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**OCCURRENCE OF CLOSTRIDIUM PERFRINGENS  
IN FISH AND MOLLUSKS**  
(With 2 Tables)

By

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متى تواجـد ميكروب الكـلستريـديوم بيرفرنجـز في الاسماك والرخويات  
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تم فحص 100 عينة من الاسماك و 100 عينة من الرخويات المتواجدة في أسواق الاسماك  
بالاسماعيلية بتحديد نسبة تواجـد ميكروب الكـلستريـديوم بيرفرنجـز وكان متوسط العدد الحـي للميكروب هو 49، 89، 6، 15، 28، 2 و 98 في كل من الخياشيم والسطح والعضلات لكل من البلطسي  
والدنيس ثم الرخويات على التوالي وقد تم عزل هذه الميكروبات بنسبة 34، 38، 10، 16، 22، 6 و 67 في كل من البلطسي والدنيس والرخويات على التوالي.

**SUMMARY**

The gills, surface and muscles of 100 samples 50 each of *Tilapia* and *Crysophyrus* fish species and 100 samples of Mollusks "*Lamellibranch Tapes decussatus*" were collected from Ismailia fish markets and subjected to enumeration of *Colstridium perfringens* (MPN/g.or cm<sup>2</sup>). The mean MPN counts were 49, 89, 6, 15, 28, 2 and 98 of gills, surface, muscles of *Tilapia* and *Crysophyrus* species and Mollusks "*Tapes decussatus*" respectively.

The incidence of *C.perfringens* in the examined samples were 34(68%), 38(76%), 10(20%); 16(32%), 22(44%), 6(12%) and 67(67%) in gills, surface, muscles of *Tilapia* and *Crysophyrus* species and Mollusks respectively. The significans of the *C.perfringens* and control measures were discussed.

**INTRODUCTION**

Fish and shellfish are subjected to many risk of contamination from various sources, either during their aquatic environment or after being harvested. *C.perfringens* is widely recognized as one of the principle causes of human food poisoning of bacterial origin. It widely exists in soil, water, dust, food, spices and intestinal tract of man and animals (HOBBS, *et al.* 1953; HOCH, *et al.* 1974; LOEWNSTEIN, 1972; NYGREN, 1962; STRONG, *et al.* 1963 and THATCHER and CLARK, 1975).

Food poisoning occur due to ingestion of foods containing large population of viable cells of *C.perfringens* (10<sup>6</sup>/g. food) and subsequent production of an enterotoxin in the intestine (DISCKE and ELEKE, 1957 and HAUSCHILD, *et al.* 1971). The

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food involved in *C.perfringens* outbreaks are often meat, poultry and fish dishes which are prepared in such a way that anaerobic conditions are provided for the germination of spores which have survived heat treatment in precooked fresh foods. There is always a significant period of time allowed for cooling and subsequent faults in storage encourages multiplication (JAY, 1978 and RIEMAN and BRYAN, 1978).

Fish and shellfish have been implicated as a source of *C.perfringens* food poisoning. STRONG, et al. 1963 recorded the isolation of *C.perfringens* from various sources, 16% of 122 samples of raw meat, poultry and fish. TANIGUTI and ZENITANI, 1969 detected *C.perfringens* type A in a high percentage on the body surface of fish and shellfish. TANIGUTI, 1971 recorded the isolation of *C.perfringens* type A from 65% of raw fish samples purchased from retail shops.

The aim of this work was to determine the occurrence of *C.perfringens* in Tilapia and Crysophyrus fish species in addition the Lammellibranch Mollusks "Tapes decussatus" which has nowadays an economical importance due to their exportation to various European countries.

### MATERIAL and METHODS

A total of 200 fish and shellfish samples (including 50 samples each of Tilapia and Crysophyrus and 100 samples of Mollusks "Tapes decussatus" were collected from local Ismailia City fish markets. The skin, gills and muscles of fish samples and the content of the Mollusks were examined for the presence of *C.perfringens* according to BEERNES, et al. (1980). Enumeration of the organism was determined by referring the combination of positive tubes to MPN table consulted by DE MANN (1977).

### RESULTS

The results were tabulated in Tables 1 and 2. Table (1) pointed out the minimum, maximum and the average MPN counts/g.or cm<sup>2</sup>, while Table (2) illustrate the frequency percentage of the *C.perfringens* in the examined fish and shellfish samples.

### DISCUSSION

The results achieved in table (1) showed that the skin and gills of both fish species have a high count than those of the muscles, the mean values were 89/cm<sup>2</sup> and 49/g.; 28/cm<sup>2</sup> and 15/g. in both Tilapia and Crysophyrus fish species respectively, while the mean values in Mollusks was 92/g. The results obtained are nearly similar to those reported by TANIGUTI and ZENITANI (1969) and TANIGUTI (1971).

Table (2) pointed out that *C.perfringens* was isolated from 34(68%), 38(76%) and 10(20%) of gills, skin and muscles of Tilapia and 16(32%), 22(44%) and 6(12%) of Crysophyrus fish species respectively. It is also evident from table (2) that *C.perfringens* could be recovered from 67(67%) in the examined samples of Mollusks. The results obtained are higher than those reported by STRONG, et al. (1963) and similar



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to those reported by TANIGUTI (1971). The high incidence of *C.perfringens* in fish and shellfish was attributed the pollution of fresh and sea water, in addition to the unsanitary handling of the fish and shellfish after harvesting (WHO, 1968).

Consequently, the presence of *C.perfringens* in large numbers constitute a public health hazard. The species cause gas gangrene, and food poisoning in man, dysentery in lambs enterotoxemia in lambs, sheep, and young calves, struck in sheep and an acute fatal disease in young piglets. It is worth mentioning that fish and shellfish which harvested from polluted water or improperly provide a ready medium for transmission of *C.perfringens* to the consumers in form of acute diarrhea with cramps following a meal including precooked cold or reheated meat, poultry and fishes (RIEMAN and BRYAN, 1978).

In conclusion, to safeguard consumers, suitable regulations should be imposed for prevention the sewage pollution of the fresh and sea water either from human or animal sources, and strict hygienic measures should be adopted during handling, distribution and storage of fish and mollusks. In addition to the control of temperature conditions.

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Table (1)  
MPN count of *C.perfringens* in Fish and Mollusks

Fish and Mollusks	Minimum	Maximum	Average
Tilapia Spp.:			
Gills/g.	3.0	240	49
Skin/cm <sup>2</sup>	3.0	460	89
Muscles/g.	3.0	23	6
Crysophyrus Spp.:			
Gills/g.	3.0	43	15
Skin/cm <sup>2</sup>	3.0	93	28
Muscles/g.	3.0	4	2
Mollusks " <i>Tapes decussatus</i> ": content	3.0	460	92

Table (2)  
Frequency distribution of *C.perfringens* in fish and Mollusks

Fish/Mollusks	Total No.	Positive		Negative	
		No.	%	No.	%
Tilapia Spp.:					
Gills	50	34	68	16	32
Skin	50	38	76	12	24
Muscles	50	10	20	40	80
Crysophyrus Spp.:					
Gills	50	16	32	34	68
Skin	50	22	44	28	56
Muscles	50	6	12	44	88
Mollusks " <i>Tapes decussatus</i> ":	100	67	67	33	33