

Utilization Carrot Pulp as Corn Replacement in the Broiler Diet

SadiqRozi Khan

Department of Animal Production, Faculty of Veterinary Science, Nangarhar University, Nangarhar Province, Afghanistan

Corresponding Author: SadiqRozi Khan

Abstract—Carrot (*Daucus carota L.*) is a winter vegetable cultivated for its edible roots throughout the world. Carrot contains moisture content in between 86 to 89%. Chemically, carrot contains 0.2% fat, 0.9% protein, 1.1% total ash, 1.2% crude fiber, 2.2mg/100g Fe, 10.6% carbohydrate, 80 mg/100 g Ca, and 53 mg/100 g P. The aim of this study was to evaluate carrot pulp effect on growth performance of broiler chicks. The experiment was conducted with six hundred unsexed broiler Hubbard classic chicks to replace corn with carrot pulp in broiler's diet. Chicks were divided into four experimental units (pens) of 150 chicks, each with three replicates. Corn was replaced 3 and 5% with carrot pulp. Diets were equaled in crude protein (20.7%) as well as in digestible energy (2955 kcal/kg) from day one to day 20 and had equal crude protein (19.7%) as well as digestible energy (3051 kcal/kg) from 21st to day 45. Feed consumption, average gain, and feed conversion were determined. No significant differences in feed consumption, body weight and FCR were observed in all groups. The variance was measured against ($P > 0.05$). Consequently, carrot pulp can be replaced with corn in the diets of broiler chicks up to 5% without negative effects on feed consumption, body weight gain and FCR.

Keywords—feed consumption, feed conversion ratio, carrot pulp, broiler chicks

Date of Submission: 13-02-2019

Date of acceptance: 28-02-2019

I. Introduction

Conventionally feeding stuffs which are frequently available for poultry diets include corn, rice bran, soybean meal, fish meal, guar meal and vitamin and mineral supplements. Corn, soybean meal and fish meal are mostly imported in Afghanistan. Importing these items has resulted in a high cost of diets for poultry. Many attempts are desired to be conducted to reduce the cost of these ingredients. Feeding modification in the poultry diet is one of many attempts to reduce the cost of feed for poultry industry.

Disposal of agricultural wastes is becoming an environmental and health hazard in communities (Rizal, et al, 2010). Fruits juice wastes might also be included in poultry diets because they still have the nutrients which are available for poultry. Agricultural wastes could be used after proper treatment and handling as a source for animal feed (Shquir, 1984).

Olive pulp can be included up to 7.5% in the ration of broilers (Rabayaa, Omar and Othman, 2001). Apple by-product could be used in broiler diets (Zafar, Idrees and Ahmad, 2005). Tomato pomace of different processing methods could be included up to 10% in broiler diets without affecting live body weight (Betawi, 2005). A study has been reported that the dried sweet orange rind could also be used to replace dietary maize in broiler diets up to 15% (Oluremi, Ojighen and Ejembi, 2006).

In rabbits, addition of 30% apple pulp in the diets improved their performance (Fanimu, Oduguwa, Alade, Ogunnaiké and Adesehinwa, 2003). Inclusion of 15% apple pulp with 10% sugar beet molasses did not have any adverse effects on broilers performance (Ahmad, 2004). Recent reports have been clarified that replacing 20 and 40% lemon pulp and 20 and 60% orange pulp for yellow corn in rabbit diets achieved best nutrients digestibility and nutritive value (Ibrahim et al, 2011). There is no information available on the utilization of carrot pulp in the poultry diets.

According to the previous observation there are many agriculture wastes which can be used in Poultry feed. Carrots are being produced in Afghanistan and used for extracting of Juice as beverage for human being. The waste of carrot (pulp) is used with some extent for livestock and unfortunately mostly thrown in public areas, causing pollution in environment. The present study was planned to find an alternative poultry feedstuff source for corn in poultry feed. The current study was a trail base project to use carrot pulp with some extent as corn replacement in broiler feed.

II. Materials and Methods

Fresh Carrot Juice extracted pulp was obtained from local market and was carried with hygienic care and dried in sun in fully sunny day. The prepared dried pulp was formulated in the feed as 3 and 5% as alternative of corn.

A total of six hundred Hubbard Classic commercial day-old broiler chicks of mixed sex have purchased from local Market and randomly divided into four experimental units (pens) of 150 chicks. The chicks weighed on average 49 ± 0.7 g at the start of the experiment. The experiment was arranged in three dietary treatments containing different percentage of carrot pulp and three replications.

The chicks were offered with feed twice a day at 8:00 a.m. and 4:00 p.m. *ad libitum* and clean water was available to the birds all the time throughout the experimental period with plastic cascades. The chicks were fed with the starter diet containing different levels of carrot pulp for 20 days and had been switched to the finisher ration on 21 to day 42.

The carrot pulp was dried with Natural air force in sunlight and included in feed formulation as 3 and 5% instead of corn. Formulation of Corn and carrot pulp was adjusted in order to keep the total energy and crude protein of the treatments to make them equal in digestible energy and same percentage of crude protein. Vitamins and minerals premixes were added equally in all treatment rations.

III. Results and Discussion

Feed consumption, body weight and feed conversion ratio are mentioned in Table 1, 2 and 3 respectively. Fresh carrot Juice extracted pulp was obtained from local market and dried in sun in fully sunny day. Dried pulp was formulated in the feed as 3 and 5% as alternative of corn. Adding 3 and 5% carrot pulp instead of corn had no significant differences in feed consumption ($P>0.05$), no increasing in daily feed intake was in agreement with finding of Chaudry et al (2004) conducted for dried lemon pulp in broiler chicks. Inclusion dried carrot pulp into broiler diets in contrast with control, not significantly increased of daily weight gain in whole experimental periods ($P>0.05$). No increasing of daily weight gain by inclusion of dried carrots pulp in our experimental diets is in agreement with Mourao et al (2008) findings for dried lemon pulp. FCR was not different significantly ($P>0.05$) in agreement with Mourao et al (2008) for their findings for dried lemon pulp, in all groups.

Carrot pulp has to be dried to remove the moisture content and improve its quality; it is then used in broiler ration. It has been concluded that carrot pulp can be used safely in broiler ration replacing maize by 3 and 5% (W/W) without any side effects in broiler on weight gain, feed consumption and feed conversion ratio (FCR). A higher level than 5% may create problem of wet litter and depressed feed efficiency perhaps due to higher fiber content, further researches are considered to be conducted.

Table 1: Average feed consumption \pm SEM of Broilers chicks (gr)

Group	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week
Control	115 \pm 0.45	320 \pm 0.95	797 \pm 1	1541 \pm 2.5	2723 \pm 2.8	3880 \pm 6.7
Treatment 1	120 \pm 0.45	315 \pm 0.95	810 \pm 1	1496 \pm 2.5	2745 \pm 2.8	3808 \pm 6.7
Treatment 2	111 \pm 0.45	313 \pm 0.95	771 \pm 1	1455 \pm 2.5	2714 \pm 2.8	3870 \pm 6.7

The means within the same columns do not have significant difference ($P>0.05$).

SEM: Standard Error Mean

Group I (control) fed by standard ration without carrot pulp inclusion; Group II (treatment 1) fed by ration containing 3% carrot pulp; Group III (treatment 2) fed by ration containing 5% carrot pulp.

In table one all groups of chicks consumed equal feed, and statistically there is no difference, therefore it is necessary to understand body weight gain.

Table 2: Average body weight \pm SEM of Broilers chicks (gr)

Group	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week
Control	144 \pm 6	305 \pm 14	643 \pm 14	1093 \pm 23	1724 \pm 4	2145 \pm 4
Treatment 1	150 \pm 6	300 \pm 14	659 \pm 14	1069 \pm 23	1727 \pm 4	2143 \pm 4
Treatment 2	143 \pm 6	301 \pm 14	623 \pm 14	1047 \pm 23	1718 \pm 4	2142 \pm 4

The means within the same columns do not have significant difference ($P>0.05$).

SEM: Standard Error Mean

Group I (control) fed by standard ration without carrot pulp inclusion; Group II (treatment 1) fed by ration containing 3% carrot pulp; Group III (treatment 2) fed by ration containing 5% carrot pulp.

Table two described that chicks had same body weight during six weeks, by the reason it is necessary to understand the difference of FCR.

Table,3: Average Feed conversion Ratio±SEM of Broilers chicks (No)

Group	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week
Control	0.8±0.4	1.05±0.009	1.24±0.009	1.41±0.009	1.58±0.01	1.79±0.01
Treatment 1	0.8±0.4	1.05±0.009	1.23±0.009	1.4±0.009	1.59±0.01	1.75±0.01
Treatment 2	0.79±0.4	1.06±0.009	1.24±0.009	1.39±0.009	1.57±0.01	1.72±0.01

The means within the same columns do not have significant difference ($P>0.05$).

SEM:Standard Error Mean

Group I (control) fed by standard ration without carrot pulp inclusion; Group II (treatment 1) fed by ration containing 3% carrot pulp; Group III (treatment 2) fed by ration containing 5% carrot pulp.

IV. Conclusion

Carrot pulp was dried in natural sunlight and ground before using in ration. First it was mixed with others ingredients and then prepared in pellet texture. There was no any change in color, smell and taste. In conclusion, carrot pulp can be replaced with corn when added to the diets of broiler chicks up to 5% without negative effects on feed consumption, body weight gain and FCR. Further researches are considered to be done for higher level.

Acknowledgement

This study was supported by university support and workforce development program(USWDP) for the financial support and making facilities to perform the research. I would also like to thank the ministry of higher education, Nangarhar University and Veterinary science faculty, giving the chance to submit my proposal for such research.

References

- [1]. Ahmad, G. A. (2004). Simultaneous use of apple pomace and molasses as a source of energy for broiler. *Indian Journal of Poultry Science*,39(2), 179-181.
- [2]. Chaudry MA, Badshan A, Bibi N, Zeb A, Ahmed T, Ali S, Termeulen U. (2004). Citrus waste in poultry rations. *Arch Geflügelk*. 68: 206-210.
- [3]. E. Rabayaa, J. M. Abo Omar and R. A. Othman. (2001). Utilization of olive pulp in broiler rations. *An-Najah University J. Res.*, Vol. 15.
- [4]. Fanimo AO, Oduguwa OO, Alade AA, Ogunnaike TO, Adeshinwa AK. (2003). Growth performance, nutrient digestibility and carcass characteristic of growing rabbits fed cashew apple waste. *Livestock Research in Rural Development*, 15 (8): 15-23.
- [5]. Ibrahim MR, El-Banna HM, Omara II, Suliman A. (2011). Evaluation of nutritive value of some citrus pulp as feedstuffs in rabbit diets. *Pak J Nutr*. 10: 667-674.
- [6]. Mourao JL, Pinheiro VM, Prates AM, Bessa RJB, Ferreira LMA. (2008). Effect of dietary dehydrated pasture and citrus pulp on the performance and meat quality of broiler chickens. *Poult Sci*. 87: 733-743.
- [7]. N. A. Al-Betawi. (2005). Preliminary study on tomato pomace as unusual feed stuff in broiler diets. *Pak. J. of Nutrition* 4 (1): 57-63.
- [8]. O. I. A. Oluremi, V. O. Ojighen and E. H. Ejembi. (2006).the nutritive potentials of sweet orange (*Citrus sinensis*) rind in broiler production. *Int. J. of Poult. Sci*, 5 (7): 613-617.
- [9]. Riaz,M.N.,Mohyuddin,G.,Al-Haq,M.I.(1999). Physical,chemical and sensory characteristics of jams made from fresh and frozen strawberries. *Pakistan Journal of Arid Agriculture*, 2:51-60.
- [10]. Shquir, A. (1984) a. Sources of cheap feed stuffs to livestock in West Bank and Gaza Strip. *Samed*. Vol. 6 No. 39.
- [11]. Shquir, A. (1984) b. Utilization of animal wastes. *Bethlehem Univ. Journal*. No. 3
- [12]. Yoserizal, Maria endomahata, Mira andriani, and Guoyaowu. (2010). Utilization Juice wastes as corn replacement in the broiler diet. *World Academy of Science, Engineering and Technology*.
- [13]. Zafar F, Idrees M, Ahmad Z. (2005). Use of apple byproducts in rations of broiler chicks in Karachi. *Pakistan Journal of Physiology*. 1: 13-18.

SadiqRozi Khan. "Utilization Carrot Pulp as Corn Replacement in the Broiler Diet." *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)* 12.2 (2019): PP- 72-74.