University of Thi-Qar Journal of agricultural research
ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 10, Issue 1 (2021) PP 123 -130
https://jam.utq.edu.iq/index.php/main https://10.54174/UTJagr.Vo10.N1/11

Dietary rationing of date pomace, tomatoes, grapes and their mixing in the initiator period and its effect on some productive traits and some fasting bacteria in the small intestine of broilers

[1] Marwah Abd AL-Kafar Sarhan, [2]Muhammad Joodi Shaheed, [3] Ahmed Ali Kadhem Al-salhi

[1,2,3]*University of Thi- Qar, College of Agriculture and Marshlands, Department of Animal Production*
[1] *Email:Marwahabd915@gmail.com*
[2]*Email: Muhammed-j@utq.edu.iq*
[3] *Email:Ahmed.a.k.alsalhi@gmail.com*

Abstract:

This study aims to compare the effect of diluting the feed provided to broilers with the remains of canning factories (dates, tomatoes, grapes and their mixture) on some productive traits and some jejunum bacteria. It is located in the field of poultry at the Faculty of Agriculture and Marshlands. In the experiment, 240 unsexed, 1-day-old Ros-308 chicks, average starting weight 42g, were used. Chicks were fed a standard initial diet for 1-7 days. Chicks were randomly distributed to five treatments, 48 chicks for each treatment (16 chicks for each replicate). The experimental diets were used from the beginning of the second week until the end of the third week (14 days) as follows: (T1: control diet diluted with no dilution) (T2: control diet diluted with 20% date pomace) (T3): control diet diluted with 20 % tomato pomace) (T4: control diet diluted with 20 pomace) from 20% grape pomace diet (T5: control diet diluted 20% of a homogeneous and equal mixture of three types of pomace), and after the end of the third week, the serving was increased For everyone until the end of the trial period. At the end of the experiment, there were no significant differences in economic growth and growth results in traits (live weight rate, weight gain rate, feed consumption rate, feed conversion efficiency) with an arithmetic improvement in traits in all production traits. In favor of the two treatments (T5, T3), the result was a significant increase ($p \leq 0.05$) in the number of lactobacilli bacteria in the jejunal part of the small intestine with a significant decrease in the total of aerobic bacteria and Escherichia coli.

Keyword **: Dietary , date pomace, , tomatoes pomace, , grapes pomace , broilers**

I. INTRODUCTION

As a result of the efforts made by specialists in the field of poultry nutrition and the continuous selection of modern breeds of broilers has led to an acceleration of the growth rate, an improvement in the efficiency of food conversion and an increase in the amount of fat in the body; Xu et al. 2017) but the immune response of birds was negatively affected by this rapid growth due to the negative genetic association between growth speed and immune response (Khatib and Clore, 2013). It has also been associated with an increase in metabolic disorders such as ascites, sudden death syndrome (SDS), and skeletal problems, especially the leg (Dawkins and Layton, 2012 ;Jahanpour et al., 2015). It has been observed that these diseases and deaths occur when birds are freely feed (Nir et al., 1996). Despite all the efforts made, the cost of

University of Thi-Qar Journal of agricultural research
ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 10, Issue 1 (2021) PP 123 -130
https://jam.utq.edu.iq/index.php/main https://10.54174/UTJagr.Vo10.N1/11

fodder still constituted 70-75% of the production cost, which is the highest cost in the commercial chicken production project (Tawfiq, 2009; Al-Kassar, 2012), as the raw materials included in the composition of feeds such as corn Soybeans are imported from other countries at high prices, and this has become a motive to search for feed alternatives with low economic costs, provided that these materials meet the basic requirements for the growth of the bird (Al-Khafaji, 2018). For the purpose of eliminating damage to the speed of growth, increasing the percentage of fat in the body, reducing metabolic disorders and reducing the cost of nutrition. Researchers have resorted to using food rationing in several ways, including the method of diluting the feed with food industry residues such as pomace (Al-Zuhairi, 2019) and from materials that can be used to feed poultry, factory waste from vegetables and fruits, which are produced in large quantities as by-products of manufacturing processes (Kumanda et al. al, 2019). It provides a physiological benefit to birds as it prevents or delays the onset of diseases and is considered one of the effective means to increase their ability to improve performance and disease resistance (Ognik et al, 2016; Khion, 2019). Three types of industrial waste and their mixture were used in the experiment, which is dried date pomace, which is a by-product of the factories producing vinegarand date juice (molasses), dried tomato pomace, which is a by-product of the manufacture of tomato products, tomato paste, tomato juice, cheese, sauces and dried grape pomace, a by-product of the manufacture of grapes. Diluting the control diet at 20% each, and a homogeneous mixture of the three types of pomace at 20% for feeding broiler chickens and studying their effect on some productive traits in broiler chickens up to 35 days of age.

.

II. MATERIALS AND METHODS

This study was conducted at the Agricultural Research Station of the College of Agriculture and the Marshes / Dhi Qar University for the period from 8/11/2020 to 12/12/2020. 240 one-day-old chicks of the breed (ROSS-308) with an average starting weight of 42 g, were used, prepared from the Anwar hatchery in Babel/Kifl and cared for in the field as per the Ros-308 Breeding Manual. The raw materials included in the experiment were the pomace, which is the remaining substance after pressing (dates, tomatoes, grapes), where the date pomace was obtained from molasses factories (date juice) from the Najaf Governorate. Tomato pomace was also brought from tomato paste factories, and grape pomace was collected from juice shops in Dhi Qar governorate. These materials were dried by spreading them in a light layer of direct sunlight for 7 days and turning three times a day until the humidity reached less than 10%. The materials were then ground in a mill until the grains were the size of the starter grains themselves. They were sieved with a sieve with a diameter of 2-3 mm, kept in closed bags and transferred to the poultry field, where the starter ration was diluted with ground pomace. 80 kg of the bush was withdrawn from the ration and 20 kg of pomace (date pomace, tomato, grape pomace or their mixture) were added to the treatments, bringing the total to 100 kg for the treatments (T1: diet without dilution) (T2: dilute the control regimen with 20% date pomace (T3: Dilute the control system with 20% tomato pomace) (T4: Dilute the control system with 20% grape pomace) (T5: Dilute the control system with 20% homogeneous and an equal mixture of the three types of pomace on Consecutively, diluted feed was provided to the birds for the second and third weeks of the experiment, then all birds were fed on a growth diet for 35-22 days.As for nutrients, it was calculated for the contents of 80 kg of feed and 20 kg of spray for each of energy, protein and fiber and the rest of the nutrients (Table 1 and 2).The following equations were used to calculate the productive characteristics of broiler chickens:Live weight: the chicks were weighed weekly until the end of the experiment on day 35 according to Al-

University of Thi-Qar Journal of agricultural research
ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 10, Issue 1 (2021) PP 123 -130
https://jam.utq.edu.iq/index.php/main https://10.54174/UTJagr.Vo10.N1/11

Zubaidi equation (1986:(Mean live body weight = total weights of birds / total number of birds. The weekly weight gain rate was calculated according to Al-Zubaidi (1986:(Weight gain (g) = live body weight at the end of each week - live body weight at the beginning of the week. Average feed consumed according to Al-Zubaidi (1986:(Amount of feed consumed per week (gm) = Amount of feed supplied at the beginning of the week - Amount of feed remaining at the end of the week. The feed conversion efficiency or (food conversion factor) was calculated forEach week using the following equation (Al-Zubaidi, 1986 :(Food conversion factor = average amount of feed consumed per week/weekly weight gain. The number of bacteria in the fasting person was estimated according to the method of pouring the dishes mentioned before Harrigan andMcCance, (1976) Complete random design (CRD) was used to study the effect of different treatments on the studied traits and to compare significant differences between means using Duncan's test (1955) using the SAS (2012) statistical program

Table (1): Chemical analysis of Pomace (grapes, tomatoes, dates, mixture) respectively

ingredients	Grapes pomace	Tomato pomace	Date pomace	Mixture
Humidity	3.16	8	9	6.72
Dry matter	96.84	92	91	93.28
Crude protein	13.22	20.73	6	13.32
Crude fibers	27.31	30.94	24	27.42
Raw fat	0.6	1.53	0.95	1.03
Soluble carbohydrates	56.31	35.1	53.60	48.37
Ash	2.56	3.3	5.53	3.82
Energy kcal/kgm	2433.5	2416	2333	2394.17

Table (2): The composition of the diets used in the experiment during the stages of initiator and growth and the calculated chemical analysis.

Feed material	Starter diet (1-21) days (control)	Initiator diets for dilutive treatments (7-21) days				Growth diet (22-35)days for all treatments
	T1	T2	T3	T4	T5	
Maize	43.5	34.8	34.8	34.8	34.8	47.4
Wheat	17	13.6	13.6	13.6	13.6	17
Soybean	28	22.4	22.4	22.4	22.4	26
Protein concentrate	10	8	8	8	8	6
Vegetable oil	0.5	0.4	0.4	0.4	0.4	2.6
Limestone	0.7	0.56	0.56	0.56	0.56	0.7
Salt	0.3	0.24	0.24	0.24	0.24	0.3

University of Thi-Qar Journal of agricultural research
ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 10, Issue 1 (2021) PP 123 -130
https://jam.utq.edu.iq/index.php/main https://10.54174/UTJagr.Vo10.N1/11

Date sputter	-	20	-		-	-
Tomato sputter	-		20	-	-	-
Grape sputter	-		-	20	-	-
Mixture	-		-	-	20	-
Total	100	100	100	100	100	
Computed chemical analysis						
Crude protein %	22.44	19.15	22.10	20.6	20.61	20.31
Metabolizable energy kcal/kg	2966.5	2839.8	2856.4	2859.9	2852	3154
The ratio of energy to protein	132.16	148.24	129.23	138.83	138.32	155.24
Crude fiber	4.06	8.2396	9.44	8.71	8.79	3.91
Calcium	1.34	1.26	1.27	1.16	1.23	1.08
Phosphorous %	0.71	0.70	0.69	0.60	0.70	0.59
Methionine%	0.55	0.62	0.62	0.51	0.63	0.41
Lysine %	1.31	1.11	1.67	1.09	1.13	1.11
Methionine +Cysteine %	1.00	0.91	0.91	0.90	0.80	0.85

III. RESULTS AND DISCUSSION

From Table No.(3) we notice that there are no significant differences in live weight and cumulative weight gain of broilers fed on different types of pomace and their mixture, due to the compensatory growth of birds at the end of the experiment period, and this is consistent with (Al-Fayyad, 2010; Khudair and Ibrahim 2010 ; Al-Jiashi 2018) or it may be due to The presence of phenols and antioxidants that support the health status of birds and positively reflect on live weight, and this is consistent with (Zhan et al. 2007);(Pop et al., 2015) ;(Dorri et al., 2012). the cumulative feed consumption(1-35 days), we notice that there are no significant differences, and these results are consistent with(Khudair and Ibrahim 2010) and (Aditya et al. 2018) As for the feed conversion factor, which shows the amount of feed consumed (gm) to produce a unit weight (gm), we note that there are no significant differences in the cumulative feed conversion efficiency this is consistent with(Lira et al,.2010) . Thus, the process of reducing feed during the second and third weeks is a successful economic process that does not affect the mentioned productive characteristics

University of Thi-Qar Journal of agricultural research
ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 10, Issue 1 (2021) PP 123 -130
https://jam.utq.edu.iq/index.php/main https://10.54174/UTJagr.Vo10.N1/11

Table (3): The effect of diluting the feed with sputter (dates, grapes, tomatoes and their mixture) during the starter period on the(average live body weight, Cumulative weight gain , Cumulative feed consumption rate, Cumulative Food Conversion Factor) ± standard error.

Treatments	Live body weight (gm)	Cumulative weight gain rate (1-35) days	Cumulative feed consumption rate (1-35)days	Cumulative Food Conversion Factor (1-35) days
T1	2367.33±17.95	2325.33±17.95	3567.45±12.58	1.53±0.007
T2	2358.22±13.28	2316.22±13.28	3536.31±2.86	1.53±0.008
T3	2373.85±3.90	2331.85±3.90	3555.38±20.28	1.52±0.01
T4	2355.88±6.93	2313.88±6.93	3549.37±15.09	1.53±0.002
T5	2378.04±16.74	2336.04± 16.74	3550.45±15.19	1.52 ±0.004
Sig. Level	N.S	N.S	N.S	N.S

N.S: no significant differences. *: The different letters within the same column indicate that there are significant differences between the treatments (P≤0.05)(

From Table No. 4 we note that dilution of broiler feed with pomace (dates, tomatoes, grapes, and their mixture) during the starter period led to a significant decrease (P≤0.05) in the numbers of total aerobic bacteria and coliform bacteria in all dilution treatments compared to the control treatment , and we note a significant(P≤0.05) increase in The numbers of lactobacilli bacteria in the jejunum part of the small intestine of broilers feed on different types of pomace and their mixture. The reason for the high numbers of lactobacilli bacteria may be because they are not affected by acidity of the stomach, as they grow and multiply more in an acidic medium. These results are consistent with with (Shaheed, 2021). Or it may be due to the phenols present in the dilution materials (pomace) and this is consistent with(Khion, 2019 ; Lichovnikova et al,.(2015)

Table (4): The effect of diluting the feed with sputter (dates, grapes, tomatoes and their mixture) during the starter period on the Preparation of microorganisms in the jejunal part of the small intestine of broilers

Treatments	numbers of bacteria (Log 10 CF / G)		
	Total aerobic bacteria	Lactobacilli bacteria	E.coli bacteria
T1	5.17±455.33a	3.28±74.67d	3.28±101.66a
T2	4.35±338.0b	3.71±90.67c	2.40±62.33b
T3	3.18±335.33b	3.71±102.33 b	3.33±53.33b
T4	4.16±332.0b	2.40 ±91.67c	8.57±57.33b
T5	4.48±323.66b	4.41 ±116.33a	0.88±48.66b
Sig. Level	*	*	*

N.S: no significant differences. *: The different letters within the same column indicate that there are significant ((differences between the treatments (P≤0.05)

IV. CONCLUSION

● We note that the reduction of broiler feed with canneries residues by 20% of the standard diet for the second and third weeks did not affect the final live weight, cumulative weight gain, cumulative feed consumption, and cumulative feed conversion factor.

● Reducing the feeding of broiler chickens with canning factory waste resulted in an improvement in the microbial properties of the jejunal part of the small intestine, as it reduced the number of harmful bacteria and supported an increase in the number of beneficial bacteria

V. REFERENCES

.Al-Khafaji, Ali Ibrahim Kazem (2018). The effect of adding date kernel powder treated with organic acids to the diet on the productive, physiological and histological performance of broilers. Master's Thesis. College of Agriculture. University of Kufa

Aditya, S., Ohh, S. J., Ahammed, M., and Lohakare, J. (2018). Supplementation of grape sputter (Vitis vinifera) in broiler diets and its effect on growth performance, apparent total tract digestibility of nutrients, blood profile, and meat quality. Animal nutrition, 4(2): 210-214

Al-Fayadh, Hamdi Abdel Aziz and Saad Abdel Hussein Naji. And Al-Hajo, Nadia Abed Nayef. (2010). Poultry Products Technology Second Edition Higher Education Press. Baghdad

Al-Jiashi, Fatima Abdel Reda Merdas. (2018). The effect of diluting feed with date kernel powder in early periods on some productive, physiological, immune and economic traits of broilers. Master's thesis, College of Agriculture, University of Al-Muthanna

Al-Kassar, Ali Mahmoud Amer. (2012). Poultry Nutrition. College of Veterinary Medicine - University of Kufa - Ministry of Higher Education and Scientific Research

Al-Khatib, Fayez Sami and Ibrahim Saeed Klor (2013). The extent of response of broilers to the phenomenon of compensatory growth using the early specific food rationing program. Rafidain Agriculture Journal. Volume 41. Issue (3): 121-134

Al-Zubaidi, Suhaib Saeed Alwan, (1986). Poultry management. Basra University Press

. Al-Zuhairi, Saja Kazem Saber (2019). Food rationing using the method of reducing forage with date-seed pulp at an early age in some productive, immune and blood traits in broilers - Master's thesis - College of Agriculture / University of Al-Muthanna

Dawkins, M. S., and Layton, R. (2012). Breeding for better welfare: genetic goals for broiler chickens and their parents. Animal Welfare-The UFAW Journal, 21(2): 147-153

. Dorri, S., Tabeidian, S. A., Toghyani, M., Jahanian, R., and Behnamnejad, F. (2012). Effect of different levels of grape sputter on performance broiler chicks. In Proceeding of the 1th International and the 4th national Congress on Recycling of organic waste in agriculture (Pp. 26-27

Harrigan, W. F., and McCance, M. E. (1976). Laboratory methods in food and dairy microbiology. Academic Press Inc.(London) Pp

Jahanpour, H., Seidavi, A., Qotbi, A. A. A., Van Den Hoven, R., Rocha e Silva, S., Laudadio, V., and Tufarelli, V. (2015). Effects of the level and duration of feeding restriction on carcass components of broilers. Archives Animal Breeding, 58(1): 99-105

. Karume, Alfred Solaka and Musa, Riyad Kazem and Muhammad, Abdullah Abdel Moneim. (2012). Evaluation of the use of different feeding systems with the addition of the Iraqi probiotic on the productive performance of broilers. Kufa Journal of Agricultural Sciences. 4 (2): 64-75

. Khion, Taha Hashem (2019). Effect of adding different levels of grape seed and leaf powder (Vitis Vinifera L.) or its extracts to the diet and drinking water on the productive and physiological performance of broilers, Master's thesis, College of Agriculture, University of Basrah

Khudair, Shaima Faisal and Basil, Muhammad Ibrahim. (2010). Dilution of feed with different percentages of wood powder in production performance and some blood traits for broilers of Cobb breed 300. Iraqi Journal of Agricultural Sciences, 41(2): 1-15

. Kumanda, C., Mlambo, V., and Mnisi, C. M. (2019). From landfills to the dinner table: Red grape sputter waste as a nutraceutical for broiler chickens. Sustainability, 11(7): 1931-1937

Lichovnikova, M., Kalhotka, L., Adam, V., Klejdus, B., and Anderle, V. (2015). The effects of red grape pomace inclusion in grower diet on amino acid digestibility, intestinal microflora, and sera and liver antioxidant activity in broilers. Turkish Journal of Veterinary and Animal Sciences, 39(4): 406-412

. Lira, R. C., Rabello, C. B. V., Ludke, M. D. C. M. M., Ferreira, P. V., Lana, G. R. Q., and Lana, S. R. V. (2010). Productive performance of broiler chickens fed tomato waste. Revista Brasileira de Zootecnia, 39(5). 1074-1081

Nagy, Saad Abdel Hussein. (2006). Compensatory growth to treat the problems of modern breeds of broilers. Iraqi Federation of Poultry Producers, Iraqi Poultry Science Association. Technical Bulletin

. Nir, I., Nitsan, Z., Dunnington, E. A., and Siegel, P. B. (1996). Aspects of food intake restriction in young domestic fowl: metabolic and genetic considerations. World's Poultry Science Journal, 52(3): 251-266

.NRC, National Research Council. (1994). Nutrient Requirements of Poultry. 9th ed. National Academy of Science. Washington, DC., USA

Ognik, K., Cholewińska, E., Sembratowicz, I., Grela, E., and Czech, A. (2016). The potential of using plant antioxidants to stimulate antioxidant mechanisms in poultry. World's Poultry Science Journal, 72(2): 291-298

Pop, I. M., Pascariu, S. M., Simeanu, D., Radu-Rusu, C., and Albu, A. (2015). Determination of the chemical composition of the grape sputter of different varieties of grapes. Scientific Papers-Animal Science Series: Lucraritiinifice-Seria Zootehnie, 63(3): 76-80

SAS. 2012. Statistical Analysis System, Users Guide. Statistical. Version 9. 1th ed. SAS. Inst. Inc. Cary. N.C. USA.

Shaheed, M. J. (2021). The effect of adding germinated date kernel powder to the diet on production performance and some broilers E. coli bacteria. Annals of the Romanian Society for Cell Biology,25(3): 8135-8142

Tawfiq, Abdel Moneim Saeed (2009). The relationship between forage metabolic energy levels and dietary restriction on the productive performance of broilers, Tikrit Journal of Agricultural Sciences, 9 (1): 414-407

. Xu, C., Yang, H., Wang, Z., Wan, Y., Hou, B., and Ling, C. (2017). The effects of early feed restriction on growth performance, internal organs and blood biochemical indicators of broilers. Animal and Veterinary Sciences, 5(6): 121

. Zhan, X. A., Wang, M., Ren, H., Zhao, R. Q., Li, J. X., and Tan, Z. L. (2007). Effect of early feed restriction on metabolic programming and compensatory growth in broiler chickens. Poultry Science, 86(4): 654-660