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QUALITY EVALUATION OF SHEEP CARCASSES SLAUGHTERED AT KALYOBIA ABATTOIRS

(With 4 Tables)

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تقييم جودة ذبائح الأغنام بمجازر القليوبية

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الأغنام تعتبر مصدر هام من مصادر اللحوم للاستهلاك الأدمي . أجريت هذه الدراسة على عدد 100 ذبحة أغنام مذبوحة بمجازر محافظة القليوبية وتم فحص هذه الذبائح كالآتي: أولاً: الفحص البكتريولوجي: وتبين من الفحص البكتريولوجي أن العدد البكتيري الكلي تراوح بين 10×10^7 إلى 10×10^6 وكان المتوسط $6,1 \times 10^6$ سم² / سم² ، 6% من الذبائح التي تم فحصها كانت مصابة بالبروسيل الماطية و3% من الذبائح التي تم فحصها كانت مصابة بـ *Corynebacterium pseudotuberculosis* كل العينات كانت خالية من السالمونيلا . ثانياً: الفحص الكيميائي: الفحص الكيميائي وفيه كانت نسبة الرطوبة تتراوح بين 72,91-77,24 وكان المتوسط 74,58% ، نسبة البروتين تتراوح بين 16,13-21,90 وكان المتوسط 19,20% . ونسبة الدهن تتراوح بين 2,95-5,87 وكان المتوسط 4,54% . والرمد نسبة تتراوح بين 0,98-1,73% وكان المتوسط 1,15% . والكربوهيدرات لم يستدل على وجودها.

ثالثاً: فحص الطفيليات: وتبين تواجد الطفيليات الآتية:

Cysticercus ovis (3%), Cysticercus tenuicollis(5%), Hydatid cyst(12%),
Dirocoelium dendriticum (8%), Fasciola hepatica(20%), Coenurus
cerebralis (2%).

وتم مناقشة الأهمية الصحية للحوم الأغنام وتأثير الاصابات البكتيرية الطفيلية على صحة المستهلك و على جودة اللحوم.

SUMMARY

A total of 100 slaughtered sheep at Kalyobia abattoirs were examined bacteriologically, chemically and for parasitic infestation. The bacteriological evaluation revealed that the total bacterial count / cm² of sheep carcasses ranged from 1.7×10^4 to 6.2×10^7 cfu with a mean value $6.1 \times 10^6 \pm 0.7 \times 10^5$ cfu / cm² . Six percentage of the examined slaughtered

sheep were infected with *Brucella melitensis*, 3% were infected with *Corynebacterium pseudotuberculosis*. Salmonella species could not be detected in the examined sheep carcasses. The chemical evaluation of the examined sheep carcasses revealed that the water content of sheep meat (mutton) ranged from 72.91% to 77.24 % with a mean value 74.85 %, protein content ranged from 16.13 to 21.90% with a mean value 19.20 %, Fat content ranged from 2.95 to 5.87 % with a mean value 4.54 %, Ash % ranged from 0.98 to 1.73 % with a mean value 1.15 %, and carbohydrate could not be detected in the examined samples. The parasitic infestation of sheep carcasses and their visceral organs revealed that the following parasites could be detected, *Cysticercus ovis*(3%), *Cysticercus tenuicollis* (5%), Hydatid cyst(12%), *Fasciola hepatica* (20%), *Dicrocoelium dendriticum* (8%), and *Coenurus cerebralis* (2%). The public health significance of the detected bacteria and parasites, and their effect on meat quality was discussed.

Key words: Sheep carcasses, abattoirs.

INTRODUCTION

The rapid increase in the population will definitely result in the increasing demand of the amount of meat which that needed for human consumption . Consequently, this constitutes a burden on the national economy. These facts have called the attention of many researchers in the field of Meat Hygiene to do their best for increasing the number of healthy livestock and their products.

Abattoirs can play a role in the management through control of a number of diseases especially bacterial and parasitic diseases (Wilson, 1999).

The small quantity of meat in sheep carcasses can be distributed and eaten before it goes bad where large cattle carcasses requires a large number of people if the meat is to be quickly consumed (Farid, 1991). The main objective of this article is to investigate parasitic infestations, bacteriological and chemical constituents of mutton meat.

MATERIAL and METHODS

A total of 100 slaughtered sheep at Kalyobia abattoirs were subjected to the following examinations:

I- The bacteriological examination

a- Total bacterial count.

By swabbing the surface according to the method recommended by Kiss (1984), the aerobic plate count was determined according to A.O.A.C. (1984).

b- Detection of *Brucella melitensis*:

By taking about 10ml quantities of blood from the slaughtered sheep. Collected blood was labeled then allowed to clot and the serum was decanted and stored at - 20C till testing. Serological diagnosis was done according to the methods recommended by Joint FAO/WHO (1971), Ferrel and Robertson (1972), Kolar (1984) Farina (1985) and Alton et al (1988).

c- Detection of *Corynebacterium pseudotuberculosis*:

By taking samples from the affected lymph nodes of slaughtered sheep suspected to be caseous lymphadenitis from which swabs were taken for bacteriological examination, and inoculated onto nutrient agar, blood agar, chocolate blood agar, Loeffler's serum and brain heart infusion agar plates. The inoculated plates were incubated at 37 C for 24 to 48 hrs. All isolates were identified morphologically, culturally and biochemically according to Carter and Cole (1990); Koneman et al., (1992); Quinn et al., (1994) and Collee et al., (1996). Serological examination and haemolysis inhibition test was performed according to the method recommended by Holstad, (1986).

d- Detection of Salmonella species according to the technique recommended by ICMSF (1978)

II- Chemical examination of mutton was carried out according to the technique recommended by A.O.A.C (1984) to determine its major components.

III- Parasitic infestations in sheep carcasses and their visceral organs was carried out according to the technique recommended by Dyson and Linkalter(1979), Soulsby (1982), Gracey and Collin's (1992) and Wilson, (1999).

RESULTS

Table 1: Total bacterial count/cm² of sheep carcasses.

	Min.	Max.	Meant [±] S.E
Total bacterial count	1.7×10^4	6.2×10^7	$6.1 \times 10^5 \pm 0.71 \times 10^5$

Table 2: Incidence of *Brucella melitensis*, *Corynebacterium pseudotuberculosis* and *Salmonella* species in sheep carcasses.

Microorganisms	Total number of examined carcasses	No. of +ve	%	No. of -ve	%
<i>Brucella melitensis</i>	100	6	6	94	94
<i>Corynebacterium pseudotuberculosis</i>	100	3	3	97	97
<i>Salmonella</i> species	100	-	-	100	100

Table 3: Major components of mutton.

Chemical composition	Min.	Max.	Mean \pm S.E.
Water %	72.91	77.24	74.58 \pm 2.13
Protein %	16.13	21.90	19.20 \pm 1.16
Fat %	2.95	5.87	4.54 \pm 0.18
Ash %	0.98	1.73	1.15 \pm 0.01
Carbohydrate	0.00	0.00	0.00

Table 4: Parasitic infestations of sheep carcasses and their visceral organs

Parasites	Total number of examined carcasses	No. of +ve	%	No. of -ve	%
<i>Cysticercus ovis</i>	100	3	3	97	97
<i>Cysticercus tenuicollis</i>	100	5	5	95	95
Hydatid cyst	100	12	12	88	88
<i>Fasciola hepatica</i>	100	20	20	80	80
<i>Dicrocoelium dendriticum</i>	100	8	8	92	92
<i>Coenurus cerebralis</i>	100	2	2	98	98

DISCUSSION

The data recorded in Table (1) revealed that the total bacterial count ranged from 17×10^3 to 62×10^6 with a mean value $6.1 \times 10^5 \pm 0.71 \times 10^5$ C.F.U./cm² of sheep carcasses. These results are in agreement with those were reported by Roberts (1980) who stated that the contaminating

organisms are derived mainly from the hide of the animal and comprise organisms that originate from both faeces and soil. During carcass dressing, these contaminants are transferred from the hide to the carcass, mainly via the hands of workers and from equipments that contact both hide and tissue. Sierra *et al.* (1996) revealed that the total bacterial count was 3.01×10^3 C.F.U /cm² of sheep carcasses just after slaughtering.

Determination of numbers and type of microorganisms of meat carcasses are important from the stand point of public health, for judging effectiveness of sanitary handling and for estimation of quality characteristics, including shelf life (Butler *et al.*, 1979).

The data recorded in Table (2) showed that six percentage of the examined carcasses were infected with *Brucella melitensis*. Incidence of ovine brucellosis was recorded as 1.36% by Karim *et al.* (1979); 11.6% Radwan *et al.* (1983); 15.03% El-Bauomy (1989), 4.5% Youssif (1994), 19.2% Ghobashy (1995) and 2.01% to 4.13% in Assiut governorate by Abdel-Hafez *et al.* (2001). *Corynebacterium pseudotuberculosis* was detected in 3% of the sheep carcasses. These results agreed to large extent with the finding of Hauptman (1955) who showed a percentage of 0.5 up to 25% of caseous lymphadenitis among slaughtered sheep. Also, Garg and Chandiramani (1985) recorded 14.2% prevalence rate of caseous lymphadenitis among sheep in India. Mubarak *et al.* (1999) could detect caseous lymphadenitis in sheep at Assiut farms and abattoirs. Caseous lymphadenitis causes economic losses due to condemnation of infected carcasses and organs at slaughter (Kuria and Ngatia, 1991; Paton *et al.*, 1991; Real Valcarcel *et al.*, 1992 and Elis *et al.*, 1995). *Salmonella* species could not be detected in the examined samples. This result is in agreement with those reported by Mousa and Yassien (1987) who failed to isolate *Salmonella* from the examined slaughtered sheep.

The high bacterial count may reflect the unhygienic conditions under which the animals are slaughtered, skinned and eviscerated. Infected carcasses with *Brucella melitensis* may play a role in infection of veterinarians, meat inspectors, workers and consumers with brucellosis (ICMSF, 1978).

The data recorded in Table (3) revealed that the water content of mutton ranged from 72.91 to 77.24 % with a mean value 74.58, Protein content ranged from 16.13 to 21.90 % with a mean value 19.20 %, Fat content ranged from 2.95 to 5.87 with a mean value 4.54%, Ash ranged from 0.98 to 1.73 % with a mean value 1.15 % and carbohydrate could not be detected in the examined mutton.

These results indicated that the nutritive value of mutton is high and agree with those reported by Bass *et al.* (1984), Ono *et al.* (1984), Kempster *et al.* (1986), Bouix (1988), Kadim *et al.* (1989), Bennett (1990), Simm *et al.* (1990) and Young (1990).

The data recorded in Table (4) revealed that the parasitic infestations of sheep carcasses and their visceral organs were *Cysticercus ovis*(3%), *Cysticercus tenuicollis*(5%), Hydatid cyst(12%), *Fasciola hepatica*(20%), *Dicrocoelium dendriticum*(8%), and *Coenurus cerebralis*(2%). These results are in agreement with those reported by Oryan *et al.*(1994) who could detect Hydatid cysts and *Coenurus cerebralis* in slaughtered sheep. Konopka (1996) stated that the main causes of sheep carcasses condemnation in Poland were helminthes (echinococcosis and fascioliasis) and contamination.

The parasitic infestation in slaughtered sheep lower the quality of sheep carcasses and cause economic losses due to condemnation of the affected parts or total condemnation (Gracey and Collins, 1992).

To increase the quality and the nutritive value of the mutton the slaughtering, skinning and evisceration of sheep carcasses must be carried out under good hygienic conditions for prolongation of shelf life of mutton. Life cycle of sheep parasites must be damaged. The stray dogs must be prevented from reaching to the abattoirs and treatment of the infected animals.

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