

قسم : الرقابة الصحية على الأغذية
كلية الطب البيطرى - جامعة أسيوط
رئيس القسم : ا.د / على يوسف لطفى

نسبة وجود ميكروب الكلوستريديم بيرفرنجنز وأنواعها
فى الحيوانات المذبوحة فى صعيد مصر

حسين يوسف ، زينب السيد ، نبيل الدنف ، مختار الطرابيلى**

تم عزل ميكروب الكلوستريديم بيرفرنجنز بنسبة ٣٩٪ من الحيوانات المذبوحة
فى صعيد مصر ، وقد تم تصنيف الأنواع المعزولة كالتالى :

أ٧ ، ب٢	فى ذبائح الجاموس
أ٨ ، ب٣ ، اس١ ، د١	فى ذبائح الأبقار
أ٥ ، اس١ ، د١	فى ذبائح الخراف

وقد وجد أن العدد الكلى للكلوستريديم بيرفرنجنز على الحيوانات المذبوحة

قليل .

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INCIDENCE AND TYPING OF CLOSTRIDIUM PERFRINGENS IN ANIMALS SLAUGHTERED AT UPPER EGYPT

(With 3 Tables)

By

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SUMMARY

Clostridium perfringens could be detected in 39% in buffalo, cattle and sheep carcasses. From buffalo carcasses could be isolated 7 toxigenic strains i.e. 7 type A and 2 type B, and from cattle carcasses 13 toxigenic strains i.e. 8 type A, 3 type B, 1 type C and 1 type D, while 7 toxigenic strains could be isolated from sheep carcasses i.e. 5 type A, 1 type C and 1 type D. Number of *Cl. perfringens* were generally low.

INTRODUCTION

Clostridium perfringens has caused outbreaks of mild illness characterised by abdominal cramps and diarrhaes, usually without vomiting, commencing 8-20 hours after eating contaminated food (NELSON, 1933; McCLUNG, 1945; OSTERLING, 1952 and HOBBS, *et al.* 1953) in a study of outbreaks of *C. perfringens* food poisoning occurring in Great Britain, found that the strains of the causative organism were feebly toxigenic, produced heat resistant spores, and recovered as type A group. In outbreaks reported by McCLUNG, 1945; OSTERLING, 1952 and HOBBS, *et al.* 1953, the meat involved had been insufficiently cooked and was kept long enough after cooking to permit growth of the organisms.

When meat cultures of living micro-organisms were fed to human volunteers, McCLUNG, 1945; OSTERLING, 1952 and HOBBS, *et al.* 1963, observed similar symptoms to those occurring in food-poisoning outbreaks where *C. perfringens* appears to have been involved.

The present study was attempted to establish the incidence and types of *C. perfringens* on surface of buffalo, cattle and sheep carcasses at the end of slaughter line.

MATERIAL and METHODS

Carcasses (40 buffalo, 50 cattle and 20 sheep) were sampled according to SMART, *et al.* 1979 within 1 hour after evisceration by swabbing 100 cm² on the inner hind leg adjacent

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to the anus. A sterile metal template was held against the carcass surface and the area defined swabbed with sterile absorbent cotton wool previously moistened in 10ml of 0.1% peptone water. Both swabs were placed in the remainder of the 10ml peptone water and examined in the laboratory with a minimum of delay.

The swab suspension was thoroughly mixed and heated at 75°C for 30 minutes in a water bath to inactivate vegetative cells, a ten fold dilution of each sample was made in peptone water. 0.1ml from each dilution was spread on SPS agar (Merk Art. Nr. 10235). Plates were incubated at 46°C for 24 hour in a Gaspack anaerobic jar. Black colonies were counted. Colonies were picked for further confirmation according to STRONG, *et al.* (1971) and THATCHER and CLARK (1975).

Typing and determination of the Toxigenicity of isolates of *C. perfringens* was carried out at Animal Health Research Institute, by inoculating the isolates in cooked meat broth and incubating at 37°C for 18 hours, and then subcultured on Blood agar and incubated at 37°C for hours. Suspected colonies were tested for toxigenicity by toxin production then typed by animal inoculation test in mice using specific antisera (B. Wellcome, England).

RESULTS

Results are tabulated in tables 1, 2 & 3.

Table (1)
Frequency distribution of *C. perfringens* isolated
from buffalo, cattle and sheep carcasses

Sources	No. of samples	Positive		negative	
		No.	%	No.	%
Buffalo	40	10	25	30	75
Cattle	50	21	42	29	48
Sheep	20	12	60	8	40

Table (2)
Types and Toxigenicity of *C. perfringens* found
on carcasses of buffalo, cattle and sheep

Sources	No. of isolates	Toxigenicity				Non toxigenic
		Type A	B	C	D	
Buffalo	11	7	2	-	-	3
Cattle	14	8	3	1	1	5
Sheep	22	5	-	1	1	15

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Table (3)
C.perfringens count/100cm² on buffalo,
cattle and sheep carcasses

Sources	Minimum	Maximum	Mean
Buffalo	10	500	155
Cattle	10	400	61
Sheep	10	600	136

DISCUSSION

C. perfringens were detected in 43 (39%) out of 110 buffalo, cattle and sheep carcasses slaughtered at Upper Egypt, including 40 buffalo, 50 cattle and 20 sheep carcasses. 10% C. perfringens could be isolated from buffalo carcasses, 21% from cattle carcasses and 12% from sheep carcasses (table 1). HOBBS, *et al.* (1953) could detect heat resistant strains of C. perfringens 14-24% of samples obtained from veal, beef and pork. STRONG, *et al.* (1963), mentioned that 16.4% raw meat contained C. perfringens. HALL and ANGELOTTI (1965), succeeded in isolating 70 and 52% C. perfringens from beef and lamb respectively. FRUIN, 1977 could isolate 82% and 52% C. perfringens from veal and lamb respectively. HUSSEIN (1978) reported that healthy cattle contained 29% C. perfringens, while SMART, *et al.* (1979), proved that beef and lamb carcasses contained 29% and 85% respectively. However, although comparison could not be possible due to the fact that the variation in the hygienic standards in slaughtering and preparation of the carcasses in every country, yet, the recorded results indicated that raw meat may be considered as a source of C. perfringens.

With respect to types of C. perfringens found in the examined carcasses of buffalo, cattle, and sheep. A total of 17 different types were recorded from the examined animal carcasses. From buffalo carcasses 9 toxigenic strains could be isolated i.e. 7 type A and 2 type B, while 3 non toxigenic strains could be isolated. In case of cattle carcasses 13 toxigenic strains could be recorded i.e. 8 type A, 3 type B, 1 type C and 1 type D, while 5 non toxigenic strains could be isolated. Moreover, 7 toxigenic strains could be isolated from sheep carcasses i.e. 5 type A, 1 type C and 1 type D, while 15 non toxigenic strains could be recorded (table 2). It is worth to mention that two of the five types of C. perfringens were classified. According to various toxins, other than enterotoxins, produced are able to cause food born disease in man. Of these, type A is the more common agent of the food poisoning, while type C causes a more serious but rare condition called enteritis necroticans (HOBBS and GILBERT, 1981).

Table (3), showed the minimum, maximum and mean c.perfringens 100cm² recovered from the examined carcasses. In buffalo carcasses minimum, maximum and mean of C.perfringens/100cm² were 10,500 and 155 respectively, and in cattle carcasses 10,400 and 61 respectively, while in sheep carcasses 10,600 and 136 respectively. The recorded results pointed out that the number of C.perfringens in the examined carcasses were low. Similar observations were reported by SMART, *et al.* 1979.

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The present study confirms that *C. perfringens* is a common surface contaminant of fresh meat carcasses. In view of the relatively small area of each carcass sampled it seems probable that strains of *C. perfringens* are present on every commercial carcasses and retail cuts prepared at Upper Egypt.

Meat products prepared from such contaminated meat are considered a source of *C. perfringens* and may be responsible for food poisoning outbreaks (LADIGES, et al. 1974; SHOUP and OBLINGER, 1976; FOSTER, et al. 1977; VERNON, 1977; SMART, et al. 1979; BOUWEN-HERTZBERGER, 1982 and YOUSSEF, 1984). The higher number of *C. perfringens* in foods implicated in outbreaks results from the failure to cool rapidly and refrigerate cooked foodstuffs, besides the heat preparations (time-temperature factor) of the meat products may be also insufficient for retarding the multiplication of *C. perfringens*.

In conclusion, according to the results recorded in this study that *C. perfringens* have been detected on the surface of the commercial carcasses it would be prudent always to assume that strains capable of causing food poisoning are present on meat and to sure their ability to multiply by careful attention to temperature control, cooking temperature (time-temp. factor) as well as post cooking storage.

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THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and expansion. From the first European settlements on the Atlantic coast to the westward movement across the continent, the nation has grown from a small collection of colonies to a vast, diverse country. The early years were marked by struggle and conflict, but the spirit of independence and self-determination eventually led to the birth of a new nation. The American Revolution was a turning point, establishing the principles of democracy and individual rights that have shaped the country's identity. The westward expansion brought new challenges and opportunities, leading to the development of a unique American culture and way of life. The nation's growth was not without its difficulties, but the resilience and ingenuity of the American people have allowed them to overcome these challenges and build a great nation.