكتيريولوجية لعدد ٣٠٠ من الجندوفلي (جنس
الامرادا) والتي تم جمعها من شواطئ قناة السويس وجود العديد من
الميكروبات المعوية والتي تنتمي الي اجناس الايشيريشيا، سيتروباكتير
بروتيس، فافوبياكتيريوم وانتيروباكتير، وقد وجد ان الميكروب القولوني
هو النوع السائد حيث كانت نسبة عزله ٤٨٪ .

وجود هذا الميكروب يشير الي تلوث المياه التي يعيش فيها هذا
الكائن . مما يتطلب السيطرة عليه بطرق واساليب مختلفة .
وقد اتضح من الدراسة ان الميكروب يمكن تثبيطه باستخدام
الكلورا مفينيكول والتيراميسين وعليه فقد اقترح استخدام هذين المضادين
الحيويين في التخلص من التلوث .
وفي نفس الوقت تحريض الجندوفلي الي تيارات من المياه العذبة
قبل تناوله في الغذاء يعتبر ذو اهمية حيوية من وجهة نظر الصحة العامة .