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Effect of using bentonite and vitamin C on some economic traits of local Arabian lambs

[1]Noor Zwaid Haddad Al-Saa'di , [2]Meitham K, Ali AL-Galiby

[1,2,3]Faculty of Agriculture and Marshlands, University of Thi-Qar, Iraq

Abstract:

The current study was conducted in the animal field of the College of Agriculture and Marshlands / University of Thi-Qar for the period from 6/11/2020 to 16/2/2021 to know the effect of adding different percentages of bentonite and vitamin C to the diets of male Arabized lambs, as the study included the use of (16) males Arabized lambs, and the experiment lasted for 100 days. The lambs were taken after weaning at the age of 5 months, with an average weight of (28 kg ± 1.24). The animals were randomly divided into four groups, with four lambs per group. The first group-included animals fed the basic diet. T2 animals were fed with bentonite added to the basic diet at a rate of 20 g/kg dry weight, T3 were fed with vitamin C in the form of capsules at a rate of 50 mg/kg live weight in addition to the basic diet, while T4 animals treated with 10 g bentonite/kg dry weight added to the diet + 25 mg vitamin C / kg live weight provided to the animal in the form of capsules. Hay was offered freely to all the different transaction lambs. The results were statistically analyzed using the complete random design, a significant increase ($P \leq 0.05$) was observed in the average body weight, The average daily and total weight gain of the third group animals (treated with vitamin C) compared to the control group and the other treated groups, as the average body weight increased from the start of the eighth week until the twelfth week, a non-significant increase was also observed in the amount of feed consumed and the food conversion efficiency of the T3 group compared to the control group.

I. INTRODUCTION

Animal production is considered one of the most important and oldest economic human resources, as it plays a vital role in providing the nutritional value to humans all over the world and constitutes 40% of the total agricultural production in the world Sejian *et al*(2015) Sheep are considered one of the most important main resources for livestock because they provide red meat, which fills a large part of the needs of consumers as well as being the most suitable for their desires. It also constitutes an important source of income for the population of pastoral areas in Iraq (FAO, 2003), feeding ruminants in Conventional low-input systems rely mainly on the consumption of coarse forages that are generally poor in nitrogen and rich in fiber, Kleefisch *et al(2017).* Ruminant animals are characterized by their ability to benefit from various food additives, which improve animal performance by improving the efficiency of utilization of various nutrients and prevent the risk of metabolic diseases. (Nian *et al*, 2017,Towaj and, Kuttar, 2014). On the other hand, the use of food additives is one of the important practical procedures that contribute to raising the productive efficiency of animals because of their great role in improving the health status of animals and thus increasing their growth, and among these additives, food additives such as vitamin C, which plays an important role in the formation of the skeletal system and tissues It also reduces the negative impact of stress situations, and has clear effects on the health and growth of lambs (Qasim, 2001),

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and non-food additives such as bentonite, which is characterized by several characteristics, especially adsorption, which is useful in controlling the release of ammonium ions in the rumen at a certain concentration required by the body, which leads to an increase in the efficiency of the benefit of nitrogen, especially that large analysis takes place in the rumen. The addition of bentonite to the feed intake improves rumen fermentation (Azadbakht *et al*, 2017).

II. MATERIALS AND WORKING METHODS

This study was conducted in the field of the College of Agriculture and Marshes / University of Thi-Qar for the period from 6/11/2020 to 16/2/2021. The study included (16) male lambs of the Arab race. The lambs were taken after weaning at the age of 5 months with an average weight of (28 kg ± 1.24). It was purchased from local markets and checked by the veterinarian to ensure its safety and freedom from diseases. The lambs were placed in semi-closed pens of equal size, where each group was allocated an area (4 x 4 m) and were equipped with plastic feeders and manholes for the duration of the experiment, and they were fed on a diet of 3% dry matter of the live body weight. The fodder was given on two morning meals at seven o'clock and in the evening at three o'clock, wheat straw was given freely to all the lambs of the different treatments. The veterinary care continued throughout the duration of the experiment, where the animals were dosed against intestinal and hepatic worms with ALbandazole at a rate of 10 cm3 for each animal, as well as the animals were given Lvermactine Subcutaneously to prevent external and internal parasites.

The weights of the lambs were taken every two weeks throughout the study period using a digital scale, and all treatments were fed on a concentrated diet consisting of (25% barley, 25% wheat bran, 20% flour, 20% maize, 7% soybean meal, 3% salts and vitamins) premix).The experimental transactions were as follows:

T1- (control group) 3% concentrated feed + dry filled feed (wheat hay).

T2- (Second treatment) 3% concentrated feed + dry filled feed + 20 gm of bentonite / kg of feed.

T3- (Third treatment): 3% concentrated feed + dry filled feed + 50 mg vitamin C / kg of animal weight.

T4- (4th treatment) 3% concentrated feed + dry full feed + 25 mg vitamin C / kg + 10 gm bentonite / kg feed.

The weights of the primary lambs were taken after they were left for two weeks to adapt to the conditions of the study, and their weights were recorded every two weeks until the end of the study period, by using a digital scale.

III. RESULTS AND DISCUSSION

Table No. (1) showed that there were no significant differences in body weight during the first six weeks of the study for treated animals that were fed diets different in their content of bentonite and vitamin C (control, 20 gm bentonite/kg dry matter of feed, 50 mg vitamin C/kg live weight, 10 gm bentonite / kg dry matter + 25 mg vitamin C / kg live weight). While there was a significant and clear superiority at the level of significance ($P \leq 0.05$)) for the third treatment fed 50 mg vitamin C / kg live weight, followed by the control treatment, and the fourth treatment fed 10 g bentonite / kg dry matter of the ration +25 mg vitamin C / kg did not differ. By live weight for the two treatments (the third and the spit), and the least of the treatments was the second treatment, fed on 20 gm of bentonite / kg dry weight of the ration for the period of time from the eighth week to the twelfth week. Weight gain is attributed to the improvement of the animal's health status, the increase in metabolic rates and the increase in the amount of feed intake (Chaidanya 2015, Akinmoladun *et al*, 2020)

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as a result of adding vitamin C or a mixture of vitamin C and bentonite together as a result of their synergistic action. The results of this study were in agreement with (Akinmoladun *et al*, 2020) in his study on Xhosa goats, for which water was determined by (70% and 50%) that adding vitamin C to the different treatment animals led to an increase in the weight of the animals for the vitamin group compared to the treatment animals that were determined It is watered (70% and 50%) and has no vitamin C added. by the control treatment, and the fourth treatment fed 10 g bentonite / kg dry matter of the ration +25 mg vitamin C / kg did not differ. live weight for the two treatments (the third and the spit) and the lowest treatment was the second treatment fed on 20 gm of bentonite / kg dry weight of the ration for the time period from the eighth week to the twelfth week. Weight gain is attributed to the improvement of the animal's health status, increased metabolic rates and an increase in the amount of feed intake (Chaidanya 2015, Akinmoladun *et al*, 2020) as a result of adding vitamin C or a mixture of vitamin C and bentonite together as a result of their synergistic action. The results of this study were in agreement with (Akinmoladun *et al*, 2020) in his study on Xhosa goats, for which water was determined by (70% and 50%) that adding vitamin C to the different treatment animals led to an increase in the weight of the animals for the vitamin group compared to the treatment animals that were determined It is watered (70% and 50%) and has no vitamin C added.

Animal weights						
Week						
12	10	8	6	4	2	0
39.22±2.87a	38.27±2.85a	35.25±2.87a	32.62± 2.17	30.45±2.50	29.26±2.98	28.47± 1.25
36.05±2.04b	32.97±2.45b	30.77±2.20b	29.80± 2.39	29.25±2.27	28.72±2.91	28.87±1.7
39.37±2.69a	38.37±2.40a	34.80±2.29a	33.82±2.6	31.67±2.5	30.07±2.30	28.12± 1.51
38.15±2.00a	37.15±2.91a	35.92±2.87a	34.55± 2.38	33.17±2.69	32.30±2.37	29.60± 1.24
0.05	0.05	0.05	N.S	N.S	N.S	N.S

Table No. (1) The average body weight (kg) for the control group of animals and the nutritional groups

The averages carrying different letters vertically differ significantly at the level of significance ($P \leq 0.05$).

T1 = control group (no additions)
T2 = bentonite group (20 g/kg dry matter of feed)
T3 = Vitamin C group (50 mg / kg live weight).

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T4 = group (bentonite + vitamin C) (10 gm of bentonite / kg of feed + 25 mg of vitamin C / kg of live weight).

Daily and total weight gain:-

The weight increases of the different treatment animals differed significantly (P≤0.05) throughout the study period (Table 2), and the weight gain of the T3 treatment group and the control group was significantly superior (P≤0.05). On each of T2, T4, the reason for the daily and total weight gain of treated animals added to their diets is vitamin C or a mixture of vitamin C and bentonite due to its role in growth, as it activates the work of the thyroid gland and increases the secretion of thyroxine, which works to increase the metabolic rate in body tissues, in addition to increasing Absorption of monosaccharides and fatty acids, an increase in the metabolism of proteins and an increase in the formation of RNA, which leads to an increase in animal growth (Al-Obaidi 2012, Al-Khuzaie 2014) and an increase in the amount of feed consumed. As for animals treated with 10 gm bentonite / kg feed + 25 mg vitamin C / kg live weight, the increases The weight is due to the synergistic action between them. The results of the current study agreed with Al-Khuzai (2014), who found a significant superiority (P ≥ 0.05) in the daily and total weight gain of the treated animals to which vitamin C was added by (500 mg/kg live weight, 250 mg/kg live weight) over the rest of the other treatment animals. Daily weight gain (90, 78) g/day, and total weight gain (8.34, 7.17) kg, respectively. While these results did not agree with AL-Sudani, (2021), in its study of feeding lambs on rations containing different levels of bentonite, it showed that there is a significant superiority of the fifth treatment (P≤0.01) over the other treatments in the average daily weight gain (177 g/day) and the kidney (16 kg).

Consumable feed:-

There were no significant differences in the amount of feed consumed during the different periods of the study between groups of animals that were fed different levels of bentonite and vitamin C in their rations (Table 2). However, the animals that added 50 mg of vitamin C to their rations ate more amounts of feed compared to the rest. Treatment animals, especially the second treatment group, to which 20 gm of bentonite/kg of feed was added to their diet. The reason is that the animals were fed collectively within the same group and not individually (Al-Dubaisi 2019). The reason for the increase in the amount of feed consumed for treated animals with vitamin C added to 50 mg/kg live weight is mainly due to the role of vitamin C in increasing the secretion of thyroxine, which leads to an increase in cellular oxidation rates within tissues in order to produce heat to warm the animals (Ghanem *et al*, 2008). Especially since the current study was conducted in cold and rainy weather conditions, which led to an increase in the amount of consumed feed. As for the treatment of (10 g bentonite / kg feed + 25 mg vitamin C / kg live weight), the increase in the amount of consumed feed is due to the synergistic action between them. This study agrees with what came from the results agreed with Akinmoladun *et al*,(2020) that adding vitamin C to the treatment animals in which water consumption was determined led to an increase in the amount of dry feed intake (DMI) by their animals compared to the treatments of animals whose water was determined No vitamin C was given. And with Al-Khuza'i (2014), who confirmed a significant superiority (P≥0.05) in the amount of feed intake for the two treatments (500, 250) mg vitamin C/kg live weight, as they recorded (641, 632) gm/head daily, respectively, compared to the rest of the treatments.

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Feed conversion efficiency:

The efficiency of the feed conversion was affected by the type of food additives to the diets of different treatments animals, as the treatments (50 mg vitamin C/kg live weight, control, 10g bentonite/kg feed + 25 mg vitamin C/kg live weight) showed a significant decrease (P≥0.05)) in the conversion efficiency. Diet compared to treatment (20gm bentonite/kg feed) The best food conversion efficiency was recorded by the third treatment (50 mg vitamin C/kg live weight), while the lowest food conversion efficiency was recorded by the second treatment (20g bentonite/kg feed).

The reason for the increase in the growth rates of treated animals with added vitamin C is as a result of its role in increasing the hormone thyroxine, which works to increase the metabolic rate in the body tissues (Hayet *et al* 1967, and Al Taie 2010). The results of the current study agreed with the study of Al-Obaidi (2012) on sheep and Sivakumar *et al.*, (2010) on goats. While these results differed with Al-Dubaisi (2019), who showed that the efficiency of food conversion was affected by the type of diet, and the best food conversion efficiency was recorded by the treatment that took (2%) bentonite diet compared to the control treatment, and they also differed with Muhammad and Yassin (2018), who showed that the efficiency of food conversion It improved in the addition treatment (20gm bentonite/head/day) compared to the control treatment.

Table (2) The effect of adding different levels of bentonite and vitamin C on the average total weight gain (kg/head), daily weight gain (gm/day), feed consumed (kg) and feed conversion efficiency (kg feed/kg weight gain) for the different experimental treatments. (Standard deviation±)

feed conversion efficiency)kg fodder / kg weight gain(	Feed consumed (day/gm)	daily weight gain) Gm/ day(	total weight gain)Kg / Unit(	Transactions
8.63±1.20b	92.8	127.97±10.54a	10.75±1.64ab	T1
11.02±1.35a	87.36	94.04±12.30c	7.93±1.12c	T2
8.60±1.13b	96.76	133.93±11.63a	11.25±1.25a	T3
10.61±1.10ab	90.8	101.7±13.15b	8.55±1.31b	T4
0.05		0.05	0.05	Morale

The averages carrying different letters vertically differ significantly at the level of significance (P ≤ 0.05).

T1 = control group (without any addition).

T2 = bentonite group (20 g / kg dry matter of the feed).

T3 = Vitamin C group (50 mg / kg live weight).

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T4 = a group of 10 g bentonite / kg of feed + 25 mg of vitamin C / kg of live weight (bentonite + vitamin C).

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