A comparative Study of the Productive Traits of Drinking Thermally Stressed Awassi Ewes with Tap and Well Water before and after their magnetic treatment

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Abstract

This study was conducted in the sheep field of the Department of Animal Production-Faculty of Agriculture - University of Kirkuk for the period from 15/6/2021 to 15/9/2021. The study targeted the role of different water types in influencing some of the productive traits of ewes exposed to heat stress in the summer. 20 mature ewes were used at the age of 18 months with an average weight of 44.12 kg. The animals were divided into four groups, each group included five ewes of homogeneous weights, and randomly divided then the coefficients into groups. The 1st treatment was orally administrated with tap water, the 2nd treatment was orally administrated with well water, the 3rd treatment was orally administrated with tap water treated magnetically (1500 gauss) and the 4th treatment was orally administrated with well water treated magnetically (1500 gauss). Both magnetically treated tap and well water groups showed a significant increasing ($P \leq 0.05$) in the weight of ewes, an average weight gain, a decrease in the amount of feed intake and an improvement in the coefficient of nutritional conversion.

Key words: Awassi, well water, Thermal, Magnetize, productive

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Introduction

Sheep breeding in Iraq is one of the resources of the national economy in Iraq. Hence, it was essential to concentrate on its growth for the agricultural industry to advance. One of the most important farm animals in Iraq is the sheep, a major producer of meat that the population is increasingly demanding due to consumer knowledge of nutrition issues [1]. The rise in temperature is one of the most important challenges facing breeders and sheep farming sectors, and therefore it will be negatively reflected on meat and milk production [2]. Water is one of the most important elements for animals exposed to heat stress, as drinking water begins to increase rapidly when the ambient temperature exceeds 27°C [3]. Magnetic water is a new technology that has been used in the agricultural sector, including animal production, because of its positive impact on the health and productivity of the animal. It can be obtained by passing water through a magnetic field [4]. It will lead to a significant increase in the weight of gain of cattle, fattening calves, and sheep, and it was noted that the weight gain, fattening calves, and sheep is due to a decrease in the amount of feed consumed and an improvement in the efficiency of food conversion [5]. As shown by[6]; the use of magnetically treated water led to a decrease in the amount of feed intake by lambs and to better nutritional conversion efficiency and greater weight. Magnetically treated water continuously regenerates, regenerates. The activates cells and works to increase the solubility of ions through cell membranes, and the effect of magnetically treated water was observed in calf farms, which led to a significant increase in weight and an increase in meat tenderness, juiciness, and flavor [7].

Materials and methods

In this experiment, 20 mature ewes were used at the age of 18 monthes, with a 44.12 kg weight average. The animals were split into four groups, each of which had five ewes of uniform weight. The coefficients were then randomly divided into the following groups:

Group I (T1): Thermally stressed animals were orally administrated with tap water for the duration of the experiment.

Group II (T2): Thermally stressed animals were orally administrated with well water for the duration of the experiment.

Group III (T3): Thermally stressed animals were orally administrated with tap water magnetically treated with a power of 1500 Gauss for the duration of the experiment.

Group IV (T4): Thermally stressed animals were orally administrated with magnetically treated well water with an intensity of 1500 Gauss for the duration of the experiment.

The device for generating magnetically treated water was prepared by Rafidain magnetic technologies company after it was examined and its intensity of 1500 Gauss was confirmed by a gauss meter dedicated to measuring the magnetic field strength. The water was treated magnetically twice daily to fill the drinking basins in the morning and the evening. The process is done by slightly opening the water tap to make the water flow gradually to give the greatest opportunity to influence the water with the magnetic field, and the water is treated magnetically as a result, keeping in mind that the period during which the water remains magnetized lasts for twelve hours, after which it gradually loses its magnetic property. With an average weight of 44.12 kg and distribution into the four groups at random, every animal was subjected to a v veterinarian's regimen throughout the trial, including medication and immunization. The group feeding system was followed under inhomogeneous environmental and administrative conditions for each group during the experiment period, where concentrated feed was provided based on 2% of live weight and two meals: a morning meal at 8:30 and an evening meal at 4:30 pm, with the continuous provision of coarse

feed for all ewes. The feed was given to the animals in the form of two daily meals (one in the morning and one in the evening), and the amount of concentrated feed was changed each month by the animals' weight increase. During the research, ewes also had access to mineral salt molds. The complete randomization design (CRD) one-way complete randomization design was utilized for the statistical analysis of the experiment's data, and used Duncan's polynomial test to determine the significance of any variations between the coefficients [8], Duncan's multiple range test. The ready-made statistical analysis program SAS (2001) was used to analyze the data according to the following mathematical model:

$Y_{ij} = \mu + S_i + e_{ij}$

Where represents:

Y_{ij} the viewing value of the studied attribute

μ Overall average

S_i the effect of magnetic treatment of water on the studied qualities

E_{ij} the experimental error that is distributed naturally and randomly

Results

Sheep weights

The results of the statistical analysis in table 1 indicated that there was no significant difference between the four treatments at the first draw before the start of the treatment. While the treatments of the third group recorded the highest significant value ($P\leq0.05$) compared to the other treatments. between the treatments for the body weight trait in the 3rd month, where T4 recorded the highest significant weight for ewes, including magnetized well water at 1500 Gauss compared to other groups.

Table 1: Influenceof Water types on average sheep weights (kg)

Withdrawals	Treatments			
	T1	T2	T3	T4
Before starting the treatments	43.40±1.26a	44.76±1.58a	43.40±1.38a	44.92±2.65a
1st draw	46.00±1.19a	46.82±1.41a	46.82±1.58a	47.52±1.32a
2nd draw	48.50±1.24a	48.94±1.08a	49.86±1.67a	50.38±1.43a
3rd draw	51.10±1.44b	52.81±0.86b	53.80±1.46b	56.34±1.39a
Total period	47.25±1.23a	48.33±1.23a	48.47±1.51a	49. 79±1.30a

Mean ± standard error

T1: Tap water without treatment. T2: Well water without treatment. T3: Magnetic tap water (1500 Gauss). T4: Magnetic well water (1500 Gauss).

Different characters in the same row indicate significant differences at the probability level ($P\leq0.05$).

Average weight gain

It was noted from table (2) that there were no significant differences ($P\leq0.05$) in the 1st month of the average weight increase between treatments, while T3 recorded a significant increase in the 2nd month compared to T2, and there was no significant difference between T1 and T4. As for 3rd month and the total period. T3 and T4 outperformed compared to T1 and T2, with the absence of morale in T2 and total period.

Table 2: influence of Water types on average weight gain (kg)

Withdrawals	Treatments			
	T1	T2	T3	T4
1st draw	2.60±0.48a	2,06±0.28a	2.76± 0.23a	2.60±0.51a
2nd draw	2.50±0.27ab	2.12±0.35b	3.20±0.11a	2.86±0.33ab
3rd draw	2.60± 0.40c	3.97±0.23b	4.94±0.47a	5.96±0.82a
Total period	2.57±0.34b	2.72±0.25ab	3.63±0.11a	3.81±0.49a

Mean ± standard error

T1: Tap water without treatment. T2: Well water without treatment. T3: Magnetic tap water (1500 Gauss). T4: Magnetic well water (1500 Gauss).
Different characters in the same row indicate significant differences at the probability level (P≤0.05).

The amount of feed consumed

The results of the statistical analysis in Table (3) showed the presence of a significant effect (p≤0.05) of water quality in the rates of the quantity of feed consumed, as it increased in treatments T1 and T2 in the 1st and 2nd month compared with treatments T3 and T4, while the lowest feed consumption was recorded in treatment T4 in the 3rd month and the total period.

Table 3: Influence of Water types on the average amount of feed consumed (kg/animal)

Withdrawals	Treatments			
	T1	T2	T3	T4
1st draw	35.57±0.19a	34.22±0.75a	31.96±0.44b	30.75±0.49b
2nd draw	37.69±0.74a	37.64±0.62a	34.34±0.79b	33.49±0.50b
3rd draw	39.14±0.79a	38.78±0.31a	33.40±0.53b	29.06±0.72b
Total period	37.47±0.22a	36.88±0.37a	33.23±0.41b	31.10±0.48c

Mean ± standard error
T1: Tap water without treatment. T2: Well water without treatment. T3/Magnetic tap water (1500 Gauss). T4/Magnetic well water (1500 Gauss).
Different characters in the same row indicate significant differences at the probability level (P≤0.05).

Food conversion coefficient:

The results of the statistical analysis in Table (4) showed that there were no significant differences (P≤0.05) in the coefficient of food conversion between the coefficients of the experiment in the 1st month, but in the 2nd month the lowest significant rates were observed (P≤0.05) in T2, the results showed a significant increase in T1 in Food conversion coefficient at 3rd month, and in the total period, the lowest significant rates (P≤0.05) were observed in treatments T3 and T4.

Table 4: Effect of Water Types on Nutritional Conversion Coefficient (kg/animal)

Withdrawals	Treatments			
	T1	T2	T3	T4
1st draw	15.62±2.68a	17.93±02.55a	11.81±0.90aa	14.00±0.49a
2nd draw	16.02±3.33ab	20.04±3.54a	10.76±0.23b	12.30±1.29b
3rd draw	±16.392.10a	±9.740.53a	6.76±0.76b	4.88±0.63b
Total period	15.99±1.93a	15.90±1.75a	10.21±0.26b	11.21±1.47b

Mean ± standard error
T1: Tap water without treatment. T2: Well water without treatment. T3: Magnetic tap water (1500 Gauss). T4: Magnetic well water (1500 Gauss).
Different characters in the same row indicate significant differences at the probability level (P≤0.05).

Discussion

The results of the current study agree with his findings [9]. In achieving a significant improvement in the quality of the final lamb's weights and the overall weight gain of the group, the consumption of magnetically treated water by emotional female lambs led to an increase in the productive efficiency represented by weight. As well, the results of the study were consistent with what he found [10]. In his study on male emaciated lambs, he noted the presence of a significant effect of magnetically treated water in the final lambs ' weights and the total and daily weight gain, and the scientific explanation that may be attributed to the increase due to the animal drinking magnetized water is the increased solubility of mineral salts in magnetically treated water, which makes it more willing

to penetrate cell membranes and then Take advantage of them [11].

The reason may be due to the increases that occurred in the fourth and third magnetically treated groups compared to the first and second groups. That magnetically treated water leads to an increase in the growth rate by increasing the efficiency of the blood to deliver food and oxygen to the tissues and cells of the body, which leads to an increase in intracellular construction processes and reduces the process of destruction [5]. Through many studies conducted, it has been observed that magnetic water treatment increases the vitality and activity of water biologically, improves the movement of blood and its delivery to the tissues and cells of the body, has the property of dissolving oxygen to a high degree, and the presence of the permeability of magnetically treated water helps it in the decomposition of nutrients and improves the absorption of nutrients, minerals,and water in the body. Magnetically treated water has a role in supporting the functioning of thyroid gland by increasing the activity of the pituitary gland in the secretion of thyroid stimulating hormone, which in turn works to increase the rate of secretion of the thyroxine by the thyroid gland. Which in turn leads to an increase in the metabolic rate in body tissues and organs such as the heart, liver, and skeletal muscles, increased absorption of monosaccharides and fatty acids, and increased protein metabolism in terms of helping them in the formation of RNA, as it works, and in the growth of the animal, which leads to weight gain accompanied by an increase in all body dimensions, as he explained in [12]. Pointed out, as magnetically treated water works to regrow, regenerate, and activate cells continuously and works to increase the solubility of ions through cell membranes [7]. As for the results of the amount of feed consumed shown in table 3 and the efficiency of food conversion shown in table 4, these results agreed with [6] They pointed out that the use of magnetically treated water led to a decrease in the amount of feed intake by lambs, better nutritional conversion efficiency, and greater weight. The results of the study were also consistent with what both [5]. The use of magnetic water technology in animal fields will lead to a significant increase in the weight of cattle, fattening calves, and sheep, as well as explaining that the weight gain is at the expense of a decrease in the amount of feed consumed and an improvement in the efficiency of food conversion. The results of this study are consistent with both [9, 10]، Who confirmed that the higher the intensity of magnetically treated water, the better the efficiency of food conversion. The difference between the aggregates may be because the magnetically treated water works to preserve the internal environment of the digestive system as much as possible, which leads to an increase in the effectiveness and efficiency of the microbiota inside the rumen, as the effectiveness of these biota increases when the rumen is neutral, and as a result, increasing the activity of this biota inside the rumen increases the occurrence of the fermentation process leading to increased digestion of nutrients [13, 14] .

Conclusion

The results of the study showed an increase in the weights of ewes and the average weight gain of magnetically treated water aggregates, a decrease in the amount of feed intake,and an improvement in the nutritional conversion coefficient of magnetically treated water aggregates.

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تأثير أنواع مختلفة من المياه المستخدمة للنعاج المجهدة حراريا في بعض الصفات الإنتاجية خلال موسم الصيف

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- تاريخ استلام البحث 13/07/2023 وتاريخ قبوله 2023/08/10
- البحث مستل من رسالة ماجستير للباحث الاول.

المستخلص

تم إجراء هذه الدراسة في حقل الأغنام التابع لقسم الانتاج الحيواني – كلية الزراعة – جامعة كركوك للمدة من 6/15 /2021 ولغاية 15/ 2021/9، استهدفت الدراسة دور انواع المياه في التأثير على بعض الصفات االانتاجية للنعاج العواسية المُعرضة للإجهاد الحراري في الفصل الصيف. استخدمت فيها 20 نعجة عواسية ناضجة جنسياً عند عمر سنة ونصف وبمتوسط وزن 44.12 كغم، وزعت الحيوانات الى اربع مجاميع، وشملت كل مجموعة خمسة نعاج متجانسة الأوزان، ثم قسمت المعاملات عشوائياً على المجموعات. رويت المعاملة الاولى بمياه الإسالة والمعاملة الثانية مياه الأبار والمعاملة الثالثة بمياه الإسالة معالجة مغناطيسياً بشدة (1500غاوس) والمعاملة الرابعة مياه الأبار معالجة مغناطيسياً بشدة (1500غاوس).

أظهرت النتائج الدراسة وجود ارتفاع معنوي ($P\leq0.05$) في اوزان النعاج ومتوسط الزيادة الوزنية لمجاميع المياه المعالجة مغناطيسياً، وانخفاض في كمية العلف المتناول وتحسين في معامل التحويل الغذائي لمجاميع المياه المعالجة مغناطيسياً.

الكلمات المفتاحية: مياه الآبار. مياه الممغنط. الاجهاد الحراري. الانتاجية