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INCIDENCE OF PASTEURELLAE AMONG SLAUGHTERED SHEEP AND ITS EFFECT ON MEAT QUALITY

(With 5 Tables)

By

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مدى تواجد الباستيريلا في الخراف المذبوحة وتأثيرهما على جودة اللحـــــــــوم

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أجرى البحث على ١٥٠ عينة من رئات الخراف المذبوحة (٥٠ رئة طبيعية، ١٠٠ رئه بهـــــا التهابات رئويـة)· وقد تم فحص هذه العينات على مدى تواجد الباستيريلا بها ووجد أن نســـــبة الباستيريلا في الرئات التي بها الالتهابات ٢٣٪ والطبيعية كانت النسبة ٦٪· وقد تـــــم عـــــزل باستيريلا مالتوسيدا من ١٠٪ من الرئات التي بها الألتهابات بينما كانت نسبة الباستيريلاهيموليتيكا ٢٠٪ فقط من الرئه التي بها التهابات· وقد تم عدوا د خراف بالعترات المعزولة وذبحت هذه الخـــراف بعد فترة علاجية معينة وقد وجد أن هناك أختلافات واضحة في وزن الحيوان الحي ونسبة التصافـــي وزن الأعضاء الداخلية ، كمية الدهون وأجزاء الذبيحة III , II هذا بالاضافة الى التحليـــــل الكيماوى ونوعية اللحوم وقد وجد إن هناك فروق متباينة بين الحيوانات المعدية والحيوانات السليمة ·

SUMMARY

A total of 150 lung samples (50 normal and 100 pneumonic) were collected from slaughtered sheep at Cairo abattoir and examined for the presence of pasteurellae. The incidence of pasteurellae among pneumonic and normal lungs were 23% and 6% respectively. Pasteurella multocida was recovered from 10% of pneumonic lungs, while Pasteurella haemolitica was isolated from only 20% of pneumonic lungs.

Five sheep were artificially infected by the isolated strains of P.multocida and were slaughtered after a therapeutic treatment. Significant differences were reported in living body weight, dressing-out percentage, the weight of the internal organs, fatty tissue, meat cuts grade I and III. Moreover, the chemical composition and the over eating quality test revealed also a considerable variation between the artificially infected and the controlled groups.

INTRODUCTION

Pasteurellae has a wide host spectrum and cause epidemic and septicemic diseases of both animals and birds. They have been incriminated as a primary or secondary cause of pneumonia (enzootic pneumonia); a cause of systemic pasteurellosis in animals and sometimes it is present as commensals in the respiratory tract and

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nasal sinuses of persons associated with animals (GILMOUR and ANGUS, 1984). Concerning sheep, there is no doubt that pasteurellosis is one of the most important infectious diseases which causes economic loses not only due to high mortalities, but also due to loss in weight of pasteurellosis recovered sheep(WINKLER 1982). As far as no previous study was conducted on the meat quality of sheep previously infected with pasteurellosis, the present study was planned to investigate the following:

1- Monitoring the lungs of the slaughtered normal and pneumonic sheep for pasteurellae.

2- Study of the meat qualities of pasteurella infected sheep after recovery.

MATERIALS and METHODS

1- Monitoring for pasteurellae:

A) Collection of samples: 150 lung samples were collected from slaughtered sheep at Cairo abattoir. The samples were taking during the post-mortem inspection, pieces of lungs were taking during the post-mortem inspection, pieces of lungs were taken separately into sterile polythene bags. The samples were transferred to the laboratory without delay to be examined.

B) Detection of pasteurellae: The procedure adopted were done according to CRUICKSHANK et al. (1975).

C) Identification of pasteurellae: The isolated strains were identified according to BERGEY'S mannual (1984).

2- Study of the meat quality of pasteurella infected sheep after recovery from artificial infection :

Ten male Osemi sheep nearly of the same age and an average live body weight of 22 Kg. were selected and observed for one month for healthy condition. Animals were fed on a balanced ration and kept under god hygienic condition.

Artificial infection : Before starting the experiment the animal weight was recorded. Five sheep were separated and had been infected with the isolated strains of P.multocida according to BAIN (1963) and BARAKAT et al. (1976).

Treatment: According to a performed antibiogram streptomycin injection 10 mg/Kg twice daily for 5 successive days till the temperature drops and the animals started to restore appetite.

Slaughter and carcase evaluation : The methods adopted were carried out according to FABBRICANATE and SULTAN (1975).

Chemical analysis of the lean meat and fat : Were carried out according to the methods recommended by PEARSON (1976), HORWITZ et al. (1975) and the calorific value was calculated according to ALEXANDROV (1970).

Test panel evaluation : Were carried out according to MORE and IRITER (1970).

RESULTS

The results were tabulated in tables 1 to 5.

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Table (1): Pasteurellae isolated from normal and pneumonic lung samples.

Samples	No.	Total No.of inf. sheep		P.multocida infection		P.haemolytica infection		Mixed infection	
		No.	%	No.	%	No.	%	No.	%
Pneumonic	100	23	23	10	10	20	20	7	7
Normal	50	3	6	3	6	0	0	-	-

Table (2): Dressing percentages in both experiment and control sheep.

	Weight			
	Experiment		Control	
	Mean/Kg*	Mean %*	Mean/Kg*	Mean %
L.B.W. before infection	22.6		22.6	
L.B.W. before slaughter	26.8 ± 00.66		30.8*** ± 0.33	
Dressed carcase	12.7	100	15.5*	100
Dressing value %	47.3 ± 2.86		50.25 ± 1.63	
Mesentric fat	0.18 ± 0.06	1.43	0.26 ± 0.04	1.65
Liver	0.47 ± 0.03	3.72	0.67** ± 0.05	4.35
Spleen	0.04 ± 0.002	0.34	0.06 ± 0.008	0.38
Kidnies	0.08 ± 0.005	0.61	0.11** ± 0.004	0.73
Lungs	0.368 ± 0.016	2.90	0.486** ± 0.022	3.13
Heart	0.134 ± 0.007	1.06	0.14 ± 0.005	0.90

*: % in relation to the dressed carcase weight.

**: Sig. at P / 0.05

***: Sig. at P / 0.01

L.B.W. = live body weight.

Table (3): Meat grades and carcase composition.

	Weight			
	Experiment		Control	
	Mean/Kg*	Mean %*	Mean/Kg*	Mean %
Half carcase	6.35 ± 0.42	100	7.61 ± 0.4	100
Grade I	3.42 ± 0.16	56.66	5.12 ± 0.21	66.19**
Grade II	1.68 ± 0.23	27.40	1.70 ± 0.13	24.62
Grade III	1.03 ± 0.15	15.94**	0.61 0.63	9.60
Lean Meat	3.34 ± 0.19	52.66	4.12** 0.27	54.12
Fat	0.18 ± 0.014	0.03	0.51*** ± 0.08	0.07
Bone	1.465 ± 0.05	11.53	1.499 ± 0.17	9.67
Connective tissue	0.37 ± 0.11	5.83	0.53 ± 0.12	6.96
Edible parts"A"	3.52 ± 0.19	0.55	4.62*** ± 0.23	0.61
Non-Edible parts "B"	1.84 ± 0.132	0.29 0.29	2.03 ± 0.18	0.27
Lean meat yield	0.25 ± 0.014		0.27 ± 0.019	

*: Mean % in relation to the half carcase weight.
**: Sig. at P / 0.05.
***: Sig. at p / 0.01.
Parts "A": Meat and Fat.
Parts "B": Bone and C.T.

Table (4): Panel test evaluation of meat.

	Exp. Mean	Cont. Mean
Appearance	6.08 ± 0.125	6.76*** ± 0.086
Teture	5.44 ± 0.128	6.288*** ± 0.106
Tenderness	5.2 ± 0.138	6.32*** ± 0.093
Flavor	6.04 ± 0.13	6.56** ± 0.098
Over eating quality	5.6 ± 0.11	6.52*** ± 0.1

** : Sig. at P/ 0.05 ***: Sig. at P/ 0.01

Score system

Point	quality	Point	quality
7	Very Good	5	Good
4	Medium	3	Fair
2	Poor	1	Very Poor

Table (5): Mean valute of the proximate chemical composition of Meat and Fat.

	Meat		Mesentric fatic fat	
	E	C	E	C
Moisture	73.65 ± 0.73	74.72 ± 0.39	21.77** ± 1.18	13.74 ± 1.12
Protein	18.76 ± 0.55	17.77 ± 0.31	3.38 ± 0.30	1.65** ± 0.18
Fat	3.78 ± 0.11	5.14*** ± 0.14	73.57 ± 1.35	83.45*** ± 1.35
Ash	1.09 ± 0.04	1.12 ± 0.02	0.21** ± 0.02	0.13 ± 0.01
Call/100g	123.22 ± 3.17	125.78 ± 2.03	718.14 ± 12.4	802.24 ± 11.79

E : Experiment C : Control

** : Sig. at P / 0.05 *** : P / 0.01

DISCUSSION

It is evident from the results recorded in table (1) that 23% of pneumonic sheep lung samples were positive for pasteurella, whereas only 6% of normal sheep lungs contained pasteurella. As regard P.multocida, it was recoverd inrate of 10% from pneumonic case, and 6% from normal lungs. On the other hand, P.haemolitica was recoverd in 20 from pneumonic lungs only. similar results were recorded by ABD EL-MOTY (1979), while higher rate was reported by ALLEY (1975) and lower rates were reported by BANSAL and MALIK (1966); MISRA et al. (1970) and DOUTRE and PERREAU (1981).

Meat quqlity of slaughtered sheep :

Inspection of data presented in table (2) reveaed that, the mean value of the living body weight before slaughtering of the experimental and control groups were 26.8 Kg and 30.8 Kg respectively, and the variation were proved to be highly significant at P/ 0.01. The carcase yield was 12.7 Kg and 15.5 Kg respectively and the variation was significant at P/ 0.05. Also variations were noticed in the fat content and the weight of the internal organs were highly significant at P/ 0.01 and at P/ 0.05. The same results were recorded by KIRTON et al. (1976) and JONES et al. (1982).

Meat grade and carcase composition :

The data presented in table (2) revealed that, the cuts of grade I were proved to be 3.42 Kg and 5.12 Kg with a mean values percentages of 65.66% and 66.10% in rxperimental and control sheep groups, and the variation was significant at P/ 0.05. In meat cuts grade II the variation could not be detected, while in meat cuts grade III the variation was significant at P/ 0.05, in which the thin flank, fore and hind shanks, in experimental and control groups were 1.03 Kg and 0.61 Kg with a mean value of 15.94% and 9.60% respectively. The fatty tissue lied with 0.18 Kg and 0.51 Kg and revealed to be highly significant at P/ 0.01. Similar results were recorded by JONES et al. (1982).

The results of panel test score table (4) revealed that, the meat of animals of control group were always better in all tasting items than those of the experimental group with higher significant variation at P/ 0.01 in appearance, texture, tenderness and over eating quality, while the variation found to be only significant at P/ 0.05 in case of meat flavour. This variation can be attributed to the fact that, the muscles of animals under stress following pasteurella infection looses a considerable amount of their fat (Table 5) which are responsible for such variation (CROSS et al., 1975; DRYDEN and MARCHELLO, 1970; KHALIL et al., 1972 and ROMANS et al., 1965).

The chemical composition (Table 5) revealed that, the mean values percentages of moisture, protein, fat and ash were 73.6; 74.27; 18.7; 17.7; 3.7; 5.14 and 1.0, 1.12 in experimental and control groups rspectively. The fat content lied with significant variation at P/ 0.01, while moisture and protein content revealed no significant variation. The meat of the experimental group was darker in colour than the control group. This can be attributed to losses in the fat content (RILEY et al., 1981).

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From the results obtained in this study, it is evident that significant differences were reported in: living body weight, dressing percentages, weight of the internal organs, meat cuts grade I and III, and in thefatty tissue of theartificial infected aimals. These differences in the quality of sheep meat were attributed to the stress effect of pasteurellae organisms on the living animals. Effort must carried out to control the pasteurellae infection in sheep flock by different methods of vaccination. Moreover occasion of pasteurellae infection, the slaughtering of the infected animals should be sustained for a sufficient period to allow the animals to regain the losses which were caused by such infection.

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