Digestibility of Rabbits on Feeding of Cabbage waste

Karu. Pasupathi
*Assistant professor, Institute of Animal Nutrition, Kattupakkam – 603 203,
Tamil Nadu Veterinary and Animal Sciences University, Kancheepuram District
drkarupasupathy@gmail.com

Abstract— The study was carried out to examine the effect of cabbage waste feeding in rabbits performance and cabbage waste feeding on digestibility of rabbits were analysed. The articles regarding cabbage waste feeding by replacing various feed ingredient at various levels are collected and also the digestibility articles were reviewed.

Key words : Broiler rabbits, cabbage waste, growth performance, digestibility

I. INTRODUCTION

Rabbit farming is gaining momentum in India due to its high production potentials, high mothering ability, adaptability to a wide range of conditions, high genetic variability, high roughage utilization and low cost of production. Rabbit production appears as an attractive proposition for the supply of high quality meat especially in India. The increased livestock production in India can be achieved by rearing animals of short generation interval like rabbits by small scale farmers. In rabbit farming, litter size and litter weight are the important economic traits which are to be genetically improved for obtaining maximum productivity ultimately, increased profit. Litter size at birth had been identified as one of the main traits affecting the profit functioning of rabbit farm (Eady and Prayaga, 2000).

Recent All India Livestock Population statistics showed that the rabbits population is increasing by 37.33 per cent compared to previous census on livestock though an overall reduction in livestock population of 3.33 per cent (All India Livestock Population, 2012). New Zealand breed rabbits are better suited to our wide varying Indian climatic condition. Most of the farmers involved in rabbit farming are landless labours feeding their rabbits with vegetable waste available at cheaper cost and throughout the year. Very few farmers are feeding their rabbits with concentrate mixture and cultivated fodders like Bajra Napier hybrid grass or *Desmanthus virgatus*. The vegetable waste predominantly consists of cabbage head and waste. In India it was estimated that 2.81 MT cabbage head and leaves are being wasted every year (FAOSTAT. 2012). Since the cabbage waste contains glucosinolates,, an antinutritional factor which affect the iodine uptake and thereby influence the productive and reproductive performances, the articles available were analysed and presented here.

II. FEEDING OF CABBAGE WASTE

Nguyen Thi Kim Dong and Nguyen Thanh Van (2008) found that the average daily gain increased linearly with the increased level of cabbage inclusion, significantly higher weight gain (21.80 g d-1) was observed in 60 per cent cabbage replaced diet followed by 80 per cent replaced diet (21.40 g d-1) as compared to those fed only paragrass (16.8 g d-1). The intake of DM, OM and EE were similar in all the treatment groups, however the intake of crude protein (12.5 vs. 10.4 g h-1 d-1) was higher and NDF was lower (27.90 vs. 41.62 g h-1 d-1) due to higher protein (16.2 vs. 10.0 per cent) and lower NDF (26.0 vs. 67.0 per cent) in the cabbage waste when compared to paragrass. The increased intake of crude protein has been attributed as the reason for better growth rate. The feed conversion ratio was linearly better (P>0.05) with increasing level of cabbage waste and it was 4.33 and 3.50 in unsupplemented and 80 per cent paragrass replaced with cabbage waste, respectively.

In a feeding trial with sole feeding of cabbage and comparing the performance with water spinach as a sole source of feed, the daily weight gain of cabbage waste fed groups was significantly higher (15 vs. 12.7g d-1). The dry matter intake (48 vs. 72 g d-1) and dry matter conversion (3.28 vs. 5.91) of cabbage fed group were lower. The percentage of crude protein on dry matter basis was lower (23.7) in cabbage waste than in water spinach (28.1). Supplementation of cabbage fed rabbits with rice or sweet potato roots did not improve the growth rate nor the dry matter intake and convertibility (Bui Phan Thu Hang et al., 2011).

However, Nguyen Huu Tam et al. (2009) reported that when cabbage and water spinach diet was supplemented with rice, better (P>0.05) weight gain (17 vs. 21 g d-1), higher feed intake (79 vs. 89 g d-1) and protein intake (19.4 vs. 15.9 g d-1) were observed when compared to groups fed without rice supplementation. The white cabbage variety was comparable to Chinese cabbage and cauliflower in terms of live weight gain. Similar comparable results in terms of weight gain were observed when cabbage waste was fed with and without rice (Bui Phan Thu Hang et al., 2011).

Fedeli Avanzi and Janella (1976) reported that the growth performance of rabbits was not affected when mixed cereals was replaced with fresh cabbage up to 24 per cent level.

Fomunyam (1984) found that the replacement of maize with fresh cabbage up to 15 per cent level improved growth performance in rabbits.

Partridge et al. (1985) conducted a growth trial using high protein concentrate diet and barley and compared with rabbit fed barley replaced with cabbage, reduction in total DM intake and growth rate were observed. The degree of reduction was 0.28 g and 0.2 g for each gram of barley replaced with cabbage waste for dry matter and average daily gain, respectively.

In broiler rabbit trial with incorporation of Desmanthus virgatus or berseem meal or sun hemp forage meal or groundnut hay meal part by part resulted in comparable weight gain; however, the feed efficiency was poor (3.4 vs. 2.62 to 2.74) when berseem meal used as sole roughage source at 27 per cent (Rao et al., 1986).

ISSN: 2278 – 7798

In a feeding trial in rabbit, higher (P>0.05) average daily weight gain of 13.13 g d-1 was observed with Desmanthus virgatus fed group than Stylosanthes scabra (11.41 g d-1) and Crotolaria juncea (11.43 g d-1) fed groups and FCR was better (P>0.05) in desmanthus fed group, (Gunasekaran et al., 2013).

Glucosinolates intake of up to 1.2 g d-1 did not affect average daily gain (31 vs. 33 g d-1) in rabbits, however increasing the glucosinolate content to 1.5 g d-1, weight gain was 28 g d-1 (Tripathi et al., 2003). In calves, feeding higher glucosinolate rape seed meal decreased the average daily gain (521 g d-1) compared to low glucosinolate diet (755 g d-1), (Andreas Papas and Ingalls, 1979).

In pigs, cabbage waste replacing at 15 and 30 per cent of the concentrate, the average daily gain decreased (P>0.05) from 792 to 683 g d-1, (Livingstone et al., 1980).

III. DIGESTIVILITY OF CABBAGE WASTE

Nguyen Thi Kim Dong and Nguyen Thanh Van (2008) conducted digestion trial in rabbits replacing paragrass with cabbage waste at graded levels (0, 20, 40, 60 and 80 per cent on dry matter basis). The digestibility of dry matter (DM), organic matter (OM), ether extract (EE) and neutral detergent fibre (NDF) were higher at 20, 40, 80 and 60 per cent and above levels of cabbage waste in place of para grass, respectively. The digestibility of crude protein was higher (P>0.05) as the level of cabbage waste inclusion was increased (77.3 vs. 83.7). The nitrogen retention had the tendency to increase (P>0.05) with the increasing levels of cabbage waste inclusion (0.70 to 0.78 g kg -1W0.75). This report was similar to the finding of Nguyen Van Thu and Nguyen Thi Kim Dong (2005) and Samkol et al. (2006).

Binversie and Miller (2013) reported the TDN value of cabbage waste was 74.0 per cent.

A study conducted by replacing water spinach basal diet with cabbage waste at 0, 25, 50 and 75 per cent levels on dry matter basis (Le Thuy Binh Phuong and Duong Nguyen Khang, 2008) in rabbits revealed that the inclusion of cabbage waste increased DM and OM digestibility at 25 and 50 per cent, protein digestibility in the 50 per cent replacement. The NDF and ADF digestibility were not affected (P>0.05) when increasing the inclusion of cabbage waste (up to 75 per cent). However, increased nitrogen retention (1.75 vs. 1.79 g kg-1W0.75) occurred up to 50 per cent level of cabbage waste inclusion. The same authors in second trial observed that nitrogen retention was reduced at 75 per cent inclusion of cabbages.

In rabbits, the digestibility of DM, OM, CP and ADF were not affected (0.57 vs. 0.58, 0.60 vs. 0.64, 0.69 vs. 0.71 and 0.19 vs. 0.23, respectively) up to 1.2 g d-1 glucosinolate intake. Increasing glucosinolate intake decreased (P>0.05) the digestibility, but the nitrogen retention was comparable (2.3 vs. 2.1 g d-1) to that of control (Tripathi et al., 2003).

Gunasekaran et al. (2013) reported the DM, CP, EE and NFE digestibility in Desmanthus virgatus fed to rabbits was 72.5, 66.3, 63.7, 73.0 and 62.4 per cent, respectively and they were higher (P>0.05) than the digestibility of nutrients in Stylosanthes scabra and Crotolaria juncea.

In swine concentrate, incorporation of cabbage waste at 10 and 15 per cent did not influence the digestibility of DM, CP, CF, EE and NFE when compared to concentrate without cabbage waste (Nath et al., 2013). Feeding of Desmanthus virgatus leaf meal at 17 per cent in the concentrate diet of swine decreased the DM, OM and nitrogen digestibility (Ly and Samkol, 2001), the digestibility of nutrients in desmanthus calculated by difference method revealed the digestibility of DM, OM, NDF and nitrogen were 36.9, 37.2, 30.3 and 44.0 per cent, respectively. Similarly, Gohl (1981) reported low digestibility of dry matter and nitrogen of desmanthus in cattle.

IV. CONCLUSION

The study on cabbage waste reveals that cabbage waste could be offered to rabbits 100 per cent level for backyard farming and the commercial farmers include up to 50 per cent in grower phase (up to 6 months) and 100 per cent level after six months of age without affecting reproductive performance

V. REFERENCES

1. All India Livestock Population, 2012. Ministry of Agriculture, Department of Animal Husbandry, Dairying and Fisheries, Krishi Bhawan, New Delhi.
2. Andreas Papas, J. and R. Ingalls, 1979. Studies on the effect of rape seed meal on thyroid status of cattle, glucosinolate and iodine content of milk and other parameters. Journal of Nutrition. 109: 1129-1139.
3. Binversie, L. and Z. Miller, 2013. Feeding cabbage waste. University of Wisconsion-Extension Dairy and Livestock Educator, Outagamie country.
4. Bui Phan Thu Hang, Vo Lam and T.R.Preston, 2011. Effect of different sources of carbohydrate as supplements to basal diet of water spinach and cabbage leaves on the growth rate in rabbits. Livestock Research for Rural Development, 23 (11):1-6.
5. Eady, S.J. and K. C. Prayaga, "Factors affecting litter size and birth weight in rabbits," Proc. Assoc. Advmt. Anim. Breed. Genet., vol. 14, 2000.
6. FAOSTAT. 2012. Food and Agricultural Organisation. The Rome.
7. Fedeli Avanzi, C. and G.G. Janella, 1976. Growth and thiocyanate level in blood and urine of rabbits fed with carrots, rape and cabbage. First World Rabbit Congress, Dijon, Communication 28:1-4.
8. Fomunyam, 1984. Cabbage and plantain/banana leaf in rabbit diets. Third World rabbit Congress, Rome, 1:415-422
9. Gohl, B., 1981. Tropical feeds. Feed information summaries and nutritive values. FAO. Rome.
10. Gunasekaran, S., K.Viswanathan, Karu.Pasupathi and L.Radhakrishnan, 2013. Evaluation of leguminous fodders for growth performance in weaned New

ISSN: 2278 – 7798

Zealand White rabbits. International Journal of Applied Science and Engineering, 1 (1):10-12

11. Le Thuy Binh Phuong and Doung Nguyen Khang, 2008. Utilization of cabbage waste byproducts from market for growing crossbred rabbits. In: MEKARN Workshop proceedings, Organic rabbit production from forages, Cambodia.
12. Livingstone, R.M., B.A. Baird and T. Atkinson. 1980. Cabbage (Brassica oleracea) in the diet of growing-finishing pigs. Animal Feed Science and Technology, 5:69-75.
13. Ly, J. and Pok Samkol, 2001. Nutritional evaluation of tropical leaves for pigs; Desmanthus virgatus. Livestock Research for Rural Development, 13(4): 1-3.
14. Nath, M.K., A.K. Gohain, D. Kalita and H.F. Ahamed, 2013. Studies on the performance of growing and finishing pigs on cabbage waste. Indian Veterinary Journal, 90 (8): 59-61
15. Nguyen Huu Tam, Vo Thanh Tuan, Vo Lam, Bui Phan Thu Hang and T.R. Preston, 2009. Effect of growth on rabbits of supplementing basal diet of water spinach (Ipomoea aquatic) with vegetable waste and paddy rice. Livestock Research for Rural Development, 21 (10):1-4.
16. Nguyen Thi Kim Dong and Nguyen Thanh Van, 2008. Effect of different levels of cabbage waste (Brassica olerea) replacement in paragrass (Brachiaria mutica) basal diet on growth performance and nutrient digestibility of crossbred rabbits in Mekong Delta if Vietnam. M.Sc. thesis submitted to Department of Animal Husbandry, College of Agriculture and Applied Biology, Catho University, Vietnam.
17. Nguyen Thi Kim Dong and Nguyen Thanh Van, 2008. Effect of different levels of cabbage waste (Brassica olerea) replacement in paragrass (Brachiaria mutica) basal diet on growth performance and nutrient digestibility of crossbred rabbits in Mekong Delta if Vietnam. M.Sc. thesis submitted to Department of Animal Husbandry, College of Agriculture and Applied Biology, Catho University, Vietnam.
18. Nguyen Van Thu and Nguyen Thi Kim dong, 2005. Effects of replacement of different levels of paragrass by sweet potato vines on feed utilization, growth rate and carcass quality of crossbred rabbits in the Mekong delta of Vietnam. In: Proceedings of the workshop on the technology development for livestock production. JIRCAS-CTU, 98-103.
19. Partridge, G.G., S.J. Allan and M. Findley, 1985. Studies on the nutritive value of roots, cabbage and grass silage for growing commercial rabbits. Animal Feed Science and Technology, 13 (3): 299-311
20. Rao, K.S., M.R. Reddy and G.V.N. Reddy, 1986. Utilization of unconventional roughages in the formulation of complete feed for rabbits: Effect on growth and carcass characteristics. Indian Journal of Animal Nutrition, 3(4):235-243
21. Samkol, P., T.R. Preston and J.Ly, 2006. Digestibility indices and nitrogen balance in growing rabbits fed basal diet of water spinach (Ipomoea aquatic) supplemented with broken rice. Livestock Research for Rural Development, 18(2): 3
22. Tripathi, M.K., A.S. Mishra, A.K. Misra, R. Prasad, D. Mondal and R.C. Jakhmola, 2003. Effect of graded levels of high glucosinolate mustard meal (Brassica juncea) meal inclusion on nutrient utilisation, growth performance, organ weight and carcass composition of growing rabbits. World Rabbit Sci., 11: 211–226.

ISSN: 2278 – 7798