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STUDIES ON RABBIT MEAT QUALITY RECOVERED FROM PASTEURELLOSIS

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Summary

This work was planed to study the effect of pasteurellosis on rabbit meat quality. The slaughter data in both control and experimentally infected rabbits were calculated and showed significant differences all over the period of the experiment , between the two groups. The living body weight , shoulder and thorax , lions and flank , rump and thigh ;giblet weight and dressing percentage decreased significantly in recovered rabbit in comparison with control. Also , sensory evaluation test revealed a highly significant difference in all testing items between control and recovered rabbits 2 days post treatment. The estimation of the main chemical composition of rabbit meat showed non significant differences in such components except the fat percentage that showed significant decreased on the 2 nd and 5 th day post infection and treatment. Evaluation of the economic effect of pasteurellosis in rabbits was also discussed.

Introduction

Rabbits are raised for a variety of reasons and virtually are found every country. Rabbit meat is extremely low in calories and high in protein content and easy to digest and this should be kept in mind when feeding children , senior citizen or those with weak stomach ***(Bennett , 1986)***. In Egypt , great attention has been given to rabbit breeding and production since last years. Several factors currently limit the economic viability of rabbit production. A major factor is that rabbits are susceptible to several diseases that reduce production. Pasteurellosis is considered one of the most important diseases of rabbits (***Ronald et al. , 1983***). It is a highly contagious disease of rabbits including acute rhinitis or cold chronic rhinitis (snuffles , nasal catarrh) bronchopneumonia , abscess , middle ear disease and genital infection.

Rabbit meat mainly composed of 18.8 % - 19.4 % protein , 9.9 - 10.9 % fat and 68.5 - 72 % moisture (***Rao et al. , 1987***). In Newzeland white rabbit meat , the moisture was 77.34 % , protein was 21.55 % , ether extract 2.73 % and ash 1.63 % (***Mohamed , 1989***) , he added that the percentage of carcass weight , front parts weight , lion weight , hind part weight , offals weight and Giblet weight were 45.8 , 17.05 , 10.04 , 18.7 , 49.7 and 4.5 respectively , while the dressing percentage was 50.3. ***Grant and Zelnik (1974)*** found that dressing percentage was 46.6 %. The carcass yield was

found to be 52 - 59 % at 2 Kg life body weight and 54 - 60 % at 3 Kg living body weight (***Bedinerz and Frind , 1975***). ***Lukefahr et al. (1982)*** found that the dressing and Giblet percentage were 50.4 % and 8.5 % respectively for Newzeland white rabbits. The other dressing percentages were reported by ***Malajan and Lahiri (1983)*** (48.3 %) , ***Desalvo and Zucchi (1984)*** (53.6 %).

Material and Methods

1.Pasteurella multocida strain:

The strain used for experiment infection of rabbits was isolated from locally infected rabbits in Aerobic Bacterial Vaccines Dept. , Vet. Serum and Vaccine Research Institute , Abbasia.

2.Animals:

Thirty two white Newzeland rabbits about 2 months age and average weight of 1583 gm were used in this study. These animals were divided into 2 groups. The first group , consisted of 16 rabbits , was subjected to experimental infection with 0.5 ml of Pasteurella multocida. The second group were kept as control. The animals were examined 12 hours post inoculation to detect rising of temperature.

3.Treatment:

The inoculated rabbits were treated with ampicillin in a dose 0.1 ml / Kg body weight by I / M route for 5 successive days.

4.Slaughter:

According to Islamic method , 8 infected rabbits and 3 control ones were slaughtered 2 , 5 , 8 , 11 days post treatment. The last group was left to 18 days post treatment to show if the recorded animals after treatment compensate the loss in weight and the changes in their meat quality.

5.Samples for meat quality estimation:

The samples were taken from the middle part of the lion and prepared for the chemical analysis according to ***Lukefahr et al. (1982) , Sallam and Hafez (1984) and Abdel Gawad (1988)*** , fat , protein , moisture and ash percentages were estimated.

6.Analysis of meat:

Analysis of meat for its chemical composition (moisture , protein , fat and ash) was performed according to the official methods (***A.O.A.C. , 1980***).

7.Sensory evaluation of rabbit meat:

(***More and Iriter , 1970***).

Muscles were cut into 3 X 3 cm pieces which cooked for 90 minutes. Then the meat and broth were served hot. Panel members (10 - 12) persons entered their scores on special cords.

Results and Discussion

Estimation of slaughtered data in normal control rabbits presented in Table (1) showed that the mean values were within the normal growth limits which agreed with ***Grant and Zelnik (1974)*** , ***Bedinerz and Frind (1975)*** , ***Lukefahr et al. (1982)*** , ***Malajan and Lahiri (1983)*** , ***Desalvo and Zucchi (1984) and Mohamed (1989)*** where ***Grant and Zelnik (1974)*** recorded a dressing percentage in Newzeland white rabbits of 46.6 % ; ***Bedinerz and Frind (1975)*** mentioned that the carcass yield was (52 - 59 %) 2 Kg. Live body weight ; ***Lukefahr et al. (1985)*** whom found that the dressing and Giblet percentage were 50.4 % and 8.5 % respectively for Newzeland white rabbits ; ***Malajan and Lahiri (1983)*** who stated that the dressing percentage in Newzeland white rabbits was 48.3 % ; ***Desalvo and Zucchi (1984)*** reported a 53.3 % dressing percentage in white Newzeland rabbits and ***Mohamed (1989)*** who reported that the percentage of carcass weight , front part weight , lion weight , hind part weight , offals weight and Giblet weight were 45.8 % , 17.05 % , 10.04 % , 18.7 % , 49.7 % and 4.5 % respectively while the slaughter data in rabbits under experiment showed highly significant variation than control groups ($P < 0.001$) in living body weight , carcass weight , shoulder and thorax , lions and flank , rump and thigh , Giblet weight and dressing percentage all over the period of experiment except the dressing percentage which showed significant difference ($P < 0.05$) on the 18 days post infection and treatment. This difference could be attributed to the

stress of infection with Pasteurella multocida which extended to exert a noticeable effect upon the living body weight and the weight of internal organs , this attribution agreed with ***Ronald et al. (1983)*** who concluded that the enzootic pneumonia due to pasteurellosis in rabbits lessens body weight and results in efficient feed utilization.

The Table (2) showed the chemical composition of the test and control rabbits slaughtered at 2 , 5 , 8 , 11 and 18 days post infection with Pasteurella multocida and treatment was evaluated. Non significant changes in the percentage of moisture , protein and ash were noted between control and experimental rabbits. The fat percentage was significant in test rabbits during the 2 nd and 5th days post infection and treatment ($P < 0.05$). The data of normal control rabbits agreed with those ***Bennette (1986)*** , ***Reo et al. (1978) and Mohamed (1989)*** who mentioned that the protein percentage was 20 % , moisture 77.9 % , ether extract 2.73 % and ash 1.63 %. The difference in fat content in the muscle than the control reflected the degree of stress resulted from pasteurella infection which had great influence on meat quality.

Table (3) showed the sensory evaluation of rabbit meat which revealed a slight significant difference ($P < 0.001$) from the control rabbit meat which was always better in all tasting items. These variation could be attributed to the fact that the muscle of

animals under stress of pasteurella infection losses a considerable amount of fat which is responsible for the appearance (***Cross et al. , 1975***) , tenderness (***Dryden and Marchello , 1970 and Khalil et al. , 1972***) flavour and aroma (***Romans et al. , 1965***).

Table (4) showed that the net income in case of infected and treated rabbits could be considered of useless while in case of normal rabbit the net income was valuable.

From the result of this study , it is important to discover the disease early and carried out treatment with the most suitable antibiotic , it is also important that to control the disease before its appearance by getting off all diseased rabbits and vaccination of healthy ones. It could be recommended that treated rabbits showed be slaughtered three weeks latter to give chance for reconstitution of muscle and fat content which repair the taste , appearance tenderness and flavour of the carcass.

Table (1) **Means of slaughter data**

	2 days post treatment		5 days post treatment		8 days post treatment		11 days post treatment		18 days post treatment	
	T	C	T	C	T	C	T	C	T	C
* Living body weight Pre - infection	1578 ± 5.93	1581.6 ± 7.26	1584 ± 3.05	1581.6 ± 7.26	1585 ± 5.0	1582 ± 7.26	1553 ± 5.36	1552 ± 14.53	1562 ± 5.93	1533 ± 7.26
* Living body weight at slaughter time	1300 ± 20.21	8719 ± 2.08***	1340 ± 25.65	1783 ± 9.07***	1390 ± 16.07	1851 ± 15.27***	1453 ± 9.07	1921 ± 5.85***	1558 ± 6.88	2068.3 ± 10.90
* Carcass weight	520 ± 5.86	822 ± 3.29***	570 ± 2.91	874 ± 2.66***	612 ± 3.44	953 ± 3.77***	683 ± 7.43	1018 ± 2.53***	829 ± 5.35	1148 ± 4.16***
* Shoulder & thorax	192 ± 1.53	306 ± 4.26***	232 ± 5.36	324 ± 3.06***	233 ± 2.63	343 ± 1.73***	250 ± 2.64	367 ± 3.24***	290 ± 1.96	436 ± 3.21***
* Lions & flank	116 ± 2.95	180 ± 1.79***	110 ± 6.08	193 ± 2.07***	122 ± 3.06	219 ± 2.08***	151.4± 4.20	229 ± 2.64***	190 ± 1.14	250 ± 1.00***
* Rump & thigh	212 ± 4.75	335 ± 7.19***	228 ± 4.58	357 ± 1.85***	257 ± 5.13	391 ± 1.98***	281.6± 2.70	422 ± 1.00***	349 ± 4.07	462 ± 3.06***
* Offals	733 ± 22.48	814 ± 8.53**	718 ± 22.48	821 ± 8.40**	715 ± 10.15	802 ± 5.28***	654 ± 21.20	807 ± 12.39**	653 ± 20.05	810 ± 10.14***
* Giblet weight (Liver , Kidney and Heart)	46.8 ± 2.14	82.6 ± 1.2***	52.36 ± 0.57	89.15 ± 1.27***	59.5 ± 1.54	96.86 ± 1.64***	65.40 ± 3.12	96 ± 1.59***	75.66 ± 0.53	110.3 ± 0.66***
* Dressing %	43.6 ± 0.97	52.6 ± 0.34***	46.4 ± 0.76	54 ± 0.21***	48.3 ± 0.65	6.7 ± 0.44***	51.5 ± 0.55	57.9 ± 0.36***	58.0 ± 0.51	60.8 ± 0.70***

T = Treated
C = Control
*** = Significant at P < 0.001
* = Significant at P < 0.05
= Standard Deviation

Table (2) Chemical composition of rabbit meat.

Time of slaughter post treatment		Moisture %	Protein %	Fat %	Ash %
2 days post treatment	Experiment	75.90±0.60	20.96±0.60	1.29±0.25 **	0.90±0.22
	Control	74.40±1.47	21.20±2.20	2.80±0.54	1.70±0.62
5 days post treatment	Experiment	76.60±0.58	20.50±1.99	1.00±0.03 **	0.94±0.10
	Control	74.00±1.47	21.20±2.20	2.83±0.54	1.71±0.62
8 days post treatment	Experiment	76.60±0.54	20.41±1.40	2.14±0.62	0.70±0.25
	Control	74.10±1.47	20.40±2.20	2.89±0.54	1.80±0.62
11 days post treatment	Experiment	76.08±1.00	20.24±0.20	2.33±0.29	1.18±0.05
	Control	75.77±1.81	20.44±0.53	2.67±0.19	1.05±0.09
18 days post treatment	Experiment	75.69±0.68	20.10±0.65	2.68±0.95	1.10±0.15
	Control	75.80±1.81	20.40±0.53	2.55±0.19	1.00±0.09

± SD

*** Sig. P < 0.001

** Sig. P < 0.05

Table (3) Sensory evaluation of rabbit meat.

Time of slaughter post treatment		Appearance	Texture	Tender-ness	Flavour	Over eating quality
2 days post treatment	Experiment	5.27±0.12 ***	5.16±0.17 ***	5.33±0.17 ***	5.58±0.02 ***	5.34±0.13 ***
	Control	6.68±0.16	6.85±0.15	6.37±0.17	6.69±0.16	6.73±0.15
5 days post treatment	Experiment	6.30±0.42	6.51±0.18 *	5.43_ *	6.10±0.06	6.33±0.13
	Control	6.70±0.21	6.53±0.03	6.66±0.17	6.83±0.17	6.33±0.17
8 days post treatment	Experiment	6.73±0.09	6.33±0.18	6.53±0.14	6.43±0.26	6.63±0.18
	Control	6.83±0.17	6.37±0.19	6.52±0.09	6.50±0.00	6.73±0.12
11 days post treatment	Experiment	6.50±0.09	6.73±0.09	6.66±0.07	6.40±0.10	6.33±0.07
	Control	6.83±0.17	6.73±0.14	6.70±0.15	6.50±0.00	6.70±0.15
18 days post treatment	Experiment	6.76±0.06	6.64±0.11	6.56±0.17	6.46±0.11	6.42±0.20
	Control	6.87±0.10	6.63±0.22	6.60±0.00	6.43±0.23	6.40±0.15

± SD

*** Sig. P < 0.001

* Sig. P < 0.025

Table (4) Economic effect of Pasteurellosis in rabbits.

Items	Treated	Control
1)Price	5 X 16 = 80 L.E.	5X16 = 80 L.E.
2)Food Cost	46.7 Kg rationX0.45 L.E = 21.033 L.E.	61.58 Kg ration X 0.45 L.E. = 27.71 L.E.
3)Body Weight Loss		
a)Mortality	2 rabbits X 1.580 Kg = 3.16 Kg . 3.16 X 5 L.E.= 15.8L.E.	
b)Disease	2.5 Kg loss X 5 L.E. = 12.5 L.E.	
c)Contamination	0.563 Kg + 0.622 Kg + 0.563 Kg = 1.748 Kg X 10 L.E. = 17.48 L.E.	
4)Isolation, Sensitivity Test and Antibiotics	22 L.E.	
6)Other Costs	10 L.E.	10 L.E.
Total Costs	178.813	117.71
Total Income	18.583 Kg X 7 L.E. = 130.08	28.062 KgX7 L.E = 196.182
Net Income	130.08 - 178.813 = - 48.733 L.E.	196.182-117.71 = + 78.472 L.E.

* Includes : Farm rent , Labour , Drugs , ...etc.

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