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BIOCHEMICAL STUDIES ON RABBIT MEAT RELATED TO SOME DISEASES

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A B S T R A C T

125 rabbits were classified to 5 groups (25 of each) where the first group was considered as control .The other 4 groups were represented by diseased conditions (Abscess, Snuffles, Enteritis and Mange). The collected samples from different farms from Kalubia government were subjected to chemical examination for evaluation of their quality. The results showed marked highly significant decrease in moisture % in case of enteritis. All diseased cases were significantly decreased specially enteritis and mange in protein %. While, the results of diseased conditions appeared no significant change in fat %. There was slightly significant differences between apparently healthy rabbit meat and diseased conditions in carbohydrate %. Also, **it** was found slightly significance decrease in results of the diseased conditions rabbit meat than the apparently healthy rabbit meat in ash %.The results showed marked alteration in biochemical examination in almost of the diseased condition which render most of these conditions either unfit for human consumption in severe cases or low quality rabbit meat.

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1. INTRODUCTION

Rabbit meat consumption in Egypt is still quite low and there is an increasing concern with healthiness of diet, so rabbit meat show high nutritional quality, wholesome tasty with appreciable juiciness and tenderness. It contains high amount of protein and low amount of fat and cholesterol [1], relatively high content of poly unsaturated fatty acids [2]. Rabbit meat is mainly composed of 20-21% protein, 9.9-10.9% fat (highly unsaturated fat) and 68.5-72% moisture [3] and low in cholesterol and sodium and rich in potassium, phosphorus and magnesium [4], [5]. Rabbit meat quality can also be described by its chemical, physical and sensorial traits, which are the most critical characteristics for the final consumer [6]. Therefore, the aim of this study is to obtain data on the biochemical studies on rabbit carcasses, which can be prevented of spread of food borne pathogens and less of economic losses in the farm.

2. MATERIAL AND METHODS

2.1. Collection of samples:

25 apparently healthy rabbits and 100 of diseased rabbits were collected from different farms from Kalubia government from flocks ready to be slaughtered. The diseased condition living rabbits suffering from some conditions as abscess, snuffles, enteritis and mange, the samples were taken from the hind leg from muscles of thigh (semimembranosis and semitendenosis).

2.2. Biochemical examination:

2.2.1. Determination of moisture percentage [7]:

The technique recommended by [7] for Determination of moisture percentage was adapted. Thus, the sample was dried to constant weight, and loss in weight was reported as moisture percentage.

$$\text{Moisture \%} = \frac{\text{Weight loss x 100}}{\text{Weight of sample}}$$

2.2.2. Determination of protein percentage [8]:

The weighed samples were placed in Kjeldahl flask containing mercury oxide (catalyst) and potassium sulphate (increasing boiling point). Concentrated sulphuric acid was added, and the mixture was heated and boiled until the sample was completely digested and yielded NH^{+}_{4}.The flask was cooled, the solidified contents (including a sulphide to precipitate the mercury) was added and, the released ammonia was distilled via a condenser into a boric acid solution containing acid-base indicator. The collected ammonia was titrated with standardized hydrochloric acid. So the amount of ammonia present could be detected, and thus the amount of nitrogen can be calculated.

Crude protein = nitrogen x 6.25.

2.3. Determination of fat percentage [8]:

A weighed sample of muscle was dried at 60 °C for 72 hours. The dried sample was exactly weighed and wrapped carefully in a filter paper. Such prepared sample was used hi determination of fat %. Soxhlet flask containing 75 cc ether was placed on the electrical heater, the sample was placed in the extractor which was fixed tightly over the Soxhlet flask. Then, the condenser was fixed over the extractor. When heating occurred ether will be evaporated and raised up through the outside capillary tube to the condenser, where it was re-condensed to liquid again under the effect of water current in the condenser, and down set on the sample dissolving apart of the fat. Ether will accumulated in the extractor until siphoning occurred. Where the ether returned to the flask again with the dissolved fat. This process will be repeated until all fat in the sample will be extracted this take about 6hours. Repeat weighing the sample after drying to record the loss of weight and calculate fat %.

2.4. Determination of carbohydrate percentage [9]:

Carbohydrate % = 100% - (protein % + Fat % + Humidity % + Ash %).

2.5. Determination of ash percentage:

A weighed sample was dried at 60 °C for 72 hours. The dry sample was analyzed for determination of ash % according to [8]. In a porcelain crucible of known weight, place the known weight sample, the crucible was transferred into muffle furnace at 450 °C to free ash from carbon and inorganic matters. The process was continued for about 6 hours, then the crucible was cooled, desiccated and weighed. Repeat heating, weighing till reaching 2 equal successive weights.

Ash % = difference between crucible with ash and empty crucible.

3. RESULTS

Table (1): Statistical analytical results of moisture % in the examined samples of normal and diseased rabbit meat (n=25). S.E* = Standard error of mean

Rabbit case	Min	Max	Mean ± S.E*
Apparently healthy	70.3	73.5	72.08 ± 0.59
Abscess	71.1	72.3	71.66 ± 0.22
Snuffles	70.1	72.1	70.91 ± 0.26
Enteritis	66.1	69.2	67.33 ± 0.40
Mange	70.3	73.3	71.82 ± 0.51

Table (2): Statistical analytical results of protein % in the examined samples of normal and diseased rabbit meat (n=25).

Rabbit case	Min	Max	Mean ± S.E*
Apparently healthy	18.8	21.3	20.16 ± 0.25
Abscess	17.3	19.3	18.42 ± 0.33
Snuffles	18.5	20.0	19.10 ± 0.27
Enteritis	16.9	18.1	17.51 ± 0.32
Mange	16.5	19.0	17.74 ± 0.45

Table (3): Statistical analytical results of fat % in the examined samples of normal and diseased rabbit meat (n=25).

Rabbit case	Min	Max	Mean ± S.E*
Apparently healthy	2.7	4.9	3.95 ± 0.39
Abscess	3.9	4.3	4.14 ± 0.07
Snuffles	3.6	4.1	3.90 ± 0.08
Enteritis	2.9	3.6	3.28 ± 0.13
Mange	3.9	4.8	3.40 ± 0.16

Table (4): Statistical analytical results of carbohydrate % in examined the samples of normal and diseased rabbit meat (n=25).

Rabbit case	Min	Max	Mean ± S.E*
Apparently healthy	0.6	2.3	1.16 ± 0.31
Abscess	0.9	2.7	1.73 ± 0.40
Snuffles	1.0	3.1	2.02 ± 0.44
Enteritis	1.7	3.8	2.76 ± 0.53
Mange	1.3	3.0	2.37 ± 0.25

Table (5): Statistical analytical results of ash % in examined the samples of normal and diseased rabbit meat (n=25).

Rabbit case	Min	Max	Mean ± S.E*
Apparently healthy	2.2	4.1	3.60 ± 0.17
Abscess	2.8	3.3	3.14 ± 0.07
Snuffles	2.9	3.2	3.09 ± 0.06
Enteritis	2.2	3.5	2.87 ± 0.24
Mange	2.9	3.4	3.20 ± 0.16

4. DISCUSSION

Results summarized in table (1) indicated that the moisture % in apparently healthy rabbit meat ranged from 70.3 to 73.5 with an average 72.08 ± 0.59 %, while diseased conditions of rabbit meat were ranged from 71.1 to 72.3 with an average 71.66 ± 0.22% for abscess, 70.1 to 72.1 with an average 70.91 ± 0.26 % for snuffles, 66.1 to 69.2 with an average 67.33 ± 0.40 % for enteritis and 70.3 to 73.3 with an average 71.82 ± 0.51 % in case of mange Such values show highly significant decrease in moisture % in case of enteritis when compared with corresponding

values of meat from healthy rabbits and it is may be attributed to excessive loss of water from the body due to diarrhoea which led to variable degree of dehydration and water loss from the tissues. On the other hand slightly decrease in moisture % in case of abscess, snuffles and mange if compared with healthy rabbit meat. The obtained results of the healthy rabbits are nearly approach to those obtained by [10] and in accordance with those of [11]. From the results presented in table (2) it is evident that the Protein % of apparently healthy rabbit meat was ranged from 18.8 to 21.3 with an average of 20.16 ± 0.25 %, while in diseased conditions ranged from 17.3 to 19.3 with average of 18.42 ± 0.33 % for abscess, 18.5 to 20.0 with average 19.10 ± 0.27 % in case of snuffles, 16.9 to 18.1 with average 17.51 ± 0.32 % for enteritis and 16.5 to 19.0 with average 17.74 ± 0.45 % for mange. All diseased cases were significantly decreased specially enteritis and mange, may be attributed to the inability of the body to take nutrients through feed as a result of diarrhoea in case of enteritis, so the body directed to later on protein to overcome deficiency and produce the required energy for life. The results obtained from apparently healthy rabbits were nearly approach to those obtained by [10, 12, 11 and 13]. It is evident from table (3) that the fat % of apparently healthy rabbit meat was ranged from 2.7 to 4.9 with an average 3.95 ± 0.39 % while in diseased conditions of rabbit meat ranged from 3.9 to 4.3 with an average 4.14 ± 0.07 % for abscess, 3.6 to 4.1 with average 3.90 ± 0.08 % for snuffles, 2.9 to 3.6 with an average 3.28 ± 0.13 % for enteritis and 3.9 to 4.8 with average 3.40 ± 0.16 % for mange. From the results of diseased conditions of rabbit's meat, there was no significant change in fat % with that of apparently healthy rabbit. This was in accordance with that obtained by [14], furthermore the results recorded from apparently healthy rabbit meat were similar to that obtained by [15**,** 13] and apposite to that obtained by [14, 3**,** 15 and 16]. The achieved results given in table (4) indicated that the carbohydrate % of apparently healthy rabbit meat was ranged from 0.6 to 2.3 with mean value 1.16 ± 0.31% while in diseased conditions of rabbit meat ranged from 0.9 to 2.7 with mean value 1.73 ± 0.40% for abscess, 1.0 to 3.1 with mean value 2.02 ± 0.44 % for snuffles, 1.7 to 3.8 with mean value 2.76 ± 0.53 % for enteritis and 1.3 to 3.0 with mean value 2.37 ± 0.25% for mange. There was slightly significant difference between apparently healthy rabbit meat and diseased conditions, and this may be attributed to inability of damaged diseased liver cells to utilize all carbohydrate in process of glycolysis for production of energy [17 and 13]. The results revealed in table (5) revealed that the Ash % of apparently healthy rabbit meat was ranged from 2.2 to 4.1 with mean value 3.60 ± 0.17% while in diseased conditions of rabbit meat ranged from 2.8 to 3.3 with mean value 3.14 ± 0.07% for abscess, 2.9 to 3.2 with mean value 3.09 ± 0.06% for snuffles, 2.2 to 3.5 with mean value 2.87 ± 0.24 % for enteritis and 2.9 to 3.4 with mean value 3.20 ± 0.16 % for mange. From these results, there was found slightly significance decrease in results of the diseased conditions than the apparently healthy rabbit meat result. This could be explained by the relative decrease of minerals due to decrease proteolysis and lipolysis. The results obtained from apparently healthy rabbit meat was in accordance with that fore mentioned by [18] and nearly approach to that of [11 and 16].

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دراسات كيميائية على لحوم الأرانب وعلاقتها ببعض الحالات المرضية

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الملخص العربي

تتعرض الأرانب لكثير من الحالات المرضية التي تستوجب إعدام كلى أو جزئي للأجزاء المصابة. وقد اهتمت هذه الدراسة بتحديد مدي جودة هذه الأجزاء (المتبقية بعد الإعدام الجزئي للأجزاء المصابة) ومدي صلاحيتها للاستهلاك الآدمي ومحاولة توكيد جودة هذه الأجزاء من عدمه ومدي تأثير هذه الحالات المرضية على الجزء المتبقي من الذبيحة. لذلك تناولت هذه الدراسة فحص 125 عينة من الأرانب المعدة للاستهلاك الآدمي والتي جمعت من مزارع مختلفة من محافظة القليوبية. وقد تم تقسيم هذه العينات خمسة مجموعات منها أربعة مجموعات (كل مجموعة = 25عينة) مرضية تميز كل مجموعة منها بإصابتها بحالة مرضية (الخراريج ، الاعراض التنفسية ، الاسهال والجرب) تستوجب إعدام كلى أو جزء منها والسماح لباقي الذبيحة بالمرور للاستهلاك الآدمي العادي. كما تم مقارنة نتائج هذه المجموعات المرضية مع مجموعة خامسة (25 عينة) من ذبائح سليمة ظاهرياً لمحاولة استبيان مدي تأثير هذه الحالات المرضية على الأجزاء المتبقية من الذبيحة بعد إعدام الجزء الذي تظهر علية الأعراض المرضية. النتائج تشير الى انخفاض ملحوظة فى نسبة الرطوبة فى حالات الإسهال. كما أن نسبة البروتين تقل فى حالات الاسهال والجرب. بينما الحالات المرضية لا تتأثر عند قياس نسبة الدهن والكربوهيدرات وايضا وجد انخفاض ملحوظة فى نسبة الرماد فى كل الحالات المرضية مقارنتا بالحالات السليمة ظاهريا. مما سبق توضح نتائج التحاليل الكيمائية للحالات المرضية فى الأرانب تشير الى عم صلاحيتها للاستهلاك الأدمي او على الاقل قلة جودتها.

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