

قسم الرقابة الصحية على الأغذية  
كلية الطب البيطري - جامعة القاهرة  
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### مدى تواجد الميكروبات اللاهوائية في بيض الدجاج

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أجري البحث على مائة وخمس وعشرون عينة من بيض الدجاج تم تجميعها من الأسواق والمحلات بالقاهرة والجيزة وذلك لتحديد مدى تواجد الميكروبات اللاهوائية في كل مسن محلول الغسيل والمحتويات الداخلية لكل بيضة على حده .

وقد أسفرت الدراسة عن تواجد اللاهوائيات في ٧٦% ، ٥٥% في كل من محله لول غسيل ومحتويات البيض على التوالي . وقد أمكن عزل ميكروبات الكلوستريديا من ٥٣% ٣١% من محلول غسيل ومحتويات العينات . وكذا أمكن عزل المكورات اللاهوائية من ٦٤% ، ٣٧% من تلك العينات . وقد أسفر التصنيف الميكروسكوبي والكيميائي عن عزل ميكروب الكلوستريديم بيوتريكم ، كلوستريديم فالاكس ، كلوستريديم لينتوبوتريسنس كلوستريديم بارابوتريفيكم والكلوستريديم بيرفرينجينس بنسب مختلفة من العينات .

هذا وقد تم مناقشة الأهمية الصحية للميكروبات المعزولة .

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## **ANAEROBIC MICROORGANISMS IN RAW HEN EGGS** (With 3 Tables)

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### **SUMMARY**

One hundred twenty five of hen's eggs were examined for the incidence of anaerobic microorganisms. 76% of the examined washing solution was found to contain anaerobes, while 55.20% of the examined egg content proved to contain anaerobic microorganisms.

Clostridia could be isolated from 53.6% and 31.2% of the examined washing solution and egg contents respectively, while anaerobic cocci could be isolated from 64.8% and 37.6% of the examined samples respectively.

Microscopical and biochemical identification of the isolated Clostridia reveal the presence of *Cl. butyricum*, *Cl. fallax*, *Cl. lentoputrescens*, *Cl. paraputrificum* and *Cl. perfringens* in varying percentages. Public health importance of the isolated anaerobes was discussed.

### **INTRODUCTION**

The Flourishment of poultry industry and the pronounced increase in the annual production of eggs have led to progressive increase in the consumption of eggs.

Hen eggs are among the most perishable foods for man due to their favourable price, high nutritive value, desired physical properties and ease of preparation.

It is well known that food may be a vehicle of transmission of many bacterial, viral, protozoal and fungal diseases to the consumer (FEACHMAN, *et al.* 1977; HOBBS and GILBERT, 1978 and ICMSF, 1978).

Raw eggs have several natural antimicrobial defences. Some of these are physical, such as the cuticle and shell membranes, while others are chemical e.g. lysozyme which is in the shell membranes and albumen (KOROTOVA, 1957). While this enzyme will aid in cell lysis of some bacteria, others are resistant and may cause spoilage of raw egg (KOROTOVA, 1957).

Improper or insufficient cleaning and sanitizing of equipments can provide a source for contamination of raw eggs with numerous types of microorganisms (MOATS, 1981). Contamination of eggs and egg products with microorganisms possibly means injury of egg quality which may lead to spoilage of eggs or perhaps to transmission of pathogens to the consumer.

Staphylococci, *Cl. perfringens* and *Salmonellae* account for three-quarters of the outbreaks and almost 90% of the cases of illness reported by the center for disease control in the USA (FOSTER, 1972).



S.S. SALLAM, *et al.*

Eggs and egg products are considered as vehicle for transmission of many pathogenic microorganisms (WOODWARD, *et al.* 1970 and FOSTER, 1972).

Isolation of Clostridia from egg products has been done (SUTTON and HOBBS, 1969 and JAKOBSEN and TROLLE, 1979), while growth of anaerobes in whole egg and egg products have been studied by (PAUL and POTTER, 1978 and LUBIN, *et al.* 1985).

This paper attempts to shed light on the anaerobic microorganisms in raw hen eggs.

### **MATERIAL and METHODS**

One hundred twenty five raw hen eggs were collected from different street markets and shops in Cairo and Giza. Samples were transported to the laboratory to be immediately examined for the incidence of anaerobic microorganisms.

The technique recommended by ICMSF (1978) was applied using Gas-pack anaerobic Jar (BBL). Suspected colonies were isolated, purified and identified according to BUCHANAN and GIBBONS (1975) and WILLIS (1977). Isolated clostridia were biochemically identified only.

### **RESULTS**

Are tabulated in tables 1, 2 and 3.

### **DISCUSSION**

It is evident from the results given in (Table 1) that anaerobic microorganisms could be detected in 76% and 55.2% of the examined egg shell washing solution and egg content respectively.

Clostridia microorganisms could be isolated from 67(53.6%) and 39(31.2%) of the examined egg shell washing and egg content respectively. On the other hand anaerobic cocci, which include Veillonella species, peptococcus species and peptostreptococcus could be isolated from 81(64.8%) of the examined shell washing solution and from 47(37.6%) of the examined egg content samples (Table 2).

It is evident from the results given in (Table 3) that *Cl. butyricum*, *Cl. fallax*, *Cl. lentoputrescens*, *Cl. paraputrificum* and *Cl. perfringens* could be isolated from 14.4%, 5.6%, 4.8%, 21.6% and 12.8% of the examined shell washing solution samples respectively. On the other hand, the same isolates could be isolated from 1.6%, 7.2%, 6.4%, 12.8% and 8% of the examined egg content samples respectively.

*Cl. perfringens* was implicated in several cases of food poisoning and some strains cause enteritis necroticans, necrotizing colitis, infections of the uterus, intestine, gall bladder and urinary system (HOBBS, *et al.* 1953; CRUICKSHANK, 1962; DOLL, *et al.* 1970; DAVIS, *et al.* 1973; WILLIS, 1977 and ICMSF, 1978).

Some strains of *Cl. fallax* produce a lethal toxin and are responsible for wound infection and gas gangrene in man. Although members of genera *Veillonella*, *Peptococcus* and *Peptostreptococcus* are among the normal bacterial flora of the Oropharynx, the gastrointestinal and the

## ANAEROBIES, RAW HEN EGGS

female genital tracts, however some strains are associated with a variety of anaerobic infections in man as they play an aetiological role with facultative anaerobes in synergistic infections such as anaerobic streptococcal myositis (PIEN, et al. 1972; LAMBE, et al. 1974; WEINBERG, 1974 and WILLIS, 1977).

From the above mentioned it could be concluded that market hen eggs under the prevailing conditions of production, handling and distribution may, at times, constitute a public health hazard.

For the safety of consumers, it deems necessary that instruction should be emphasized on the importance of sanitary measures applied during production, handling and marketing of table eggs as well as periodical inspection of poultry farm to improve the quality of the produced eggs.

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S.S. SALLAM, et al.

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Table (1)  
Incidence of anaerobic microorganisms in examined hen eggs

	No. of samples	+ve	%
Washing solution	125	95	76.00
Egg content	125	69	55.20

Table (2)  
Incidence of Clostridia and anaerobic Cocci in examined hen eggs

	No. of samples	Clostridia		Anaerobic cocci*	
		+ve	%	+ve	%
Washing solution	125	67	53.6	81	64.8
Egg content	125	39	31.2	47	37.6

Table (3)  
Types of isolated clostridia from the examined hen eggs.

	Washing solution No = 125		Egg content No = 125	
	+ve	%	+ve	%
<i>Cl. butyricum</i>	18	14.4	2	1.60
<i>Cl. fallax</i>	7	5.6	9	7.20
<i>Cl. lentoputrescens</i>	6	4.8	8	6.40
<i>Cl. paraputrificum</i>	27	21.6	16	12.80
<i>Cl. perfringens</i>	16	12.8	10	8.00

\* Anaerobic cocci include:

- |             |         |             |         |
|-------------|---------|-------------|---------|
| - Veillonel | species | - Peptoctus | species |
| - peptoctus | species |             |         |

