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Effect of using different energy and protein contain in diet on some production performance characters of local brown quail breed

ABSTRACT

The study was conducted in one of the research farms in the Department of Animal Production / College of Agriculture at Tikrit University for the period from 17 /10/ 2020 to 11/1/2021 in order to determine the appropriate diets from energy and protein and impact on the production performance of the egg producing brown Japanese quail 35 days' age. the birds were categorized and divided into six treatments, each treatment contains three duplicates and each repeater contains 8 birds (6 females 2 males) raised for 12 weeks three durations for four weeks. The Experiment treatments were fed on the following diets: treatments resulting from the first treatment 2800 kcal/kg energy feed and 20% crude protein. (first treatment use (2800 kcal/kg and CP18 protein ratio), second use (2900 kcal/kg and CP20 protein ratio), third use (2700 kcal/kg and protein ratio) CP17) and treatments resulting from the second treatment 2900 kcal/kg energy feed and 22% crude protein (first use (2800 kcal/kg and CP18 protein ratio), second (2900 kcal/kg and CP20 protein ratio) third use (2700 kcal/kg and CP17 protein ratio). The results of the statistical analysis showed that there were no significant differences between the factors in the percentage of egg production, the weight of eggs, and the feed consumption rate during the total period (6-17 weeks) and significant treatments exceeded the first, third, fourth and sixth treatments compared with the fifth treatment, There was no significant difference between them and the second treatment in the egg mass and the feed conversion factor was improved during the total period of all experiment treatments by compared with fifth treatment.

INTRODUCTION

Nutrition represented about 60-70% of the total cost of mass poultry production (Ibrahim, 1987). protein and energy are the most important components of the diet affecting the growth of birds and their sources are the most expensive in it, so there concentrate in the diet increase its price, and this made researchers seek to reduce levels of protein and energy to the least extent possible while maintaining the ratio between them so as not to affect and reducing the cost of high to the extent possible (Reda ,2015)

The main factor affecting the amount of feed consumed is the level of energy in the diet and increasing its level in the diet leads to a decrease the appetite of bird and lower energy leads to increase its appetite thus increased feed consumed (Ribeiro et al. 2014).

In recent years, quail farming has taken a special place in poultry production (Al-Azzawi et al, 2013). Quail has many desirable qualities that will increase its contribution from Poultry products from animal protein essential for human nutrition (EI-Shafei et al, 2012) Characterized by early sexual maturity, short generation time period, and high production of eggs with a high content of vitamins and mineral elements important to humans, quail birds are a biological machine with high nutritional conversion efficiency (Singh, 2008), and have unique qualities in disease resistance and adaptability to various weather conditions and is an ideal experimental animal (Abu Ala, 2005).

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Therefore, the study aims to achieve the best level of energy and protein used in quail diets because there is no nutrition guide for the quail and how it affects product performance. the researchers had to find the best percentage of energy and protein in quail diets.

MATERIALS AND METHODS

This study was conducted in one of the research rooms of the Department of Animal Production in a college of Agriculture at Tikrit University for the period from 17 /10/ 2020 to 11/1/2021 to determine the appropriate diets of energy and protein on the productive and physiology performance of the layer quail bird. For 35 to 119 days.

In the age of 35 days 72 birds of each transaction were distributed to three treatments included 3 replicate for each one.

The first stage uses two hundred forty-eights were raised quail chicks with age of 7-35 days. The birds were divided into two treatments (2800 kcal/kg energy feed and 20% crude protein) and (2900 kcal/kg energy feed and 22% crude protein) each treatment contained four replicate with 31 birds per replicate during the starting stage.

In the second experiment each treatment in previse experiment divided into two groups, fed on three treatments fourth one used (2800 kcal/kg and CP18 protein ratio), fifth treatment used (2900 kcal/kg and CP20 protein ratio), sixth treatment used (2700 kcal/kg and protein ratio) CP17).

The data were statistically analysed using the complete random design (CRD) to study the effect of the coefficients on the studied traits, and the significant differences between the means were compared using Duncan's polynomial test (Duncan, 1955), and the statistical program SAS (2005).

Table (1): Components of the production diet for quail and their calculated chemical composition (119 - 35 days) Ingredients

Ingredients	Diets		
	First	Second	Third
yellow corn	44.8	52.6	46.1
Wheat	20.5	3.93	20
wheat bran	-	-	6.3
Soybean meal (48%)	20.5	27.25	14.1
*** protein concentrate**	5	5	5
Fat	0.7	2.72	-
Calcium carbonate	7	7	7
Di-Calcium Phosphate	1.2	1.2	1.2
Salt	0.3	0.3	0.3
Total	100	100	100
**** Chemical composition**			
Metabolizable energy (Kcal/kg)	2809	2900	2700
Crude protein(%)	18	20	16
Crude fiber(%)	3.14	3.28	3.39
Lysine(%)	0.92	1.07	0.79
Methionine(%)	0.38	0.41	0.36
Met.+Cys. (%)	0.66	0.72	0.62
Calcium(%)	3.14	3.15	3.13
phosphorous(%)	0.47	0.44	0.53

Calculated according to the NRC (1994)

The studied characteristics of the layer quail

Hen day egg production (H.D.P.), average egg weight, Feed consumed for mothers, Egg Mass and feed conversion factor.

Results and Discussion:

Hen day egg production (H.D.P)

Table (2) shows the effect of using different levels of energy and protein in the diet on the daily egg production (HD%), where the results showed that there were no significant differences between the treatments during the first period (6-9 weeks) and there was a significant exceeded between the experimental treatments during the second period (10-13 weeks), where the first, third, fourth and sixth treatment outperformed the fifth treatment, which was fed during the first stage (growth stage) on a diet containing 22% protein and energy of 2900 kcal/kg, and there was no significant difference between the second treatment and the remaining of the treatments. Also, there were significant differences between the treatments during the third period (14-17 weeks), where the first, second, third, fourth and sixth treatment outperformed the fifth treatment as well. And there were no significant differences between the treatments during the total period (6-17 weeks.) The absence of significant differences between the treatments may be due to the fact that the bird obtains what it needs from the energy in the diet by regulating its consumption of feed, the bird reduces the amount of feed consumed when the energy of the diet increases and vice versa .

Table (2): the effect of using different quantities of energy and protein on the average egg production percentage (H.D.P %) of quail (average ± standard error)

Treatments	Frist period 9-6 weeks	Second period 10-13weeks	Third period 14-17 weeks	Total period 6-17 weeks
H.D.P				
T1	1.95± 70.63 a	5.16 ±82.33 a	1.95 ±84.12 a	2.67 ±79.02 a
T2	61.24 1.81 ±a	5.18 ±77.37 ab	83.36 3.86± a	3.20 ±73.99 a
T3	67.81 4.48± a	2.92±86.10 a	3.96 ±83.32 a	2.34 ±79.08 a
T4	5.15 ±68.44 a	1.72± 86.50 a	3.83 ±83.12 a	2.78 ±79.36 a
T5	62.97 6.97± a	65.70 7.97±b	2.61 ±67.49b	1.23 ±65.38 a
T6	4.22 ±64.87 a	2.06 ±84.51 a	5.95 ±80.05 a	76.48 2.54 ± a

Different letters within the same column indicate significant differences between the treatments at the level of significance ($P < 0.05$). In the second experiment each treatment in previse experiment divided into two groups, resulting from the first treatment during the starting stage. 2800 kcal/kg energy feed and 20% crude protein. T1: use (ME 2800, percentage of protein CP18), T2: use (ME 2900, percentage of protein CP20), T3: use (ME 2700, percentage of protein CP17), Treatments resulting from the second treatment during the starting stage. 2900 kcal/kg energy feed and 22% crude protein T4: use (ME 2800, percentage of protein CP18) and T5: use (ME 2900, percentage of protein CP20) and T6: Use (ME 2700 and CP17 protein).

Egg weight rate

Table (3) shows that there are no significant differences between the different experimental treatments and for all experiment periods, as well as for the total productive period 6-17 weeks, which recorded the values (10.69, 10.97, 10.77, 11.08, 10.87 and 10.97) for the experiment treatments, respectively. The reason may be that the level of energy and protein (2700 kcal/kg and protein 16%) provided the essential amino acids, which led to a balance in the weight of the egg because of its Effect on the contents of the egg sufficient to obtain a good egg weight rate.

Table (3): Effect of using different quantities of energy and protein on the average weight of a quail egg (average ± standard error)

Treatments	Frist period 9-6 weeks	Second period 10-13weeks	Third period 14-17 weeks	Total period 6-17 weeks
	Egg Weight			
T1	10.10 0.13 ± a	0.10 ±10.80 a	0.18 ±11.18 a	0.07 ±10.69 a
T2	10.24 0.38± a	0.27 ±11.04 a	0.23 ±11.62 a	0.26 ±10.97 a
T3	9.79 0.14 ± a	0.19 ±10.98 a	0.20 ±11.54 a	0.16 ±10.77 a
T4	0.17 ±10.20 a	0.17 ±11.24 a	0.37 ±11.81 a	0.23 ±11.08 a
T5	10.27 0.10 ± a	11.03 0.32± a	0.40 ±11.32 a	0.22 ±10.87 a
T6	0.29 ±10.39 a	0.14 ±11.11 a	0.30 ±11.41 a	0.10 ±10.97 a

Different letters within the same column indicate significant differences between the treatments at the level of significance ($P < 0.05$). In the second experiment each treatment in previse experiment divided into two groups, resulting from the first treatment during the starting stage. 2800 kcal/kg energy feed and 20% crude protein. T1: use (ME 2800, percentage of protein CP18), T2: use (ME 2900, percentage of protein CP20), T3: use (ME 2700, percentage of protein CP17), Treatments resulting from the second treatment during the starting stage. 2900 kcal/kg energy feed and 22% crude protein T4: use (ME 2800, percentage of protein CP18) and T5: use (ME 2900, percentage of protein CP20) and T6: Use (ME 2700 and CP17 protein).

Rate feed consumption

Table (4) shows that there are significant differences in the factor of feed consumed among the treatments during the first period from 6 to 9 weeks, and the second treatment was significant ($P \leq 0.05$) exceeded on the remaining treatments that recorded values (29.69, 30.14, 28.59, 29.36 and 29. 98 and 28.77), respectively. And there were no significant differences between the treatments during the other experiment periods in addition to the total period from (6 to 17). the low level of energy and protein used in the experiment may have led to providing the bird with sufficient energy and protein needs to perform its productive activities.

Table (4): the effect of using different quantities of energy and protein on the rate of feed consumption for quail (g/day) (average ± standard error)

Treatments	Frist period 9-6 weeks	Second period 10-13weeks	Third period 14-17 weeks	Total period 6-17 weeks
	Rate feed consumption			
T1	29.69 0.36 ± ab	0.88 ±28.57 a	0.24 ±29.45 a	0.30 ± 29.24 a
T2	30.14 0.18 ± a	0.94 ±30.12 a	28.36 0.76± a	0.19 ±29.54 a
T3	28.59 0.45 ± b	0.30±29.39 a	1.32 ±28.18 a	0.62 ±28.72 a
T4	0.60 ±29.36 ab	0.33± 30.01 a	0.52 ±29.34 a	0.38 ±29.57 a
T5	29.98 0.35 ± ab	30.30 1.32 ± a	0.54 ±29.51 a	0.62 ±29.93 a
T6	0.58 ±28.77 ab	0.12 ±28.94 a	0.49 ±28.70 a	28.80 0.13 ± a

Different letters within the same column indicate significant differences between the treatments at the level of significance (P < 0.05). In the second experiment each treatment in previse experiment divided into two groups, resulting from the first treatment during the starting stage. 2800 kcal/kg energy feed and 20% crude protein. T1: use (ME 2800, percentage of protein CP18), T2: use (ME 2900, percentage of protein CP20), T3: use (ME 2700, percentage of protein CP17), Treatments resulting from the second treatment during the starting stage. 2900 kcal/kg energy feed and 22% crude protein T4: use (ME 2800, percentage of protein CP18) and T5: use (ME 2900, percentage of protein CP20) and T6: Use (ME 2700 and CP17 protein).

Egg mass/female (g)

The results in table (5) shows that there are no significant differences in the mass of eggs for the period from 6 to 9 weeks and during the second period. We note that there is a significant outnumbered (P≤0.05 third, fourth and sixth treatments compared to the fifth treatment, and there were no significant differences between them and The remaining of the experimental treatments for a period of 10 to 13 weeks, which recorded the values (8.88, 8.56, 9.47, 9.72, 7.20, and 9.39), respectively. As for the third period, second, third and fourth treatment were significant exceeded to the fifth treatment, and there was no difference between them and the remaining of the experiment treatments. Any significant difference as for the total period, the first, third, fourth and sixth treatments recorded a significant exceeded over the fifth treatment, and there was no significant difference between them and the second treatment. The reason for the existence of significant differences in the mass of eggs between the experimental treatments is because the average of this trait results from the product of multiplying the egg production rate by the egg weight rate, and thus the effect is close to the effect of the other traits.

Table (5): Effect of using different quantities of energy and protein on quail egg mass (gm of eggs/bird/day) (average ± standard error)

Treatments	Frist period 9-6 weeks	Second period 10-13weeks	Third period 14-17 weeks	Total period 6-17 weeks
	Egg mass			
T1	7.13 0.20 ± a	0.52 ±8.88 ab	0.28 ±9.40 ab	0.32 ±8.47 a
T2	6.28 0.42 ± a	0.75 ±8.56 ab	0.60 ±9.70 a	0.51 ±8.18 ab
T3	6.65 0.53 ± a	0.45 ±9.47 a	0.60 ±9.63 a	0.39 ±8.58 a
T4	0.59 ±6.99 a	0.31 ±9.72 a	0.21 ±9.79 a	0.33 ±8.83 a
T5	6.45 0.65 ± a	0.70 ±7.20 b	0.56 ±7.66 b	0.05 ±7.10 b
T6	0.68 ±6.92 a	0.11 ±9.39 a	0.90 ±9.17 ab	0.34 ±8.44 a

Different letters within the same column indicate significant differences between the treatments at the level of significance (P < 0.05). In the second experiment each treatment in previse experiment divided into two groups, resulting from the first treatment during the starting stage. 2800 kcal/kg energy feed and 20% crude protein. T1: use (ME 2800, percentage of protein CP18), T2: use (ME 2900, percentage of protein CP20), T3: use (ME 2700, percentage of protein CP17), Treatments resulting from the second treatment during the starting stage. 2900 kcal/kg energy feed and 22% crude protein T4: use (ME 2800, percentage of protein CP18) and T5: use (ME 2900, percentage of protein CP20) and T6: Use (ME 2700 and CP17 protein).

feed conversion factor

Table (6) shows that there were no significant differences in the feed conversion factor for the period from 6 to 9 weeks, which recorded the values (4.16, 4.83, 4.34, 4.27, 4.75 and 4.32) gm feed / gm eggs, respectively, and there were significant differences during The second period is 10 to 13 weeks, the first, third, fourth and sixth treatments have improved significan compared to the second and fifth treatments, while in the third period 14-17 weeks and the total period is 6-17 weeks, the first, second, third, fourth and sixth treatments have improved significan compared to the

fifth treatment, which recorded the highest Feed conversion factor (3.51, 3.79, 3.46, 3.45, 4.30 and 3.53 gm of feed / gm of eggs), respectively.

Table (6) Effect of using different quantities of energy and protein on the feed conversion factor of quail (average ± standard error)

Treatments	Frist period 9-6 weeks	Second period 10-13weeks	Third period 14-17 weeks	Total period 6-17 weeks
	feed conversion factor			
T1	4.16 0.12 ± a	0.09 ±3.22 b	0.11 ±3.13 b	0.10 ±3.51 b
T2	4.83 0.29 ± a	0.45±3.59 ab	0.15 ±2.94 b	0.26 ±3.61 b
T3	0.29 ±4.34 a	0.12 ±3.11 b	0.05 ±2.93 b	0.10 ±3.46 b
T4	0.45 ±4.27 a	0.10 ±3.09 b	0.10 ±3.00 b	0.19 ±3.45 b
T5	4.75 0.55 ± a	0.38 ±4.27 a	0.23 ±3.88 a	0.10 ±4.30 a
T6	0.43 ±4.32 a	0.02 ±3.08 b	0.40 ±3.20 b	0.14 ±3.53 b

Different letters within the same column indicate significant differences between the treatments at the level of significance ($P < 0.05$). In the second experiment each treatment in previse experiment divided into two groups, resulting from the first treatment during the starting stage. 2800 kcal/kg energy feed and 20% crude protein. T1: use (ME 2800, percentage of protein CP18), T2: use (ME 2900, percentage of protein CP20), T3: use (ME 2700, percentage of protein CP17), Treatments resulting from the second treatment during the starting stage. 2900 kcal/kg energy feed and 22% crude protein T4: use (ME 2800, percentage of protein CP18) and T5: use (ME 2900, percentage of protein CP20) and T6: Use (ME 2700 and CP17 protein).

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تأثير استخدام مستويات مختلفة من الطاقة والبروتين في الاداء الإنَتاجي لطائر السمان الياباني البني

عثمان ناجح حجاب **معد عبد الكريم البدي**

قسم الإنتاج الحيواني – كلية الزراعة – جامعة تكريت – تكريت - العراق

الخلاصة

أجريت هذه الدراسة في احدى قاعات الحقل الحيواني التابع لقسم الانتاج الحيواني في كلية الزراعة - جامعة تكريت للمدة من 2020\10\17 لغاية 2021\1\11 لتحديد العلائق المناسبة من طاقة وبروتين وتأثيرها في الاداء الانتاجي لطائر السمان الياباني البني المنتج للبيض بعمر 35 يوم . تم تجنيس الطيور وتقسيمها الى ستة معاملات كل معاملة تحتوي على ثلاث مكررات كل مكرر يحتوي على 8 طيور (6اناث 2ذكور) و ربيت لمدة 12 اسبوعاً ثلاث مدد كل مدة اربعة أسابيع . غذيت معاملات التجربة على العلائق التالية : المعاملات الناتجة من المعاملة الأولى لعليقة البادىء(2800 كيلو سعرة/كغم طاقة علف و 20٪ بروتين خام) هي (المعاملة الاولى استخدام (2800 كيلو سعرة/كغم ونسبة بروتينCP18) و الثانية استخدام (2900 كيلو سعرة/كغم ونسبة بروتينCP20) والثالثة استخدام (2700 كيلو سعرة/كغم ونسبة بروتينCP16)) والمعاملات الناتجة من المعاملة الثانية لعليقة البادىء(2900 كيلو سعرة/كغم طاقة علف و 22٪ بروتين خام) هي(الرابعة استخدام (2800 كيلو سعرة/كغم ونسبة بروتينCP18) والخامسة استخدام (2900 كيلو سعرة/كغم ونسبة بروتينCP20) والسادسة استخدام (2700 كيلو سعرة/كغم ونسبة بروتينCP16). اظهرت نتائج التحليل الإحصائي عدم وجود فروق معنوية بين المعاملات في النسبة المئوية لانتاج البيض ووزن البيض ومعدل استهلاك العلف خلال المدة الكلية (6 – 17 أسبوع) وتفوقت معنويا المعاملات الأولى ، الثالثة ، الرابعة والسادسة بالمقارنة مع المعاملة الخامسة ولم يكن هناك أي فرق معنوي بينهما وبين المعاملة الثانية في كتلة البيض وتحسن معامل التحويل الغذائي خلال المدة الكلية لجميع معاملات التجربة بالمقارنة مع المعاملة الخامسة .

الكلمات المفتاحية:
الطاقة ، البروتين ، الأداء الإنتاجي ، السمان