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# The Effect of Adding Powdered Pomegranate Peels and Ginger Tubers to The Diet of Laying Hens on Some Blood Parameters.

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**ABSTRACT**

This experiment was conducted in the fields of the Animal Production department - College of Agriculture - University of Kirkuk, from 7/24/2023 until 10/1/2023. One hundred forty laying hens, 28 weeks old, were used. The birds were randomly distributed into seven treatments. Each treatment included five replicates, with four birds per replicate. T1: control treatment. T2: control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed. T3: control diet with adding pomegranate peel powder at a concentration of 2 g/kg feed. T4: control diet with the addition of ginger tuber powder at a concentration of 1 g/kg feed. T5: control diet with the addition of ginger tuber powder at a concentration of 2 g/kg feed. T6: control diet with the addition of pomegranate peel powder at a concentration of 0.5 g/kg feed + 0.5 g/kg feed ginger tuber powder. T7: control diet with the addition of pomegranate peel powder at a concentration of 1 g/kg feed + 1 g/kg feed ginger tuber powder. At the end of the experiment, blood was withdrawn from the chicken for testing. The data was analyzed statistically using SAS, and the differences between the means were tested using the Duncan test at the probability level ($P<0.05$). The present study indicates that the use of 2 g/kg of pomegranate peel powder in the diet of the laying hens decreases the total protein and Uric acid levels in the blood. And also the effect on the AST, MDA, and GSH levels in the blood.

***Keywords*:** Layers, Pomegranate peels, ginger tubers, powdered.



## INTRODUCTION

Poultry production is one of the most pervasive industries in animal husbandry, and it is regarded as one of the fundamental and significant pillars that nations around the world rely on to ensure food security [1, 2]. Since artificial antioxidants may contain chemicals that cause cancer, there have been several attempt to use the natural dietary additives in diet of poultry [3, 4, 5, 6, and 7].

Pomegranate peels have been used because they contain natural antioxidants as well as phenolic compounds [8]. Pomegranate peels have the ability to act as antioxidants because they contain phenolic compounds and dissolved tannins in water [9]. [10] indicated that about 35% of the weight of the pomegranate fruit is made up of pomegranate peels, which are the most abundant due to their lack of use. Pomegranates have a distinguished place in folk medicine, where the sour pomegranate is used as a diuretic [11], and that the bitter taste of pomegranate peels helps in treating infections [12]. Antifungals are what distinguish ginger tubers [13], as well as containing antioxidants. It also contains phenols, alkaloids, carbohydrates, and terpenes [14].

Recent scientific research has revealed that ginger tubers possess many therapeutic properties include that it acts as antioxidants, has the ability to inhibit the formation of inflammatory compounds, and has direct anti-inflammatory effects. In addition, it is noted that ginger tubers are also effective against some types of carcinogenic diseases, regulate and control high and low blood pressure, and activate and stimulate blood circulation. It is linked to reducing heart problems and helps lower blood cholesterol [15]. The antioxidants that are naturally present in the body play a major and major role in the balance that occurs between resistance to oxidation and the production of free radicals. If there is a small amount of antioxidants that are naturally present in the body and are matched by a large amount of the free radicals produced, then what is called oxidative stress occurs, which is Its results are the destruction of genetic material, DNA, proteins, carbohydrates, and vitamins. It also works to oxidize unsaturated fatty acids in cell membranes [16]. Antioxidants work directly or indirectly to remove the effect of, destroy, and scavenge free radicals. It is possible to classify antioxidants depending on their method of activating them.

The current study aimed to determine the effect of adding powdered pomegranate peels and ginger tubers as natural antioxidants to the diet of laying hens and their effect on some blood parameters.

## Materials and methods

This experiment was conducted in the fields designated for scientific research and affiliated with the Department of Animal Production at the College of Agriculture, University of Kirkuk. It is a closed field with a solid floor containing three large pullers. The experiment period was 70 days from 7/24/2023 until 10/1/2023. The rearing system was done using a vertical cage rearing system. 140 BROWN LOHMANN laying hens, 28 weeks old, were used. The birds were randomly distributed into 7 treatments. Each treatment included five replicates, with four birds per replicate. Each battery consisted of 4 floors with one feeder on each floor, installed and separated manually. Each floor consisted of five cages. Each cage contained two chickens, and the cage dimensions were (48 x 45 x 40 cm, length, width, and height, respectively) for each cage. Water was provided continuously and freely to the bird through a system of nipples connected to water supply lines, and these lines were connected to a 1000-litre water tank. Feed was provided manually at a rate of 100 g/day according to the company's guide for this breed of laying chickens. A lighting period was 16 hours per day, with a preliminary period of 15 days before starting the experiment to prepare the birds.

Powdered pomegranate peels and powdered ginger tubers were purchased from sellers of medicinal herbs in the local market of Kirkuk Governorate. The experimental diet consisted of 2708 Kcal, and 18.37 CP.

The treatments were according to the following:

**T1:** Standard control method.

**T2:** Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed.

**T3:** Standard control diet with adding pomegranate peel powder at a concentration of 2 g/kg feed.

**T4:** Standard control diet with adding ginger tuber powder at a concentration of 1 g/kg feed.

**T5:** Standard control diet with adding ginger tuber powder at a concentration of 2 g/kg feed.

**T6:** Standard control diet with adding pomegranate peel powder at a concentration of 0.5 g/kg feed + 0.5 g/kg feed ginger tuber powder.

**T7:** Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed + 1 g/kg feed ginger tuber powder.

In the end of the experiment, blood was get from the hens. Fresh blood samples were withdrawn from the wing vein from the chicken and placed in test tubes devoid of anticoagulants and left for 6 hours, after which a centrifuge separated the serum at a speed of 3000 rpm for 15 minutes. The serum was stored at -20°C until biochemical tests were performed.

The data was analyzed statistically using (SAS) [17], and the differences between the means were tested using the Duncan test [18] at the probability level ($P<0.05$).

**Results and discussion**

The mean and standard error of total protein, total cholesterol, triglycerides, glucose, and uric acid that effected by different levels of pomegranate peel powder and ginger tubers are shown in table 1. Significant differences were found in total protein and the uric acid ($P<0.05$). The total protein was decrease significantly in treatment three (T3) that was (4.66), and the increase in treatments 4, 6, and 7 (5.56, 5.50, and 5.74) respectively. The Current results agreed with the [19] finding when he used different levels of pomegranate peel in the diet of the laying hens. And our results disagreed with [20] who used pomegranate juice in the diet of the laying hens. And found there were no significant differences between the treatments in Total protein, total cholesterol, triglycerides, and glucose.

[21] used different levels of pomegranate peel powder in the Japanese quail diet, and they found significant differences between the treatments in each of Total protein, total cholesterol, triglycerides, and glucose.

[22] used different level of pomegranate peel on the diet of laying hen and found significant differences between the treatment on the cholesterol level, and the on the Triglycerides. Moreover [23] found there was no significant differences when he used different levels of ginger on the level of cholesterol, but the ALT, and the AS

Table (1): The effect of adding pomegranate peel powder and ginger tubers to laying hens' diet on total protein, total cholesterol, triglycerides, glucose, and uric acid.

| Treatments | Blood parameters tests Birds at 40 weeks old | | | | |
|---|---|---|---|---|---|
| | Total Protein | Total cholesterol | Triglycerides | Glucose | Uric acid |
| T1 | 5.06±0.10 ab | 130.80±12.72 a | 1316.50±98.21 a | 206.60±3.65 a | 5.80±0.73 bc |
| T2 | 5.06±0.26 ab | 105.80±13.29 a | 953.80±148.97 a | 222.80±10.57 a | 5.80±1.68 bc |
| T3 | 4.66±0.16 b | 99.40±13.14 a | 939.20±154.30 a | 217.40±7.78 a | 4.40±0.40 c |
| T4 | 5.56±0.17 a | 117.80±20.95 a | 1111.40±179.73 a | 215.40±12.26 a | 7.40±1.17 b |
| T5 | 5.06±0.30 ab | 107.00±21.74 a | 1189.80±119.40 a | 201.20±8.63 a | 7.40±1.94 b |
| T6 | 5.50±0.18 a | 119.60±20.94 a | 1350.80±69.88 a | 230.00±6.42 a | 10.80±1.36 a |
| T7 | 5.74±0.26 a | 131.40±21.16 a | 1039.00±154.26 a | 277.20±62.47 a | 9.80±1.93 ab |
| Level of Sig. | * | NS | NS | NS | * |

T1: Standard control method. T2: Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed. T3: Standard control diet with adding pomegranate peel powder at a concentration of 2 g/kg feed. T4: Standard control diet with adding ginger tuber powder at a concentration of 1 g/kg feed. T5: Standard control diet with adding ginger tuber powder at a concentration of 2 g/kg feed. T6: Standard control diet with adding pomegranate peel powder at a concentration

of 0.5 g/kg feed + 0.5 g/kg feed ginger tuber powder. T7: Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed + 1 g/kg feed ginger tuber powder.

The mean and standard error of the liver enzymes (AST, and ALT) antioxidants (MDA, GSH) that effected by different levels of pomegranate peel powder and ginger tubers are shown in table 2. Significant differences were found between the treatments in AST, MDA, and GSH. The AST was decrease significantly in treatment three (T3) that was (156.00), and was increase in treatment five (T5). The MDA was decrease significantly in treatment one, and two (2.05, and 2.06) respectively, and increase in both treatment 6, and 7 (3.21, and 3.45) respectively. The GSH was increase in T1 (4.15), and decrease significantly in all the other treatments. The current results agreed with the findings of [24] when he used different levels of pomegranate peel in the diet of the laying hens. [25] used the oil seed of pomegranate, and he found significant differences among the treatments in GSH of the laying hens. [22] used different levels of pomegranate peel in the diet of laying hens and found significant differences between the treatments on the GSH. Moreover, [26] found there were significant differences when he used different levels of ginger on the level of ALT, AST and the MDA

Table (2): The effect of adding pomegranate peel powder and ginger tubers to laying hens' diet on liver enzymes (AST, ALT) and antioxidants (MDA, GSH).

| Treatments | Blood parameters tests Birds at 40 weeks old | | | |
|---|---|---|---|---|
| | AST U/L | ALT U/L | MDA µmol/L | GSH µmol/L |
| T1 | 168.80±8.72 bc | 2.82±0.50 a | 2.05±0.14 b | 4.15±0.26 a |
| T2 | 185.20±13.68 ab | 0.84±0.30 a | 2.06±0.17 b | 2.44±0.25 b |
| T3 | 156.00±35.09 c | 1.74±0.81 a | 2.95±0.48 ab | 1.70±0.37 b |
| T4 | 175.80±3.62 b | 2.40±0.99 a | 2.64±0.45 ab | 2.15±0.88 b |
| T5 | 223.00±7.60 a | 2.54±2.18 a | 3.06±0.37 ab | 1.34±0.29 b |
| T6 | 211.60±12.10 ab | 3.24±1.56 a | 3.21±0.21 a | 1.44±0.36 b |
| T7 | 189.20±6.90 ab | 1.42±0.60 a | 3.45±0.33 a | 1.35±0.32 b |
| Level of Sig. | * | NS | * | * |

T1: Standard control method. T2: Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed. T3: Standard control diet with adding pomegranate peel powder at a concentration of 2 g/kg feed. T4: Standard control diet with adding ginger tuber powder at a concentration of 1 g/kg feed. T5: Standard control diet with adding ginger tuber powder at a concentration of 2 g/kg feed. T6: Standard control diet with adding pomegranate peel powder at a concentration of 0.5 g/kg feed + 0.5 g/kg feed ginger tuber powder. T7: Standard control diet with adding pomegranate peel powder at a concentration of 1 g/kg feed + 1 g/kg feed ginger tuber powder.

**Conclusion**

The present study indicates, using of 2 g/kg of pomegranate peel powder in the diet of the laying hens decrease the total protein, and Uric acid level on the blood. And also effect on the AST, MDA, and GSH level on the blood.

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# تأثير إضافة مسحوق قشور الرمان ودرنات الزنجبيل إلى علائق الدجاج البياض في بعض صفات الدم

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الخلاصة

أجريت هذه التجربة في الحقول المخصصة للبحث العلمي والتابعة لقسم الإنتاج الحيواني في كلية الزراعة جامعة كركوك. مدة التجربة 70 يوما من 2023/7/24 حتى 2023/10/1. تم استخدام 140 دجاجة بياضة من نوع براون لوهمان بعمر 28 اسبوع. وزعت الطيور عشوائيا على 7 معاملات. تضمنت كل معاملة 5 مكررات، بواقع 4 طيور في كل مكرر. المعاملات المستخدمة كانت كالاتي: المعاملة الاولى: معاملة السيطرة، المعاملة الثانية: إضافة مسحوق قشر الرمان بتركيز 1 غرام/كغم علف، المعاملة الثالثة: إضافة مسحوق قشر الرمان بتركيز 2 غرام/كغم علف، المعاملة الرابعة: إضافة مسحوق درنات الزنجبيل بتركيز 1 غرام/كغم علف، المعاملة الخامسة: إضافة مسحوق درنات الزنجبيل بتركيز 2 غرام/كغم علف، المعاملة السادسة: إضافة مسحوق قشر الرمان بتركيز 0.5 غرام/كغم علف + 0.5 غرام/كغم علف مسحوق درنات الزنجبيل، المعاملة السابعة: إضافة مسحوق قشر الرمان بتركيز 1 غرام/كغم علف + 1 غرام/كغم علف مسحوق درنات الزنجبيل. وفي نهاية التجربة، تم سحب الدم من الدجاج و تخزين المصل عند −20 درجة مئوية حتى إجراء الاختبارات البيوكيميائية. وتم تحليل البيانات إحصائياً باستخدام ***SAS***، وتم اختبار الفروق بين المتوسطات باستخدام اختبار دنكان عند مستوى الاحتمال ***P<0.05*** . أشارت الدراسة الحالية إلى أن استخدام 2 غرام/كغم من مسحوق قشر الرمان في عليقة الدجاج البياض قد ادى الى خفض مستوى البروتين الكلي وحمض البوليك في الدم. وأيضا التأثير على مستوى ***AST*** و***MDA*** و***GSH*** في الدم

*الكلمات المفتاحية :* الدجاج البياض، قشور الرمان، درنات لزنجبيل، مسحوق.