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المرحلة الثانية / الصباحي

# Impact of supplementation pomegranate peel and Rose Mary powder to the diet of broiler chickens on performance characteristics

A research submitted to the Council of the Veterinary Department as part of obtaining a veterinary technical diploma

PREPEARED BY
Zana sader AL-Deen- Shkur Sher Dil
Halmet Abdulla

**Supervisor**
**Assistan Proff.Dr. Hassan.A.Mohammed**

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بسم الله الرحمن الرحيم

يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ

دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

صدق الله العظيم

(المجادلة جزء من آلأية ١١ )

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## Abstract

This study was conducted at the field of Shaqlawa college Research and Experiment Station, Erbil polytechnic University, for (49 days periods), to study the effect of adding different levels of pomegranate peel powder to the diet on the performance of broiler strain (308) number 60 bids which divided to four groups each of group have (15 birds per replicate). A completely randomized design with factorial arrangement 2×2×2 consisted of three levels of pomegranate peels powder levels (T1. 5%, T2. 5%, Rose Mary and T3 2.5% pomegranate peels powder+ 2.5% Rose Mary). Further group control (C) without any additive of them the feeding trial lasted 7 weeks. The results showed that most treatment were significant wit C group and have best value for live body weight and carcasses weight. live body weight profile was not significantly different in the pomegranate peel powder fed groups, whereas, compare to control, it decreased the level of .In parallel with increasing levels of pomegranate peel powder.It's important to note that while rosemary offers potential benefits, it should be used as part of a balanced diet for broiler chickens, and its inclusion should be based on appropriate dosage recommendations

to avoid any negative effects. Consulting with a poultry nutritionist or veterinarian is recommended before making significant changes to the diet of broiler chickens.

## 1. Introduction

The continuation of the use of antibiotics in poultry diets, despite their benefits However, it produced pathogenic bacterial strains that are resistant to it due to its cumulative effects on the consumer's body.

For poultry products such as eggs and meat, so it was necessary to safe means and alternatives (Suresh et al., 2018) and among those alternatives are Suresh plants intact when added to poultry diets.

Medicinal products and the chemical compounds they contain are of great benefit and importance in their physiological effect and therapeutic activity. (Ahmad et al., 2005 ; Sharma, 1992) in humans and animals without side effect or health damage.

The addition of pomegranate peel powder, which contains antioxidants, represents about 92% of the antioxidants. The oxidation present in the total fruits to the diets of chicken meat and eggs because of what they contain of active compounds such as phenols **(**Ismail et al., 2012) Also, the weight of, flavonoids, tannin compounds, alkaloids, saponins, and others 30% of the weight of the fruit, as it contains more effective compounds than the pomegranate pulp itself contains - about 26% of the peel. As a result of the compounds contained in pomegranate peels, many researchers have referred to a (Li et al., 2006) its effective potential against many pathogenic microorganisms and bacteria (AL-Noaimi et al., 2017 ; Ali et al., 2017;Atya; et al., 2018 ) and the antihelminthic and antihelminthic property and the benefits of pomegranate peel powder are not limited to its efficacy against pathogens (Sabri,2013; Dkhil, 2013).

Raising LDL from microorganisms and worms, but has a role in reducing

harmful low-density lipoproteins Lowering triglycerides and improving blood sugar (HDL) ratio of beneficial high-density lipoproteins some researchers also showed the possibility of using pomegranate peel powder as an alternative to antibiotics (Li et al., 2006; Sabri; 2013). Lifestyle and prevention or treatment of some diseases. Due to the lack of studies on adding pomegranate peels to meat chicken diets in hot climates. The current study included the addition of pomegranate peels at different rates of 5%,R.M 5% and 5 %. divided for both each one 2.5%on the standard diet and studying its effect on some productive traits and the chemical composition of the main parts of the carcass.

## 2. Literature review

### 2.1. Active compounds in pomegranate peel

The most prominent characteristic of the pomegranate plant, and rather the factor that called the attention of scientists and researchers, is its containment Bioactive functional) contains many medicinal plant compounds with beneficial health effects

The tens of which were identified and estimated in the various components of the pomegranate (juice, leaf, and peel (compounds).

The peels contain folic acid, catechin, rutin, flavonols, flavonols, flavonones, and anthocyanins.

These compounds have the ability to prevent oxidation and resist free radicals, which play the most important role in reducing

(Banerjee et al. 2013) The development of many serious diseases such as cancer and arterial blockage.

(El-Hadary and Taha ,2020; Ali, et al.,2018) indicated that the powder of

pomegranate peels contains alkaloids, saponins, and tannins Flavonoids, phenols. (Sharma,1992) they show it contains a high percentage of vitamins C of 21.5 mg / 50 g. Pomegranate peels contain tannin

It is due to the therapeutic properties of pomegranate peels, as it contains tannins, alkaloids, and other substances

There are few anti-oxidants such as phenolic compounds such as anthocyanins that hinder the oxidation of lipoproteins.

### 2.2. Effect of pomegranate peels on some productive traits of poultry

Berizi et al. (2016) showed that the addition of pomegranate peel extract to the diets of broiler breeds from one day to 42 days of age at two levels (0.05 and 0.1) g/kg had no effect (Cobb 500).

Significant on final body weight, weight gain rate, feed intake and conversion factor Also, a significant decrease was recorded in the weight of the liver, heart, and abdominal fat for the treatments added to it Pomegranate peel extract compared to a control treatment . Ahmed et al. (2015) noted that the use of pomegranate by-products at a rate of 2% in broiler diets. Meat led to a significant improvement in the characteristics of meat and fatty acids and reduced the process of fat oxidation in the meat. Hamad et al. (2019) mentioned that the addition of pomegranate peel extract to the drinking water of broiler strain between from the age of one day up to 42 days, it led to a significant improvement in the average final body weight (Ross).

Berizi et al. (2016) indicated that the rate of weekly weight gain and the food conversion coefficient, as well as reducing the percentage of mortality compared with a control parameter, Saleh et al.(2017) pointed that the addition of fermented pomegranate supplements to the diets of broilers as 2.0% led to an increase in the average daily weight gain, among

meat.

2.3. Rosemary can offer several benefits when included in the diet of broiler chickens:

1. **Antioxidant Properties**: Rosemary contains compounds like rosmarinic acid, carnosic acid, and carnosol, which have antioxidant properties. These compounds help in neutralizing harmful free radicals in the body, thereby promoting overall health and potentially reducing the risk of oxidative stress-related diseases. (Li et al., 2006).
2. **Antimicrobial Effects**: Rosemary possesses antimicrobial properties due to its essential oils, which can help in controlling the growth of harmful bacteria and fungi in the gut of broiler chickens. This can contribute to improved gut health and reduced risk of infections.
3. **Improved Digestive Health**: Including rosemary in the diet of broiler chickens may promote better digestive health. Rosemary has been shown to stimulate digestive enzyme activity and improve bile flow, which can aid in the breakdown and absorption of nutrients from feed.
4. **Anti-inflammatory Effects**: Rosemary contains anti-inflammatory compounds such as rosmarinic acid, which can help in reducing inflammation in the gastrointestinal tract. This can be beneficial for broiler chickens, as inflammation in the gut can lead to poor nutrient absorption and overall health issues.
5. **Enhanced Flavor**: Rosemary has a pleasant aroma and flavor, which can improve the palatability of feed for broiler chickens. This may encourage better feed intake and utilization, ultimately leading to improved growth performance.
6. **Natural Preservative**: Rosemary extracts can act as natural preservatives, helping to extend the shelf life of feed by inhibiting the

growth of spoilage-causing microorganisms. This can be particularly beneficial in ensuring feed quality and safety during storage.

7. **Stress Reduction**: Some studies suggest that certain compounds found in rosemary may have stress-reducing effects. Reducing stress levels in broiler chickens can have positive implications for their overall health and productivity.
8. **Potential for Meat Quality**: While more research is needed, some studies suggest that including rosemary in the diet of broiler chickens may have beneficial effects on meat quality, such as reducing lipid oxidation and improving flavor.

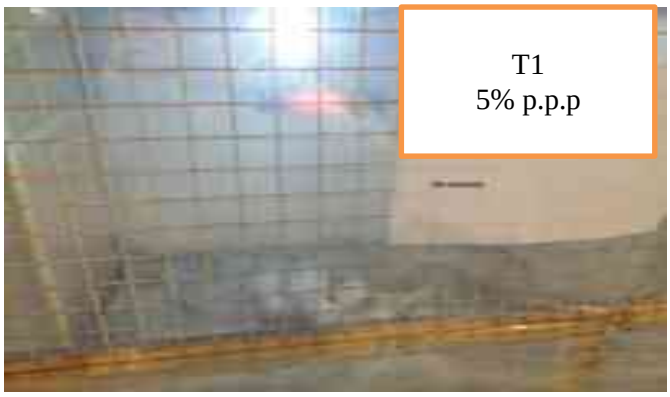
## 3. Material and Methods

**3.1. Chicks experiment**. A total of 400 chicks, one -wk.-old broiler strain (308) were divided into 4 dietary groups with four replicates per group (100 birds per 4 each of replicate 25 chicks). A completely randomized design with factorial arrangement 2×2×2 consisted of pomegranate peels powder (P.P.P.) and Ross marry (R.M) (T1. 5%(P.P.P.) ,T2. 5%, (R.M) and T3 mixed (2.5%) P.P.P and 2.5% R.M). Further group control (C) without any additive of them, the feeding trial lasted 7 weeks.

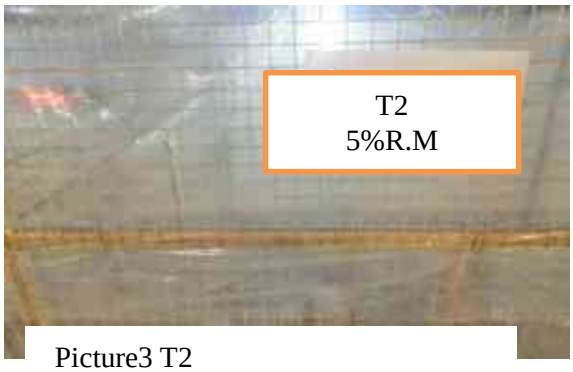
### 3.2. Housing management

Chickens are housed in the experimental hall of Shaqlawa technical college – veterinary department procedure under the same technological conditions. Viewed climatic variables must meet the criteria for the type and category of animals. Other technology systems (ventilation, lighting intensity, length of day light) (Picture. 1, 2, 3, 4)

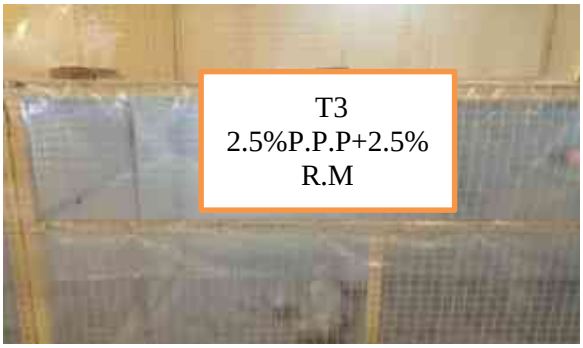

Picture one control




Picture Two T1




Picture3 T2




Picture 4T3

were implemented as recommended by the fattening technology applicable to a particular hybrid chicken included in the experiment. The trial completed at 49 days old chicken within two months of the completion of the biological tests.

Broiler chickens were kept under the Ross recommended procedure. Water and rations distributed ad libitum and uniform light provide 24 hours daily. The temperatures of the house and vaccination programmer applying are basing on broiler live breeding period raisers' recommendations.

Chickens in the course of the trial were housed on the deep litter in the same technological conditions. Microclimate indicators in the range of temperature and humidity were measured and recorded three times a day, at 7.00 am, 12.00 and 17.00 pm (Pic. 3). Measurement indicated in the zone of animals, in the

height from the floor, where the largest part of the body of animals.

### 3.3.Feed formula

### Feed formula for starter and finisher in table 1 and 2

| **Table 1: Formula of starter feed mixture** Components | | | | |
|---|---|---|---|---|
| Groups | | | | |
| % | | | | |
| Attribute | C | T1 | T2 | T3 |
| Maize | 48.50 | 48.50 | 48.50 | 48.50 |
| Soybean meal | 29.00 | 24.00 | 24.00 | 24.00 |
| Wheat | 11.5 | 11.00 | 11.00 | 11.00 |
| Fishmeal | 4.00 | 4.00 | 4.00 | 4.00 |
| Limeston($CaCo_3$) | 1.30 | 1.30 | 1.30 | 1.30 |
| monocalcum phosphate | 0.85 | 0.85 | 0.85 | 0.85 |
| *PX BR Unit | 1.00 | 1.00 | 1.00 | 1.00 |
| Methionen 99% | 0.05 | 0.05 | 0.05 | 0.05 |
| Total salt | 0.22 | 0.22 | 0.22 | 0.22 |
| lysine | 0.03 | 0.03 | 0.03 | 0.03 |
| Therionine 99 % | 0.05 | 0.05 | 0.05 | 0.05 |
| **P.P.P.** | 0 | 5 | 0 | 2.5 |
| R.M | 0 | 0 | 5 | 2.5 |
| Sunflower oil | 4 | 4 | 4 | 4 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |

| **Table 2: Formula of finisher feed mixture** Components | | | | |
|---|---|---|---|---|
| Groups | | | | |
| % | | | | |
| Attribute | C | T1 | T2 | T3 |
| Maize | 40.50 | 40.50 | 40.50 | 40.50 |
| Soybean meal | 20.0 | 20.00 | 20.00 | 20.00 |
| Wheat | 28.0 | 23.0 | 23.0 | 23.0 |
| Fishmeal | 4.00 | 4.00 | 4.00 | 4.00 |
| Limeston($CaCo_3$) | 1.30 | 1.30 | 1.30 | 1.30 |

| | | | | |
|---|---|---|---|---|
| monocalcum phosphate | 0.85 | 0.85 | 0.85 | 0.85 |
| *PX BR Unit | 1.00 | 1.00 | 1.00 | 1.00 |
| Methionen 99% | 0.05 | 0.05 | 0.05 | 0.05 |
| Total salt | 0.22 | 0.22 | 0.22 | 0.22 |
| lysine | 0.03 | 0.03 | 0.03 | 0.03 |
| Therionine 99 % | 0.05 | 0.05 | 0.05 | 0.05 |
| **P.P.P** | 0 | 5 | 0 | 2.5 |
| R.M | 0 | 0 | 5 | 2.5 |
| Sunflower oil | 4 | 4 | 4 | 4 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |

*vit. A=4,500,000 IU, vit. D=1,660,000 IU, vit. E=20,000 mg.kg-1, K3=1, mg.kg-1, vit. B1=1,800 mg.kg-1, vit. B2=2,500 mg. vit. B6=1,600 mg.kg-1, vit. B12=8.75 mg.kg-1, folic acid=600 mg.kg-calcium pentonite=5,500 mg.kg-1, niacinamid=18,000 mg.kg-1, biotin=60 mg cholin clorid=30,000 mg.kg-1, betain=65,000 mg.kg-1, cobalt=150 mg.kg-1, Iodine=380 mg.kg-1, Mn=45,800 mg.kg-1, cupper=6,500 mg.kg-1, Si=110 mg.kg-1, Zn=28,300 mg.kg-1, Fe=27,200mg.kg-1, Mo=350 mg.kg-1.

## 3.4. Experimental parameters

### 3.4.1. Body weight

Body weight was determined by weighing individual chickens overnight at age of 49 days

(picture 5) with an accuracy of ± 5 grams. Initial body weights were similar among groups, prior to diet allocation (average = 41 g/bird). P5

### 3.4.2. Daily weight gain

It was calculated in grams (g) by dividing the living body weight gained, in feeding period, by the number of the days. It was calculated on days 49.

### 3.4.3. Daily feed consumption

It was recorded at the end of the feeding periods and the daily consumption was calculated by dividing total feed consumed on the number of the days each period. It was calculated on days 49.

### 3.4.4. Feed Conversion Ratio

The chickens were inspected daily and dead birds were removed following registration of date and body weight. Feed Conversion Ratio (FCR) was calculated as the BWG (g) per FI (g). When calculating FCR, the body weights of dead birds were also considered. It was calculated on days 49.

### 3.5. Statistical analysis.

For the statistical design and data analyses, complete random design of experiment with 4 treatments was determined. Data in all experiments were subjected to ANOVA procedures appropriate for a completely randomized design and the significance of differences between the means estimated using Duncan test (Duncan's new multiple range test). Probability level of $P<0.05$ was considered for Significance in all comparisons except with chemical parameters which $P<0.01$ was considered. Values in percentage were subjected to transformation. All statistical analyses were performed using the software SPSS 23.1 for Windows® (SPSS Inc., Chicago, IL).

## 4. Result and discussion

### 4.1. Effect of different dietary treatments with different level of pomegranate peel powder and Rose Mary on performance weight (g. day-1) of birds.

Table 3 Effect of different dietary treatments with different level of p.p.p. and Rose Mary on performance weight (g. day-1) of birds.

| Treatment | Initial weight | Final weight | Weight access | Daily weight access | Feed consumption | F.C.R |
|---|---|---|---|---|---|---|
| C | 44.87± 0.85 | 3492.22±10.41a | 3447.35±9.99 a | 82.08±9.99a | 7858.41±472.29 a | 2.25±0.13a |
| T1 | 45.38± 0.75 | 2543.11.38± 11.38c | 2498.53±11.47c | 59.48±0.28c | 4707.26±348.55c | 1.85±0.13b |
| T2 | 44.82± 0.78 | 3488.40±40.59a | 3443.820± 24.75a | 81.10±0.58a | 4460.99±1028.55c | 1.28±0.30c |
| T3 | 45.05± 1.01 | 3157.10±10.10b | 3112.05±10.10b | 74.09±0.24b | 6543.06±542.79b | 2.07±0.17bc |

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

From table 3 we noticed that insignificant (P≥0.05) for initial weight because we chose similar weight from hatching manufactory. Final live body weight observed in Table 3 insignificant (P≥0.05) between C and T2 while they significant with T1 and T3, Highest value was in C. This is may be related with appitite of feed intake at starter not ability for digestion pomegranate .also similar significant fact for weight access, daily weight access abd feed consumption. For feed conservation ration (F.C.R) best value in T2 and T3, this related with mathematic equation.

### 4.2. Effect of different dietary treatments with different level of pomegranate peel powder on carcass, main and secondary parts weight

**(g. day-1) of birds.**

Table 4. Effect of different dietary treatments with different level of P.P.P and R.M on carcass, main and secondary parts weight (g. day-1) of birds.

| Treatment | Carcass without head | Breast | Thigh | leg | Wing | Back | Neck | head |
|---|---|---|---|---|---|---|---|---|
| C | 3018.47±9.63a | 1209.25±7.04b | 794.77±3.81a | 82.75±18.48b | 234.50±1.29b | 523.25±1.071a | 110.00±0.81a | 64.00±1.83b |
| T1 | 2108.90±11.90d | 557.50±5.067d | 476.50±5.80d | 140.50±1.29a | 389.00±1.83a | 452.25±2.63b | 86.00±2.16c | 122.75±2.22a |
| T2 | 2980.85±26.05b | 1362.75±25.23a | 690.50±1.29b | 134.50±1.29a | 221.13±1.31c | 451.75±2.22b | 90.98±1.83b | 124.50±1.29a |
| T3 | 2660.35±10.50c | 982.25±8.42c | 625.75±2.99c | 85.50±1.29b | 216.25±2.63d | 639.50±1.29a | 71.75±1.71d | 122.50±1.29a |

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

Table 4 observed that the fact of live body weight reflected on carcasses weight and were insignificant among treatments, highest value was clear in C because not contain pomegranate this effect of ability at starter weight . All treatments were significant (P≤0.05) for parameter of breast, higher value was in T2, this is attribute of less of fat and more of protein and moisture, for thigh higher value clear in control group which is significant with all treatments and all of them significant each other . also table pointed that insignificant (P≥0.05) for leg between T2 and T1 even they significant with other treatments, high value observed in T1.All treatments were significant for wing and neck high value were in T2, C respectively for back and head C group was significant with other groups while they are insignificant among them, this is related with reflect of carcasses weight, higher value pointed in T3, T2 respectively.

### 4.3 Effect of pomegranate peel powder and Rose Mary on carcass, with, without edible and edible parts of chicks

Table 5. Effect of P.P.P and R.M. on carcass, with, without edible and edible parts of chicks

| Treatment | Carcass with edible | Carcass without edible | Edible | liver | Heart | gizzard |
|---|---|---|---|---|---|---|
| C | 3018.47±9.63a | 2871.78±6.34a | 146.70±3.44b | 72.38±2.29b | 15.15±0.13b | 59.18±2.30a |
| T1 | 2108.90±11.90d | 1961.25±12.42d | 145.65±1.35b | 60.20±0.18c | 24.70±1.01a | 60.59±0.96a |

| | | | | | | |
|---|---|---|---|---|---|---|
| T2 | 2980.85±26.05b | 2817.10±27.14b | 163.75±1.50a | 105.25±1.26a | 25.00±2.16a | 33.50±1.29c |
| T3 | 2660.35±10.50c | 2535.50±11.70c | 124.85±4.95c | 60.10±0.18c | 24.75±4.03a | 40.00±0.82b |

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

Table 5 observed same significant for carcasses weight with and without edible this is also related with live body weight, T2 was significant and has high value for edible weight, C and T1 insignificant between them but significant with other treatment this is attribute to different parts weight, highest value found in T2 for liver and T3 which they insignificant but significant with other treatments. for heart the lowest value was in C group which is significant with other treatments are insignificant this can be attribute for increase Heart rate influence of pomegranate and T1 group insignificant for weight gizzard but significant with T2 and T3 which they significant between them.

## 5. Conclusion and Recommendation

### 5.1. Conclusion

1. Through the results that were obtained, we appreciated the use of pressed orange juice for healthy weight loss.
2. If you use pomegranate peel powder mixed with rose Mary more than the protein ratio and less than the alcohol ratio for the chest

3. It was observed that the nature of the carcass weight better in T3.

5.2. Recommendation

1. We recommend that to use pomegranate peel powder at high level because it has Role in improving the yield and quality characteristics of broiler and the nutritional characteristics on the affection contained on the canceled slice of the coin in the circumstances .
2. It is recommended to study the impact of the addition of the Romanian continent and its comparison with biological and material factors.
3. Recommendation to study the effect of adding different levels of pomegranate peel powder and rose Mary on some traits Productivity and immunity of some waterfowl such as ducks and geese

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# پوختة


مم توێژینەوەیە لە بواری کۆلێژی شەقڵاوە وێستگەی توێژینەوە و تاقیکردنەوە، زانکۆی پۆلیتەکنیکی هەولێر، بۆ ماوەی (٤٩ ڕۆژ) ئەنجامدراوە، بۆ لێکۆڵینەوە لە کاریگەری زیادکردنی ئاستی جیاواز لە تۆزی تۆپکڵی هەنار بۆ خۆراک لەسەر ئەدای جۆری گۆشتی گۆشتی (٣٠٨) ژمارە 60 پێشنیار کە دابەشکراوە بۆ چوار گروپ هەریەکەیان لە گروپەکە (15 باڵندە بۆ هەر دووبارەکردنەوەیەک). دیزاینێکی تەواو هەڕەمەکی بە ڕێکخستنی فاکتەری 2×2×2 پێکهاتبوو لە سێ ئاستی ئاستی تۆزی تۆپکڵی هەنار (T1. 5%، T2. 5%، ڕۆز مێری و T3 2.5% تۆزی تۆپکڵی هەنار+ 2.5% ڕۆز مێری). کۆنترۆڵی گروپی زیاتر (C) بەبێ هیچ زیادکردنێکیان تاقیکردنەوەی خۆراکدان 7 هەفتەی خایاند. ئەنجامەکان دەریانخست کە زۆربەی چارەسەرەکان گروپی ژیری C بەرچاو بوون و باشترین بەهایان هەیە بۆ کێشی جەستەی زیندوو و کێشی تەرمەکان. پرۆفایلی کێشی جەستەی زیندوو جیاوازییەکی بەرچاوی نەبوو لە گروپەکانی خۆراکدانی تۆزی تۆپکڵی هەنار، لە کاتێکدا، بەراورد بە کۆنترۆڵ، ئاستی .بە هاوتەریب لەگەڵ زیادبوونی ئاستی تۆزی تۆپکڵی هەنار کەمکردەوە. گرنگە ئاماژە بەوە بکەین کە لەکاتێکدا ڕۆزماری سوودە ئەگەرییەکان پێشکەش دەکات، بەڵام پێویستە وەک بەشێک لە خۆراکی هاوسەنگ بۆ مریشکی گۆشت بەکاربهێنرێت، و وەرگرتنی دەبێت لەسەر بنەمای پێشنیارەکانی ژەمە دەرمانی گونجاو بێت بۆ ئەوەی هیچ کاریگەرییەکی نەرێنی نەبێت. پێش ئەوەی گۆڕانکاری بەرچاو لە خۆراکی مریشکی گۆشتدا بکرێت، ڕاوێژکردن لەگەڵ پسپۆڕی خۆراکی پەلەوەر یان پزیشکی ڤێتێرنەری باشترە.