Short Communication

Pak. j. sci. ind. res., vol. 35, no. 7-8, July-August 1992

Utilization of Carrot Residue in Poultry Feed

SAKHAWAT ALI, ZIA-UR-REHMAN, A. D. KHAN AND F. H. SHAH

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received July 22, 1990; revised August 2, 1992)

Carrot is a commonly used vegetable in Pakistan. It occupies an important place in human diet and is utilized for the manufacture of a number of processed foods. Now-a-days, its juice is also being used as a soft drink. The residue left after extraction of juice contains sufficient quantity of protein, minerals and other nutrients including carotenes and can be incorporated into animal/poultry feed. Many workers have tried to utilize different fruit industry wastes in animal feed especially in poultry [1-4]. The present work was undertaken to evaluate the use of carrot residue in poultry feed.

Eighty days old broiler chicks (Hubbard strain) were randomly divided into four groups so as to have two replicates of ten chicks each per experimental ration.

Carrot residue material was collected from the local market and dried under sun. The chemical composition of the dried carrot residue was estimated according to standard methods [5-7] and its results are mentioned in Table 1. These results indicated that the protein level of dried carrot residue (11.5%) was almost equivalent to rice polishing. Therefore, attempts were made to utilize carrot residue as feed ingredient in poultry feed instead of rice polishing.

Four experimental rations namely A, B, C, and D were formulated by replacing rice polishing with dried carrot residue on the basis of protein level at PCSIR Labs. Complex, Lahore (Table 2). All the experimental rations were isocaloric and isonitrogenous. The experimental rations and fresh water were supplied *ad libitum* to the chicks. The temperature of the experimental room was maintained at 35, 32, 29 and 26° during the first, second, third and fourth weeks respectively and then maintained at 23° during the remaining period up to 7 weeks. The data on feed consumption, weight gain, feed efficiency, dressing percentage and weight of internal organs were subjected to statistical analysis as described by Steel and Torrie [8].

Date on weight gain is shown in Table 3. The results indicated that the chicks gained maximum weight (1722 g) when fed on ration D in which rice polishing was replaced by 12% dried carrot residue. Difference in weight gain of the chicks fed on different rations was found to be significant at 5% level. It seems to be that the weight of the birds was increased due to the presence of soluble sugars and other nutrients in carrot residue.

Feed intake by the chicks fed on different experimental rations ranged from 4480–4697 g. Maximum feed consumption was 4697 g in case of chicks fed on ration containing 12% dried carrot residue D followed by those on rations C, B and A. Statistical analysis showed significant difference at ($P<0.5$) in respect of feed consumption when data was subjected to analysis of variance. It is clear from the results that more feed was consumed by the chicks fed on ration D containing 12% carrot residue. It might be due to presence of high amount of

TABLE 1. CHEMICAL COMPOSITION OF DRIED CARROT RESIDUE MATERIAL.

Components	% age (dry matter basis)
Moisture	7.8
Ash	8.9
Crude protein	11.5
Neutral detergent fibre (NDF)	21.4
Acid detergent fibre (ADF)	14.8
Crude fibre	12.7
Fat	9.0
Total soluble nutrients	49.6
Total soluble sugars	18.0

TABLE 2. COMPOSITION OF EXPERIMENTAL RATION.

Ingredient	A Control 0% C.W.	B 4% C.W.	C 8% C.W.	D 12% C.W
Maize	15.0	15.0	15.0	15.0
Wheat	15.0	15.0	15.0	13.0
Rice	15.0	15.0	15.0	15.0
Rice pollishing	10.0	6.0	2.0	-
Cotton seed meal (decrticated)	10.0	10.0	10.0	10.0
Corn gluten Meal 30%	4.0	4.0	4.0	4.0
Corn gluten meal 60%	10.0	10.0	10.0	10.0
Rape seed meal	4.0	4.0	4.0	4.0
Carrot residue	-	4.0	8.0	12.0
Fish meal	10.0	10.0	10.0	10.0
Blood meal	3.0	3.0	3.0	3.0
Molesses	3.0	3.0	3.0	3.0
Bone meal	0.5	0.5	0.5	0.5
Vitamin mineral premix	0.5	0.5	0.5	0.5
Total:	100.00	100.00	100.0	100.0
Protein %	23.85	23.81	23.77	23.70
Metabolizeable energy: cal/kg	3051.00	3049.00	3040.00	3035.00

* CW = Carrot waste

soluble sugars and other soluble nutrients which make the feed more palatable as compared with the control feed. The feed efficiency was maximum in case of birds fed on ration C (Table 3) but the difference in the feed efficiency among different groups of chicks was found to be statistically non-significant. The average dressing percentage recorded was 59.2% (Table 3).

TABLE 3. AVERAGE WEIGHT GAIN, FEED CONSUMPTION, FEED EFFICIENCY, DRESSING PERCENTAGE AND WEIGHT OF INTERNAL ORGANS BY PERCENT OF THE BODY WEIGHT.

No. of Chicks	A 20	B 20	C 20	D 20
Experimental period (days)	49	49	49	49
Initial weight gm/chick	39	38.5	38	38
Average total weight gained (gm/chick)	1625	1658	1717*	1722**
Total feed consumed gm/chick.(0-7week)	4480	4490	4636	4697*
Feed efficiency	2.75	2.71	2.70	2.72
Mortality %	5.00	5.00	5.00	5.00
Dressing percentage	58.09	60.00	57.00	58.00
Heart weight (gm) % of body weight	0.65	0.63	0.63	0.62
Liver weight (gm) % of body weight.	2.93	2.94	3.10	3.15
Gizzard weight (gm) % of body weight.	2.10	3.01	2.99	2.84

* Highly significant at 1% level, ** Significant at 5% level.

The difference between treatments was found to be non-significant. Similarly weight of heart and gizzard also showed non-significant difference. Apparently the weight of the livers was increased by supplementation of carrot residue but statistical analysis showed non-significant difference. It can be concluded from these results that the carrot residue can be beneficially incorporated as a substitute of rice polishing upto 12%.

Key words: Carrot residue, Rice polishing, Poultry feed.

References

1. A. Sakhawat, Z. U. Rehman, A. D. Khan and F. H. Shah, Pak. j. sci. ind. res., **32,** 568 (1989).
2. J. Mertinez Pascual and J. Fersandez, Anim. Feed Sci. Technol., **5,** 11 (1980).
3. A. N. Bhattacharya and M. Harb., J. Anim. Sci., **36,** 1175 (1973).
4. J. G. Welch and A. M. Smith, J. Anim. Sci., **33,** 472 (1971).
5. R. Markham, Biochem. J., **36,** 790 (1942).
6. AOAC, *Official Methods of Analysis* (Association of Official Analytical Chemists, Washington, DC, USA, 1970), 11th ed.
7. H. K. Goering and P.J. Ven Soest, *Forage Fibre Analysis* (Agriculture Hand Book No.379, Agri. Res. Service, US Dept. Agric., 1970).
8. R. G. D. Steel and J. H. Torrie, *Principles and Procedures of Statistics* (McGraw Hill, Toronto, London, 1980), pp. 349.