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مدى تواجد الميكروب العنقودي في المخلفات الحيوانية الصالحة للاستهلاك بأسيوط

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شملت الدراسة فحص ٢٠٠ عينة من المخلفات المطهوه الجاهزة للأكل بواقع ٥٠ عينة لكلا من المعدة والأمعاء والرئتين والكبد تم تجميعها من مصادر مختلفة في مدينة أسيوط كما تم أخذ ٤٠ عينة من نفس المخلفات النيئة بدون طهو بواقع ١٠ عينات من كل نوع من الأنواع السابق ذكرها لمعرفة تأثير الحرارة على الميكروب العنقودي الذهبي وذلك لهدف دراسة عدد البكتريا ومدى تواجد الميكروب المكور العنقودي الذهبي وتأثير الطهو على عدده ٠

بينت النتائج أن نسبة وجود الميكروب العنقودي الذهبي في المخلفات الحيوانية الجاهزة للأكل بالكبد والمعدة والرئتين والأمعاء بالترتيب كانت ٤٩ (٩٨٪) ، ٤٨ (٩٦٪) ٤٩ (٩٨٪) ، ٤٨ (٩٦٪) بقيم أقل من $١٠^{٢}$/جم في حين تبين تواجده بنسبة (٢٪) من $١٠^{٢}$ - $١٠^{٣}$/جم وأن عينة واحدة في كلا من المعدة والأمعاء تحوي على عدد من $١٠^{٣}$ - $١٠^{٤}$ في حين كانت نسبة وجود الميكروب المكور العنقودي الذهبي في ١٤ (٢٨٪) ، ٩ (١٨٪) ، ١٢ (٢٤٪) ، ١١ (٢٢٪) من عينات الكبدة والمعدة والرئتين والأمعاء على التوالي وأن ١١ (٧٨٫٦٪) ، ٦ (٦٦٫٧٪) ، ٧ (٥٨٫٣٪) ، ٩ (٨١٫٣٪) منها كانت موجبة التجلط ٠

كما بينت الدراسة تأثير الطهي على المخلفات الحيوانية النيئة يؤدي الى انخفاض نسبة تواجد الميكروب العنقودي المكور الذهبي موجب التجلط الى ١٠٠٪ ٠

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INCIDENCE OF STAPHYLOCOCCI IN OFFALS IN ASSIUT MARKETS

(With 4 Tables)

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SUMMARY

Two hundred samples ready to eat meat offals (50 samples each of stomach,intestine, lung and liver) were examined for total bacterial and Staphylococcus counts. On the other hand Sthaph. aureus, coagulase positive were isolated, also 40 samples of raw meat offals (10 samples each of stomach, intestine, lung and liver) were used for the assessement of the effect of cooking on the Staph. aureus coagulase positive.

Regarding the total bacterial counts in case of cooked edible by-products (liver, stamach, lung and intestine) the average counts were $1x10^7$; $5x10^7$ $1x10^8$ and $6x10^7$ respectively. Staph. aureus was detected in less than 10^2/g in 98%, 96%, 98% and 96% ready to eat cooked liver, stomach, lung and intestine respectively, while the Staphylococcus counts ranged from 10^2-10^3 was (2%) in all the examined products, but only one sample in case of intestine had count ranged from 10^3-10^4. The coagulase positive strains obtained from the total isolates were examined as well as studying the effect of cooking on the Staph. aureus.

INTRODUCTION

Animal by-products include every thing of economic value, other than the carcase, obtained from animal during slaughter and processing and are classified as either being edible or inedible, based upon whether or not they intended for human food. In recent years there has been a decline in the general acceptance of meat offals. Almost of the meat offals are more perishable than the carcase because they are subjected to a wide range of contaminations with spoilage and pathogenic microorganisms during their harvesting.

The presence of Staphylococcus aureus in the final cooked products constitutes a public health hazard. This depends upon the rate of contamination before and after cooking processes. Therefore this work was planned to study the occurrence of Staphylococcus aureus in ready to eat meat offals in Assiut markets.

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MATERIAL and METHODS

Part I:

200 samples of ready to eat meat offals (50 samples each of stomach, intestine, lung and liver) were collected from different shops in Assiut city. Each sample was aseptically transferred to a sterile mixer to be homogenized and thoroughly mixed. All samples were subjected to the following:

1 - Enumeration of total bacterial count, as recordd by A.O.A.C. (1975).
2 - Isolation and identification of Staphylococcus aureus according to FEINGOLD and MARTIN (1982).
3 - Enumeration of coagulase positive Staphylococci using surface technique as recorded by THATCHER and CLARK (1975).

Part II:

40 samples of raw meat offals (10 samples each of stomach, instestine, liver and lung) were collected from shops in Assiut city. Each sample was divided into 2 parts after thoroughly mixing in a sterile grinding mixer. The first portion of the meat offals was subjected for bacteriological examination, while the second was subjected to cooking process in a stainless steel pan with cover lid and allowed to boil for about 30 minutes. Then the cooked meat offals were allowed to cool and then were subjected to the same adopted bacteriological technique. The obtained results were tabulated and recorded.

RESULTS

Table (1) shows that the minimum, maximum and means of the total aerobic plate count in case of cooked edible by-products (liver, stomach, lung and intestine) were ($3x10^6$, $1x10^8$ and $1x10^6$); $4x10^7$, $5x10^8$ and $5x10^7$); ($4x10^7$, $1x10^9$ and $1x10^8$) and ($4x10^6$, $3x10^8$ and $6x10^7$) respectively. These findings were higher than that reported by BACHHIL and AHLUWALIA (1973), which may be attributed to unsatisfactory hygienic measures adopted in processing and handling of the product.

The suggestive directive microbiological limits of standard plate count of edible offals were $5x10^5$ in which the counts below it, is considered acceptable; while till 10^7 considered marginally acceptable. Above 10^7 is considered unacceptable as stated by THATCHER and CLARK (1975).

The results given in Table (2) reveals that the Staphylococcus counts in ready to eat cooked by-products (liver, stomach, lung and intestine) were 49(98%), 48(96%), 49(98%) and 48(96%) which were less than 10^2/g, from these edible offals respectively, while from 10^2-10^3 was (2%) in the same examined products. On the other hand, one sample only in case of each intestine and stomach contained Staphylococcus count ranging from 10^3-10^4.

It is evident from the results given in Table (3) that out of 50 samples each from liver, stomach, lung and intestine; 14(28%), 9(18%), 12(24%) and 11(22%) respectively were proved to be contaminated with Staphylococci, on the other hand out of these isolates 11(78.6% 6(66.7%), 7(58.3%) and 9(81.8) were coagulase postive Staph. aureus respectively.

From the obtained results, 22%, 12%, 14% and 16%, from the total samples of liver, stomach, lung and intestine respectively were proved to contain coagulase postive Staph. aureus and hence are probable to produce enterotoxin, REFAI (1984).

The results given in Table (4) revealed that the number of samples which contained Staph. aureus coagulase positive out of 10 samples from raw edible liver, stomach, lung and intestine were 6(60%), 3(30%), 5(50%) and 6(60%) respectively.

DISCUSSION

From the previously mentioned data it is evident that cooked edible by-products harbouring Staph. aureus organisms indicated post cooking contamination. Cooking of these products under ordinary sanitary condition lead to reduction of Staphylococci by (100%).

REFAI (1981) revealed that foods which have been implicated in outbreaks of Staph. aureus food poisoning were traced to the carriers for this organism.

Staph. aureus organisms are killed when the by-products are thoroughly cooked. On the other hand before cooking these by-products; this organisms may contaminate hands of workers who touch the raw foods, with the subsequent contamination of equipmnet used in their preparation or processing and therefore constitute a public health hazzard.

Therefore to improve the quality and to save consumers from Staphylococcal food poisoning the following suggestive measures should be recommended:

1 - Persons who come in contact with the preparation of such popular food in the course of their work should have a medical examination prior to their employment. Medical examination of an employee should be carried out at other times when clicically or epidemiologically indicated.

2 - Every person engaged in a food handling area should wash his hands frequently and thoroughly with soap or other detergents under running warm water.

3 - Educational programmes should be given to those taking part in handling, processing and servicing of these foods.

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Table (1)
Statistical analysis of total aerobic plate count in cooked edible by-products (count per gram)

	Liver	Stomach	Lung	Intestine
Minimum	$3x10^6$	$4x10^7$	$4x10^7$	$4x10^6$
Maximum	$1x10^8$	$5x10^8$	$1x10^9$	$3x10^8$
Mean	$1x10^7$	$5x10^7$	$1x10^8$	$6x10^7$

Table (2)
Distribution of analytical results of Staph. aureus count in ready to eat cooked edible by-products

Range	Liver		Stomach		Lung		Intestine	
	No.	%	No.	%	No.	%	No.	%
/ 10^2	49	98	48	96	49	98	48	96
10^2 - 10^3	1	2	1	2	1	2	1	2
10^3 - 10^4	-	-	1	2	-	-	1	2
Total	50	100	50	100	50	100	50	100

Table (3)
Incidence percentage of the isolates and coagulase positive Staph. aureus in edible cooked by-products

	Isolates				
	Total samples	No. of samples contain staph.	%	Coagulase +ve	%
Liver	50	14	28	11	78.6
Stomach	50	9	18	6	66.7
Lung	50	12	24	7	58.3
Intestine	50	11	22	9	81.8

Table (4)
Effect of cooking on the percentages of isolated coagulase positive Staph. aureus.

	Raw			Cooked			Reduction %
	No. of samples	+ve samples	%	No. of samples	+ve samples	%	
Liver	10	6	60	10	-	-	100
Stomach	10	3	30	10	-	-	100
Lung	10	5	50	10	-	-	100
Intestine	10	6	60	10	-	-	100