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Effect of Injecting Different Levels of Iron and Vitamin B_{12} on Milk Yield and Composition and Some Blood Characteristics of Awassi Ewes.

ABSTRACT

This study was conducted in Baibokhet area (8Km north of Mosul city). The study was designed to determine the effect of subcutaneous injections of iron and vitamin B_{12} on milk production and body weight and blood characteristics of Awassi ewes. using 15 Awassi ewes with an average weights 35.3±0.65 kg and age 2-4 year thier, feed relied fully on grazing, were randomly divided in to three groups, (5 ewes/group), 1st group was regard as control, while the 2nd group injected Subcutaneous in average once for every ten days for three month with Iron and vitamin B_{12} with (5.5mg/kg body weight and 5.5mg/kg body weight) respectively, The 3rd group injected with iron and vitamin B_{12} (11 mg /kg body weight and 11 mg/kg body weight) respectively. result showed treated groups with iron and vitamin B_{12} a significant effect ($P\leq0.05$) compared with control group in (Packed cell volume, red blood cell, hemoglobin concentration ,milk yield, final body weight, total gain and daily gain), Also results shows no a significant effect ($P\leq0.05$) in (glucose, triglyceride, total protein, albumin, globulin and milk fat%, milk protein%, milk lactose%, solid nonfat%) among treated groups compared with control group, In conclusion, iron and vitamin B_{12} injection in weaning lambs improved milk production, body weight and blood characters in Awassi ewes.

INTRODUCTION

The sheep are among the most ruminant animals in Iraq, with a population of 6 million animals, according to Ministry of Agriculture, (2009), minerals and vitamins should be provided for animals to avoid any deficiency in the soil and pastures. (Ronald, 2009) has been done, the researcher pointed out that all the cells in the body need iron to maintain metabolic activity and to transfer the oxygen in the hemoglobin (Hb) and myoglobin. Aregheore, *et al.*, (2007). The importance of iron is shown in its vital role in a numbers of body functions such as oxygen transport, energy production (ATP), DNA synthesis and its important role in protecting cells from oxidation processes (Youssef, 2012). As for the effect of vitamin B_{12}, the results of some studies have shown that animals suffering from vitamin deficiency in the body can cause the reduction of fertility level and drop in the lambing rate and decrease in birth weights and growth rate, and found that the lack of B_{12} weaken the functions of the immune system of the animal (Papadopoulou, *et al.*, 2013), and many studies have indicated that using of B_{12} in feeding cow's milk has improved the immune system of the body and increase the activity and performance of the animal and production (Simon, 1990; Lardinoise, *et al.*, 1994).

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Therefore, this study was designed to determine the effect of subcutaneous injections of iron and vitamin B_{12} on the blood characteristics and milk production and body weights in the ewes.

MATERIALS AND METHODS

The study was conducted in private sheep farm in the Baibokht region (8 km north of Mosul city), on 15 Awassi ewes of aged 2-4 years were randomly divided to three groups (5 ewes / group) with as average weight of 35.3±0.65 kg, Animals feed on grazing in to fully. The first group was regarded as control, Whereas the second group was injected with Iron III-hydroxide-dextran complex with a concentration of 5.5 mg / kg live weight and vitamin B_{12} at a concentration of 5.5 µg / kg live weight. The third was injected with iron 11mg / kg live weight and vitamin B_{12} 11µg / kg live weight. Subcutaneous injection was performed once every 10 days for three months. During this period, 10 ml blood samples were taken from the jugular vein. The sample was divided into two parts (3 ml/ ewe) and put in (EDTA) tubes (Jain, 1986). The PCV and RBC were estimated. Hemoglobin blood (Hb) as stated by (Schalm *et al.*, 1975). The second part of the blood (7 ml) put in glass tubes free of anticoagulant. The serum was separated using the centrifuge at 3000 cycles / minute for 15 minutes and kept under -20 C°. The biochemical standards in the blood serum were estimated using Enzymatic Colorimetric test following the instructions that recommend for a number of analyses kit tests the ready made by the French company (Biolabo) and by using Spectrophotometer for reading the color change of the solutions, the concentration of blood serum glucose and triglycerides, by method (Burtis and Ashwood, 1996). The Biuret method was used to estimate the total protein in the serum using the instructions for several prepared and manufactured kit analyzes by the French company Biolabo and using the Spectrophotometer to read the change The chromatography was calculated at a wavelength of 546nm. The albumin was calculated in the same way at 630 nm, to measure the concentration of globulin, the following equation:

Amount of globulin (g/100ml) = Total protein(g/100ml). – Albumin (g/100ml). (Bishop *et al.*, 2000**)**.

The measurement of milk yield was started is days post-lambing using the method of hand milking, by method. ICAR, (1995) and the constituents milk measured by Device Eko-Milk Analyzer where the percentage of protein and fat and the solids nonfat and lactose. every two weeks.

The flock remained under a health and protective program that involved the all the measures keeping the health states of animals during the whole experiment. The weights of the sheep were measured before the experiment and then weighed once a month during the trial period.

All the data collected were analyzed by complete random design (CRD), using the SAS statistical program (2010). Duncan's multiple range test Duncan (1955) at 5% level was used for significant differences among means. The following mathematical model was used for all traits:

$Y_{ijk} = \mu + T_i + e_{ijk}$

μ = the overall mean

T_i = The effect of the treatment, as a 1 (control), 2 (second) and 3(third).

e_{ijk} = the random error effect.

RESULTS AND DISCUSSION

Table (1) showed significant ($P \leq 0.05$) effect for subcutaneous injections of iron and vitamin B_{12} for third and second groups compared to the control group in milk yield. The highest milk yield was for third, second and control, groups (608.88, 586.66, 399.20 g / day) respectively. The results were consistent with the findings of Radostits, *et al.*, (2007), that the element of iron is an important element to maintain the productive and metabolic functions of the animal) Simon, 1990; Lardinoise, *et al.*, 1994)using of vitamin B_{12} in the feeding of milking cows improved the immune system of the body and increase in animal activity and production. As for the milk components, non-significant differences were observed among the groups treated with iron, vitamin B_{12} and control group (Table 1).

Table (1): Effect of injecting of iron and vitamin B_{12} on milk yield and compositions in Awassi ewes. (Mean ± S.E).

Trait / Groups	Milk yield (g/day)	Milk fat (%)	Milk protein (%)	Milk lactose (%)	solid non-Fat (%)
Control	0.02±399.20 b	0.26±5.34 a	0.07±4.26 a	0.11±6.25 a	0.19±11.37 a
Second Iron 5.5 mg and vitamin B_{12} 5.5 µg / kg live weight	0.07±586.66 a	0.32±5.29 a	0.09±4.25 a	0.09±6.23 a	0.33±11.33 a
Third Iron 11 mg and vitamin B_{12} 11 µg / kg live weight	0.37±608.88 a	0.25±5.15 a	0.15±4.17 a	0.22±6.12 a	0.26±11.14 a

*Means with different superscripts within each column differ significantly (P≤0.05).

Table (2) noticed significant (P≤0.05) effect for subcutaneous injections of iron and vitamin B_{12} for third and second groups compared to the control group in body weight. This result was agreed with the Carlsan *et al.*, (1961) and Ahmed *et al.*,(2019). This may be due to the role of vitamin B_{12} improving immunity system of Animal disease and this is reflected in improved feed intake and thus increases the body weight rate. As well as when giving iron thus reduces the problems of iron deficiency level as this leads to effects on health and production and this is reflected in reducing feed consumption and reflected on body weight (Aregheore *et al.*, 2007).

Table (2): Effect of injecting of iron and vitamin B_{12} on body weight (B.W) in Awassi ewes .(Mean ± S.E)

Trait / Groups	Initial B.W(kg)	Final B.W (kg)	Total B.W (kg)	B.W daily (kg)
Control	0.91±34.70 a	0.59±40.80 b	0.17±6.10 b	0.02±0.06 b
Second Iron 5.5 mg and vitamin B_{12} 5.5 µg / kg live weight	0.48±35.64 a	0.75±44.50 a	0.52±9.50 a	0.030.10 a
Third Iron 11 mg and vitamin B_{12} 11 µg / kg live weight	0.58±35.60 a	0.66±43.00 a	0.84±9.00 a	0.02±0.09 a

*Means with different superscripts within each column differ significantly (P≤0.05).

The results of table (3) revealed a significant (P≤0.05) effect in packed cell volume, number of red blood cells and hemoglobin concentration for groups treated (iron and vitamin B_{12}) compared with control group. This result was agreed with AL-jaber, (2016). He pointed out that giving 225 international units of vitamin B_{12} for ewes resulted in a significant on the control group with concentration of hemoglobin, number of red blood cells and Packed cell volume. also agreed with the Bently and Jacobs (1980) that iron is one of the most important elements in the organism and contributes more than half in the formation of hemoglobin. due to the fact that vitamin B_{12} has a role in the formation of red blood cells in all types of animals (Girard and Matte, 1999).

Table (3): Effect of injecting of iron and Vitamin B_{12} on some blood Characteristics in Awassi ewes. (Mean± S. E.).

Trait / Groups	Packed cell volume%	Reed blood cells x10^6	Hemoglobin concentration (g/100ml)
Control	0.93±26.20 b	0.70±12.16 b	0.77±8.42 b
Second Iron 5.5 mg and vitamin B_{12} 5.5 µg / kg live weight	0.23±32.00 a	0.12±18.00 a	0.98±10.58 a
Third Iron 11 mg and vitamin B_{12} 11 µg / kg live weight	0.40±34.50 a	0.20±20.45 a	0.99±15.38 a

*Means with different superscripts within each column differs significantly (P≤0.05).

Table (4) showed non-significant (P≤0.05) differences for the concentration of glucose, triglyceride, albumin, globulin and total protein among treated groups (iron and vitamin B_{12}) compared with the control group. agreed with Ahmed *et al.*, (2019) and Weiss and Wardrop, (2010) ,Changes in the total protein level plasma and its components diagnostic and prognostic evidence any change in the concentration of plasma protein is evidence of a physiological factor , (Coles, 1986).

Table (4): Effect of injecting of iron and vitamin B_{12} on some blood biochemical Characteristics in Awassi ewes. (Mean ± S.E).

Trait / Groups	Glucose (mg /100ml)	Triglyceride (mg /100ml)	Albumin (g/100ml)	Globulin (g/100ml)	total protein (g/100ml)
Control	0.41±45.18 a	0.05±99.33 a	0.11±3.74 a	0.07±3.39 a	0.09±7.13 a
Second Iron 5.5 mg and vitamin B_{12} 5.5 µg / kg live weight	0.99±52.33 a	0.99±104.44 a	0.20±3.71 a	0.40±4.19 a	0.29±7.91 a
Third Iron 11 mg and vitamin B_{12} 11 µg / kg live weight	0.09±52.91 a	0.60±104.40 a	0.16±3.89 a	0.66±4.10 a	0.44±7.86 a

*Means with different superscripts within each column differ significantly (P≤0.05).

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تأثير حقن مستويات مختلفة من الحديد وفيتامين B_{12} في انتاج وتركيب الحليب وبعض صفات الدم لدى النعاج العواسية

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المستخلص

تم اجراء هذه الدراسة في احد الحقول الاهلية لتربية الاغنام في منطقة بايبوخت 8 كم شمال مدينة الموصل بهدف معرفة تأثير حقن الحديد و فيتامين B_{12} في صفات انتاج الحليب، ووزن الجسم و بعض صفات الدم في النعاج العواسية، استخدم 15 راس من النعاج العواسية بعمر 2–4 سنوات وبمتوسط وزن 35.3± 0.65 كغم، وكانت هذه الحيوانات تعتمد الرعي في تغذيتها بشكل اساس، وقسمت الحيوانات عشوائيا الى ثلاثة مجاميع، اذ تعد المجموعة الاولى مجموعة السيطرة(المقارنة) اما المجموعة الثانية حقنت بعنصر الحديد بتركيز (5.5 ملغم/كغم وزن جسم) وفيتامين B_{12} بتركيز (5.5 مايكرو غرام/كغم وزن جسم) اما المجموعة الثالثة حقنت بعنصر الحديد بتركيز (11 ملغم/كغم وزن جسم) وفيتامين B_{12} بتركيز (11 مايكرو غرام/كغم وزن جسم) اذ حقنت تحت الجلد بمعدل مرة واحدة كل 10 ايام ولمدة ثلاثة اشهر، اظهرت النتائج وجود تفوق معنوي ($P\leq0.05$)عند المعاملة بعنصر الحديد وفيتامين B_{12} للمجموعتين الثانية والثالثة في صفات (النسبة المئوية لحجم خلايا الدم المرصوصة ،عدد كريات الدم الحمر ،تركيز هيموكلوبين الدم ،انتاج الحليب ، الوزن النهائي ،الزيادة الوزنية اليومية ، الزيادة الوزنية الكلية) مقارنة مع مجموعة السيطرة .ولم يلاحظ فرق معنوي ($P\leq0.05$) عند الحقن بعنصر الحديد وفيتامين B_{12} للمجموعتين الثانية والثالثة مقارنة بمجموعة السيطرة في تركيز كلوكوز مصل الدم ، تركيز الكليسيريدات الثلاثية، تركيز الالبومين، تركيز الكلوبيولين، تركيز البروتين الكلي، دهن الحليب، المواد الصلبة غير الدهنية بالحليب و بروتين ولاكتوز الحليب، وبشكل عام فأن تعزيز مستوى الحديد وفيتامينB_{12} ادى الى تحسن انتاج الحليب، ووزن الجسم وصفات الدم للنعاج العواسية.

الكلمات المفتاحية: النعاج العواسية، انتاج الحليب، صفات الدم، الحديد، فيتامين B_{12}.