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**THE EFFECT OF SUBCLINICAL EXPERIMENTAL
INFECTION WITH HAEMONCHUS CONTORTUS
ON CHEMICAL COMPOSITION OF CARCASS
OF KARADI LAMBS**

(With One Table and 4 Figures)

By

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**تأثير الإصابة التجريبي دون السريري بديدان *Haemonchus contortus*
على التركيب الكيميائي للذبيحة الحملان الكرادي**

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أجريت هذه الدراسة لمعرفة مدى تأثير الإصابة التجريبي دون السريري لديدان *Haemonchus contortus* على التركيب الكيميائي للذبيحة... حيث تم استخدام (١٤) حملاً من أغنام سلالة الكرادي وتم إصابة (٧) حملان بجرعة (٥٠٠) يرقة / كغم من وزن الجسم الحي بيرقات الطور الثالث لديدان *H. contortus* و بقيت سبعة حملان سليمة بدون إصابة استخدمت كمجموعة ضابطة. وبعد الأسبوع الثالث عشر من الإصابة تم ذبح جميع حملان التجربة المصابة والسليمة. اجري التحليل الإحصائي بواسطة برنامج SPSS باستخدام T-test. وكانت نتائج البحث كما يلي... هناك اختلاف في نسبة البروتين لـ الفخذ، الزند الأمامي والأضلاع (٩ ، ١٠ ، ١١) بين الحملان السليمة والفروق كانت غير معنوية من الناحية الإحصائية. كما ظهرت فرق إحصائي معنوي بمستوى ($p < 0.01$) لنسبة الدهن في الأضلاع (٩ ، ١٠ ، ١١) للحملان المصابة والسليمة. قد سجل اختلاف في نسبة الدهن في الفخذ والزند الأمامي ولكن غير معنوي إحصائياً. وكانت نسبة الرطوبة في الفخذ، والأضلاع (٩ ، ١٠ ، ١١) والزند الأمامي وأعلى في الحملان المصابة مما هو في السليمة ولكن الفرق غير معنوي إحصائياً. ولوحظت نسبة الرماد في الفخذ والأضلاع (٩ ، ١٠ ، ١١) والزند الأمامي متقاربة في المجموعتين السليمة والمصابة. لقد تبين من نتائج هذه الدراسة أن هناك تأثير بسيط على التركيب الكيميائي للذبيحة عند إصابة الحملان الكرادي بطفيل *H. contortus*

SUMMARY

The present study was conducted to investigate the effect of subclinical infection with *Haemonchus contortus* on meat composition of Karadi

lambs. A total of 14 lambs were used in this study; seven lambs were infected with (500) infective larvae of *Haemonchus contortus* larvae kg⁻¹ body weight, the remained lambs were left as uninfected control group. This study continued until 13th week post-infection. Statistically analyzed by SPSS program using T-test the results indicated that there was differences in protein percentage in leg, ribs (9, 10, 11) and fore shank between the two groups (infected and control). These differences were statistically not significant. There was significant difference ($p < 0.01$) of fat percentage in ribs (9, 10, 11) area between the two groups, while there was slight difference in fat percentage in leg and fore shank areas but statistically not significant. The moisture percentage in leg, ribs (9, 10, 11) and fore shank areas of infected group was higher than the control group but this difference was statistically not significant. Ash percentage in leg, ribs (9, 10, 11) and fore shank areas was convergent of both groups. In this study it can be concluded that there was a slight effect of subclinical infection with *H. contortus* on chemical composition of Karabi lambs carcasses.

Key words: *Haemonchus contortus*, chemical composition of carcass, karadi lambs

INTRODUCTION

Haemonchus Contortus is a blood-sucking parasite that pierces the lining of the abomasum, causing blood plasma and proteins loss of the host. The pathogenic effects of *H. contortus* resulted from the inability of the host to compensate for the blood loss (Bowman and Lynn, 1999). In addition to mortality the major losses are attributed to reduced feed efficiency, slow rate of gain, poor reproduction efficiency, lowered production of wool and meat, and labor and drugs associated with control (Hartwig, 2000).

H. contortus is one of the most important parasite in Iraq because it is highly prevalent and pathogenically severe. This has been confirmed by the parasitological survey (Kadhim, 1972) and epidemiological studies (Al-Saqur *et al.*, 1984; Issa *et al.*, 1984). The sheep were subjected to various gastrointestinal nematodes infection among other ruminants livestock. The lambs were most susceptible to parasitic diseases because the innate and acquired resistance is poor. The researches showed that the lambs were most susceptible and effective to infection than adult animals (Soulsby, 1982). Early weaned lambs from infected ewes with *H. contortus* were characterized by weakness and frailness either due to their infection by worms from their dams or to

reduction of milk productivity of ewes (Donald and Waller, 1973 and Thomas and Ali, 1983).

The Karadi sheep are the most breed which are reared in Kurdistan region (north of Iraq), that are characterized by high milk, wool production and the rapid growth of lambs (Ghazal & Alsaeeh, 1980)

The aim of this study was to determine the effect of subclinical experimental infection with *H. contortus* on chemical composition of carcass of Karadi lambs.

MATERIALS and METHODS

Fourteen (5-7) month-old-Karadi-lambs obtained from native Rodeo, which were reared in a parasite-free condition, faecal samples of all lambs were examined by floatation, sedimentation and Baermann technique for assurance that were free from endoparasites. All lambs were treated with anthelmintic to remove their existing worm burdens prior to experimental infection according to weight.

The experiment was carried out in animal breeding project at the Animal Production Department/ University of Dohuk. The lambs were divided equally into two groups according to the body weight. The first group was considered as a control and remained uninfected until to the end of the study. The second group was drenched with 500 *Haemonchus contortus* larvae (L3) kg⁻¹ body weight. The third stage larvae L3 were prepared by method of Theodorides (1964). The infection continued until 13th week post-infection. Faecal samples were collected weekly direct from the rectum of each lamb and the number of worm egg count was estimated by using the modified McMaster technique (Gordon and Whitlock, 1939). At the end of the experiment, lambs were slaughtered. After 24 h chilling, the cold carcasses were dissected into commercial cuts. Muscle and adipose tissue, including subcutaneous fat for leg, fore shank and three ribs area (9, 10&11), were blended together and hashed in a small feed processor, thereafter preserved in nylon bag and freezing at (- 20 °C) until the chemical analysis execution. Meat moisture was determined by using electrical hot air - oven at 105 °C for 8 hrs until fixed weight.

Ash was determined by using Muffle furnace at 550 °C. for 6 hrs until the color of ash became whitish grey.

Protein was determined by using kjeldahl method. Crude fat was determined by mean fat extracting from dry sample by using anhydrous ethyl ether (A.O.A.C., 1980).

RESULTS

The results of subclinical effect of *H. contortus* on chemical composition of protein, fat, ash and moisture from the leg and three ribs (9, 10, 11) and fore shank area for the control and infected lambs carcasses are shown in Table (1). Protein percentage in leg, three ribs (9, 10, 11) and fore shank areas of control group was higher than that of the infected lambs as shown in Figure (1). But the difference between the two groups was not statistically significant.

Table 1: The mean of chemical composition (protein, fat, ash and moisture) from the leg and three ribs (9, 10, 11) and fore shank areas for the control and infected carcass lambs.

	Groups	Protein %	Fat %	Ash %	Moisture %
Ribs area	Control	15.712 ± 0.043	25.015* ± 0.485	0.982 ± 0.043	57.868 ± 0.653
	Infected	15.418 ± 0.331	24.442* ± 0.485	0.987 ± 0.027	58.570 ± 0.692
Leg area	Control	15.350 ± 0.414	22.250 ± 1.213	1.018 ± 0.032	60.991 ± 1.269
	Infected	15.147 ± 0.417	21.165 ± 1.418	0.997 ± 0.022	62.152 ± 1.506
Fore shank Area	Control	19.750 ± 0.601	6.691 ± 1.020	1.024 ± 0.025	72.217 ± 1.505
	Infected	19.635 ± 0.560	5.954 ± 0.828	1.014 ± 0.023	73.087 ± 1.219

* significant differences ($P < 0.01$).

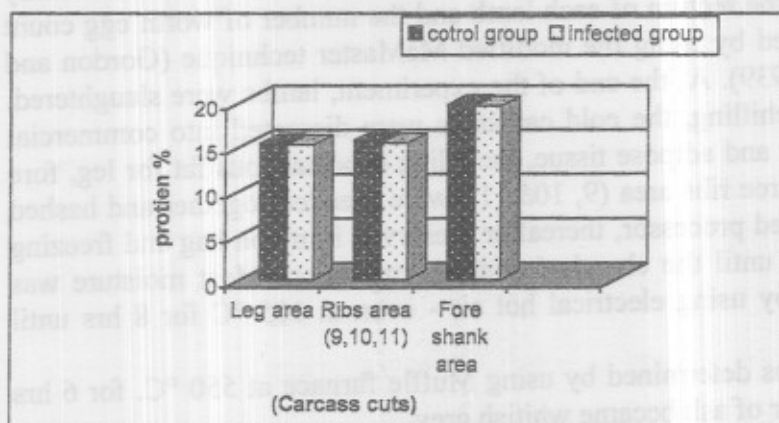


Fig. 1: Mean of protein percentage in leg, Ribs (9, 10, 11) and fore shank areas of carcasses from control and infected lambs.

Fat percentage in leg, three ribs (9, 10, 11) and fore shank areas of control and infected group are shown in Figure (2). There was significant differences ($P < 0.01$) in fat percentage between the two groups (control and infected lambs) in three ribs (9, 10, 11) area. While, there was difference in leg and fore shank areas, but statistically non significant.

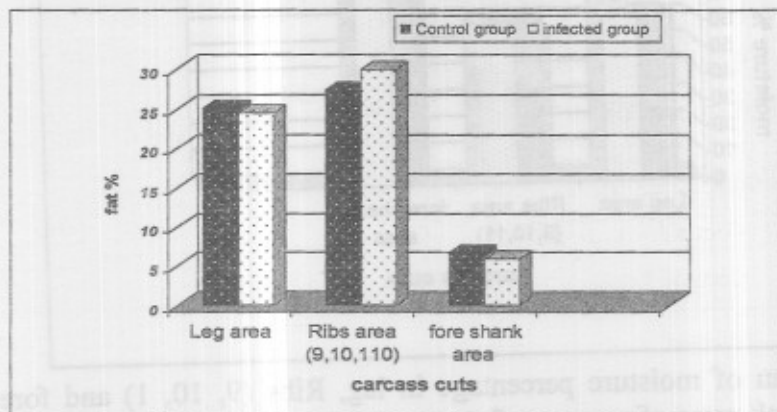


Fig. 2: Mean of fat percentage in leg, ribs (9, 10, 11) and fore shank areas of carcasses from control and infected lambs

Ash percentage in leg, three ribs (9, 10, 11) and fore shank area of control and infected group are shown in Figure (3). The ash percentage of both groups (infected and control) was convergent in leg, three ribs (9, 10, 11) and fore shank areas and there was not significant difference between the two groups.

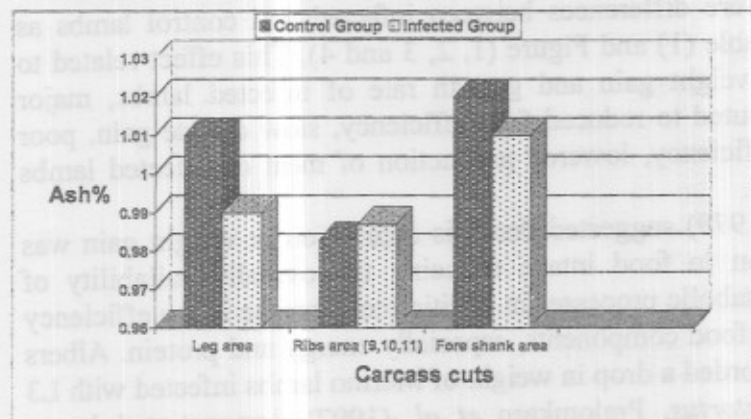


Fig. 3: Mean of ash percentage in leg, Ribs (9, 1, 11) and fore shank areas of carcasses from control and infected lambs

The moisture percentage in leg, ribs (9, 10, 11) and fore shank of infected lambs was higher than the control group as shown in Figure (4). This differences were statistically not significant.

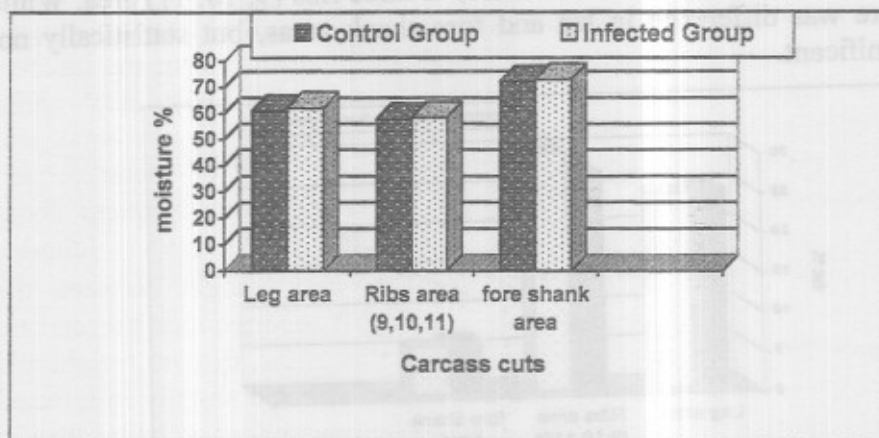


Fig. 4: Mean of moisture percentage in leg, Ribs (9, 10, 1) and fore shank areas of carcasses from control and infected lambs

DISCUSSION

There are very few workers who study the effect of gastrointestinal parasites on body composition and carcass quality as well as quantity. In the present study there was sub-clinical effect of *Haemonchus contortus* on chemical composition of the carcass, such as protein, fat, and moisture of legs, three ribs and fore shank.

There were differences between infected and control lambs as illustrated in Table (1) and Figure (1, 2, 3 and 4). This effect related to depression of weight gain and growth rate of infected lambs, major losses are attributed to reduced feed efficiency, slow of rate gain, poor reproduction efficiency, lowered production of meat of infected lambs (Hartwig, 2000).

Coop (1979) suggested that this depression in weight gain was due to reduction in food intake reducing the overall availability of nutrients for metabolic processes in addition to decrease in the efficiency of utilization of food components, especially energy and protein. Albers *et al.* (1984) recorded a drop in weight of Merino lambs infected with L3 larvae of *H. contortus*. Pralomkarn *et al.* (1997) demonstrated lower weight gain of the infected kids with *H. contortus* compared with uninfected group ($p < 0.05$).

Anorexia is a common feature to most gastrointestinal parasite disease (Asghar, 1982). The physiological changes in the alimentary tract associated with parasitism may lead to the inefficient use of available nutrients for growth, (Sykes and Coop, 1977). In addition, due to the blood sucking activities by 4th stage larvae and adult worms, when each worm removes about 0.05 ml of blood per day from the infected sheep with *H. contortus* (Urquhart *et al.*, 1996) also cause hypoproteinemia that resulting from blood losses.

Coop, *et al.* (1985) observed a reduction of mean protein depositon in the infected lambs with *Ostertagia circumcincta* about 34% - 52% in comparison with control group. Ali (1981) found a significant difference ($P < 0.01$) in the carcass weight between the infected and control lambs. Al-Jakhsi (1986) reported that the carcass quality, *Longissimus dorsi* muscle (LD), fat thickness, carcass weight and meat fat and bone ratio were observed to be affected slightly in infected groups than the control and were more obvious in Awassi breed than in Bulgarian breed. Garrize *et al.* (1987) have shown that parasitic diseases can affect the taste of meat.

Abdul-Aziz (2000) recorded a significant difference at ($P < 0.05$) in live weight at slaughter and carcass qualities between the infected and control group of Awassi lambs, while in Bulgarian breed he found a significant difference ($P < 0.05$) only in dressing percentage based on live weight and carcass weight after the chilling while the other carcass qualities were not statistically significant.

The present study revealed that the effect of subclinical infection with *H. contortus* was very slight on the ash percentage of meat in all areas (leg, ribs and fore shank) because the ash percentage is very small comparing with other composition of meat.

The moisture percentage in leg, ribs (9, 10, 11) and fore shank of infected lambs was higher than the control group. This result me be due to the increasing of protein and fat percentage in control lambs group.

The result revealed that there was slight effect of subclinical infection with *H. contortus* on Karadi lambs.

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