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THE EFFECT OF USING KEFIR AS A PROBIOTIC ON THE CARCASS CHARACTERISTICS IN MALE ARABI LAMBS

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Abstract:

Milk kefir has different physical, chemical and microbial properties, but many of the microbial species that make up kefir have probiotic functions, and it is considered a promising alternative in developing foods that contain probiotics and promote health. Sixteen Arabi male lambs weighted divided into four treatments (control, 25 ml, 50 ml and 75 ml of kefir). Body weight, carcass characteristics, and weights of the carcass cuts, including ribs, loin, thigh, tail, A physical dissection of the rib and neck, and their proportions were calculated. pieces, including fat, meat, and bone, and their percentages, was also conducted. In addition to the weight of the carcass waste. The study showed the role of kefir as a probiotic in enhancing body and carcass weight and carcass characteristics. There were significant differences ($P<0.05$) for the treatments compared to the control group in the percentage of adhesion and the weight of the hot body. The treatments also excelled significantly ($P<0.05$) in the weights of carcass pieces and their proportions. There were no significant differences in the weights of carcass waste and the weights of internal organs except heart weight in the treated groups compared with the control group.

Keywords: Arabi lambs, carcass weight, Kefir, Probiotics

INTRODUCTION

Food biotechnology and modern methods of nutrition have positive effects on the individual's health and nutritional balance. The use of beneficial bacteria that contain vital functions such as antioxidant processes, strengthening the immune system, and glycolysis in the intestine is of great importance to the individual's health (Alrosan *et al.*, 2023). Most of the bacteria used for foods containing probiotics are lactic acid bacteria, and there are several strains of yeast such as *Kluyveromyces lactis*, *Kluyveromyces marxianus*, *Pichia kluyveri*, *Pichia pastoris* and *Saccharomyces cerevisiae* (Guzel-Seydim *et al.*, 2021; Raíssa *et al.*, 2021). Given that kefir contains a group of microbial species, recent studies have developed the method associated with applying kefir to obtain new probiotic foods that have a role in promoting health (Alves *et al.*, 2021, Anna *et al.*, 2021, Onofrio *et al.*, 2016). In recent years, research has spread widely in various fields of knowledge in order to identify challenges, prospects, future trends and research implications, and to direct new studies and future research towards the importance of nutritional sciences (Kieran, 2021; Farnworth, 2005; Al Nassar, 2017).

The current study aims to demonstrate the effect of different proportions of kefir on the carcass characteristics of Arabi male lambs.

MATERIALS AND METHODS

Sixteen heads of the Arabi lambs were used aged three months and weighted 22 kg. The study was conducted at the Agricultural Research Station in Shatrah, the Dhi-Qar Agriculture Directorate. The lambs were placed in partially closed cages of the same size, equipped with plastic feeders. They were fed a diet that included 3% of their body weight. Fodder was provided to all lambs continuously during the trial period to meet their nutrients needs. The lambs were also randomly distributed into four equal groups (4 lambs/group) after measuring their initial weight. The nutritional groups included control (no kefir supplement), or adding kefir 25, 50, 75 ml for the second, third and fourth group.

Mix a group of kefir grains with an amount of skim milk at a ratio of 1:100 by adding 10 grams of kefir grains to one liter of milk, then leave the mixture at room temperature (25 degrees Celsius), then filter the mixture after 24 hours remove the kefir grains using a plastic sieve for the purpose of using them again in the production of kefir milk.

The animals were inspected and followed in the field throughout the research period, which lasted 3 months. After that, all experimental animals were slaughtered simultaneously, and the area of the oculi muscle of the twelfth rib at

the cut between the twelfth and thirteenth ribs was calculated according to what was mentioned by (Rouse *et al*., 1970; Yateem *et al*., 2022). The eye muscle area was measured after drawing it on graph paper with a pencil, then its area was calculated using an area measuring device. The thickness of the fat above the twelfth rib was measured by taking an average of four readings using a caliper. Carcass cuts included thighs, lumbar, ribs, shoulders and secondary parts, neck and chest.

Statistical analysis was performed according to a completely randomized design. The means were compared using the Duncan's multiple test at the 5% probability level for the importance of the means for the studied traits using the statistical program SPSS (SPSS, version 26, 2019).

RESULTS AND DISCUSSION

Carcass Weight And Dressing Percentage

Table (1) showed significant differences (P<0.05) in hot carcass weight and dressing percentage for the two treatments to which 75 ml of kefir was added (14.63 kg and 46.23%, respectively) and the treatment to which 50 ml of kefir was added (13.94 kg and 45.12% respectively) compared to the control group (11.51 kg, 44.87%, respectively). The reason for this may be due to the ability of microorganisms in bio stimulation to improve digestion coefficients and increase the readiness of feed nutrients, thus increasing the efficiency of feed conversion ratio and providing opportunities for nutrients absorption by improving the health condition of the digestive system (Smirnov et al., 2005; Raissa et al., 2021).

Table (1). The weight of hot carcass (kg) and dressing percentage (%) ± (SD) of male Arabi lambs supplemented with different level of kefir

Item	control	Kefir		
		25 ml	50 ml	75 ml
Hot carcass weight	11.51±0.51c	13.35±0.33b	13.94±0.43a	14.63±0.23 a
Dressing %	44.87±0.35b	45.93±0.32b	45.12±0.33a	46.23±0.39a

- **Means in rows with different letter differ significantly at 0.05 level.**

Carcass cuts weight

The mean thigh weight of lambs supplemented with 75 ml kefir recorded 5215 gm was significantly superior (P<0.05) to all treatments (Table, 2). The third treatment was significantly superior (P<0.05) to the control group (4211, 4821 and 3931gm) respectively. Table (2) also showed significant differences (P<0.05) in the weight of the ribs, where the two treatments with 75 ml and 50 ml kefir reached 2250 and 1937 gm, respectively, compared to the control group (1650 g). This can be due to the effect of the bio-stimulant on the breakdown of cellulose and hemicellulose and their use as an energy source by rumen microorganisms, which increases the use of available nutrients for growth (Durand and Fonty, 2001).

Table (2). Weights of major and minor carcass cuts (g) ± SD of male Arabi lambs supplemented with different level of kefir

Cut	control	Kefir 25 ml	Kefir 50 ml	Kefir 75 ml
Ribs	1650±25.33 c	1811±22.12b	1937±21.11a	2250±20.13a
Loin	1183±21.71	1352±11.35	1348±12.17	1321±17.11
Thigh	3931±27.18c	4821±25.12b	4211±21.14b	5215±11.25a
Shoulder	2872±11.75	3930±21.55	3851±22.11	3912±23.25
Neck	677±12.11	725±13.57	712±12.58	931±35.12
Tail	831.2±15.22	853.1±17.11	921.22±18.12	1032±15.22

- **Means in rows with different letter differ significantly at 0.05 level.**

Carcass cuts proportion

Table (3) showed that there are no significant differences in the carcass cut ratios of different treatments compared to the control group. At the same time, Table (4) showed that there were no significant differences in the weight of of meat, fat and bone of the rib pieces. Wherase, the same table showed that there were significant (P<0.05) differences in the proportions of meat and fat of this cut. The group supplemented with 75 ml kefir (54.73% and 35.98%, respectively) exceeded those of other groups. The reason for this increase in the percentage of meat in the rib cut can be attributed to the role of the synergistic action of microorganisms, which led to improving the microbial balance of the organisms in the intestine and improving the characteristics of the carcass by increasing the meat content. It also had a major role in improving the health condition and growth of the animal. Which is represented by increasing feed consumption and increasing digestion and metabolism and thus the readiness of nutrients through the production of microorganisms to digest and analyze enzymes, especially cellular and complex carbohydrates, thus increasing the readiness of nutrients in light of their production of various

substances such as proteins, vitamins and minerals, which affects the amount of meat produced and the growth of the animal. These results were consistent with (Kieran et al., 2021

Table (3). Ribs, shoulder and neck ratio % of Arabi male lambs ± SD supplemented with different levels of kefir

Item	control	Kefir 25 ml	Kefir 50 ml	Kefir 75 ml
Ribs%	14.08±0.25	14.61±0.31	14.93±0.21	15.45±0.23
Loin%	10.61±1.08	10.91±1.00	10.39±2.03	10.42±1.12
Thigh%	35.27±0.38	30.83±0.12	32.46±0.34	33.27±1.05
Shoulder%	25.77±1.22	31.71±2.88	29.68±2.14	26.93±1.93
Neck%	6.07±1.28	5.04±2.15	5.48±2.03	6.55±2.11
Tail%	7.45±1.22	6.88±2.83	7.03±2.18	7.35±1.05

Table (4). Weights and percentages of meat, fat and bone of rib cut of Arabi male lambs ± SD supplemented with different levels of kefir

physical separation	control	Kefir 25 ml	Kefir 50 ml	Kefir 75 ml
Meat (gm)	748±0.12	831±0.75	894±0.61	976±0.15
Fat (gm)	551±0.81	612±0.54	581±0.65	705±0.72
Bone (gm)	350±0.12	365±0.57	462±0.77	375±0.52
Meat%	45.3±1.23c	45.8±1.75c	46.15±1.38b	54.73±1.45a
Fat%	33.3±1.47b	33,7±1.87b	29.99±1.23b	35.98±1.38a
Bone%	21.1±0.34	20.25±1.62	23.85±1.98	19.15±0.12

Weight of internal organs

Table (5) showed that there were no statistically significant differences in the weights of internal organs except for the weight of the heart muscle, as the third treatment (50 ml kefir) and the fourth treatment (75 ml kefir) (247 g) and (249 g) respectively showed significant differences ($p< 0.05$) compared to the second treatment and the control group (258 and 197 g) respectively. The superiority of the coefficients is due to the role played by microorganisms added to the kefir grains used in improving the efficiency of food conversion and increasing the construction of various tissues (Mehania, 2007). These results were consistent with what was reported by Ali (2014).

Table (5). Mean of internal organs (gm) of Arabi male lambs. ± SD supplemented with different levels of kefir

Internal organs	control	Kefir 25 ml	Kefir 50 ml	Kefir 75 ml
Liver weight	338.7±52.3	422.5±62.1	441.2±52.2	409.2±46.31
Heart weight	197±18.3b	258±17.15a	247±31.2a	249±12.7a
Kidney's weight	75.13±2.21	86.22±3.15	77,11±7.14	85.31±6.10
Testicles weight	187.7±37.1	190.5±15.11	204.5±34.7	207.2±28.1
Lung's weight	487±11.5	412±72.3	445±51.2	419±37.5
Spleen weight	87.2±121	83.5±214	85.7±185	90.31±133
Full viscera weight	5421±822	5751±712	5912±712	6022±851

Weight of offal

Table (6) showed that there were no statistically significant differences in the weights of the carcass offal, including the head, legs, and skin, while there appeared to be mathematical differences between the treatments. The fourth treatment (75% kefir) recorded the highest values (5488 gm), followed by the third treatment. (50% kefir) and the second (25% kefir), and the control group (4971, 4722 and 4527 gm) respectively. These results were consistent with what was stated by Ali (2014) when adding yeast as a probiotic to the feed.

Table (6) The mean of carcass offal weights of Arabi male lambs ± SD supplemented with different levels of kefir

carcass offal weight (gm)	control	Kefir 25 ml	Kefir 50 ml	Kefir 75 ml
Skin	4527±138.6	4722±211.3	4971±187.7	5488±143.7
Head	215.3±23.7	223.2±25.3	218.1±21.2	234.1±22.7
Legs	851.6±21.2	842.9±23.75	783.3±12.15	863±41.21

CONCLUSIONS

Based on the aforementioned findings, the addition of kefir as a bio-stimulant resulted in the highest percentage of meat being given. This suggests that kefir microorganisms have a significant impact on improving the nutritional value of the feed consumed due to increased metabolic efficiency and increased readiness. Which in turn promotes the growth of intestinal epithelial cells. These cells have a major effect on enhancing the efficiency of nutrient absorption, which raises the effectiveness of turning feed into meat, enhances the effectiveness of feed conversion, and enhances the carcass's qualities.

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