

EFFECT OF DIETARY INCORPORATION OF HYDROPONIC MAIZE FODDER ON THE GROWTH PERFORMANCE OF NEW ZEALAND WHITE RABBITS

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SUMMARY

The objective of the study was to assess the effect of dietary incorporation of hydroponics maize fodder as a replacement of concentrate mixture on the growth performance of New Zealand White rabbits. The study was conducted at Livestock Farm Complex, College of Veterinary Science, Proddatur wherein 18 weaned rabbits were allotted randomly into 3 groups with each group consisting of 6 rabbits, namely control (100 % concentrate mixture), treatment-1 (100 % hydroponic maize fodder), treatment-2 (50 % concentrates and 50 % hydroponic fodder) groups in a completely randomized design. Feed intake of all rabbits were recorded daily, where as the body weights were recorded at weekly interval. Growth parameters such as body weight (g), body weight gain/week (g), average daily gain (g), dry matter intake (g), feed efficiency and economics such as the cost of feeding /animal and cost of feeding/g body weight in these 3 groups were studied. Treatment -2 comprising of 50 % replacement of concentrates with 50 % hydroponics maize fodder has shown significant increase in body weight gain/week (93.13 ± 6.04 g), average daily gain (13.30 ± 0.86 g) when compared to treatment-1 and control group and decrease in dry matter intake (31.79 ± 0.39 g) when compared with control group. Cost of feeding / animal/70 days (39.72 INR) and Cost of feeding/g body weight (0.04 INR) was found to be lower in treatment-1 when compared with treatment-2 and control group.

Key words : Hydroponic maize fodder, New Zealand White rabbit, growth performance

Hydroponics is often described as cultivation of fodder without soil and using water as medium. It is a system of year round growing of cereals and legumes in a shorter period with high yield under protective controlled environment. It grows 50% faster than conventional method and produce high yield of better quality fodder. Different types of fodder crops like barley, oats, wheat, sorghum and maize can be grown under hydroponics fodder production system (Krishnamurthy *et al.*, 2018). In Rayalaseema region of Andhra Pradesh, maize is often suitable for cultivation as it is cost effective and available throughout the year. It is evident that hydroponic maize fodder can include in the diets of cattle, buffaloes and poultry. Rabbits are meat type animals having very low digestible capacity of cellulose and lignin and hence require high quality nutrients such as energy, protein, fat soluble minerals and vitamins. The low fibre content and high nutritive value in the hydroponic maize fodder can also be supplemented to rabbits.

Keeping this in view, the present study was carried out to assess effect of dietary incorporation of hydroponic maize fodder on the growth performance of New Zealand White rabbits.

MATERIALS AND METHODS

Hydroponic maize fodder production

A low cost device was fabricated with 90% green shade net to control the temperature and humidity. Automated watering system with misters was arranged and specially designed trays were used to grow the hydroponic fodder. Clean seeds of maize (*Zea mays*) were soaked in tap water for 12h and kept for sprouting in air tight condition for 36 h. The sprouted maize seed was then transferred into the trays @ 1.5 kg/3.75 sft⁻¹. The seedlings were allowed to grow for 6 days and on seventh day, entire fodder along with roots was removed. The fodder is then allowed to dry

for 30 minutes and then cut into small pieces and mixed with basal feed as mentioned by Krishnamurthy *et al.* (2017).

Palatability test

To assess the acceptability and maximum intake of hydroponics maize fodder by rabbits, palatability study was conducted for 20 days before the start of experiment.

Experimental animals

The present experiment was conducted in 18 weaned rabbits of either sex which were categorised into 3 groups namely control group (100 % concentrate mixture), treatment-1(100 % hydroponics) and treatment-2 (50 % concentrates and 50 % hydroponics) at livestock farm complex, college of veterinary science, Proddatur, Andhra Pradesh. Feed offered to rabbits were recorded every day and the body weights were taken at weekly intervals for a period of ten weeks. Clean drinking water was provided in ad libitum. All the animals were fed as per the ICAR nutrient requirements (2013) during the entire experimental period. Feed samples were analysed as per AOAC (2012). Parameters such as body weights (g), body weight gain/week (g), average daily gain (g), dry matter intake (g), feed efficiency and economics such as the cost of feeding /animal/70 days and cost of feeding/g body weight in these 3 groups were studied. The data was subjected to one way ANOVA as per the procedures of Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The chemical composition of concentrate mixture and hydroponic maize fodder is shown in Table 1. The Dry matter, Crude Protein, Ether Extract, Crude Fiber, Nitrogen Free Extract, Ash and Acid Insoluble Ash in hydroponic maize fodder were 18.44, 11.56, 3.78, 8.36, 72.91, 2.97 and 0.42 per cent, respectively which were in accordance with Naik *et al.* (2014). Perusal of the table revealed that hydroponic maize fodder has low dry matter, Crude protein and NFE content compared to concentrate mixture where as ether extract and crude fibre contents are almost similar in both hydroponic maize fodder and concentrate mixture.

Weekly dry matter intake of New Zealand White rabbits under different treatments is presented in Table 2. The results indicated that significantly higher dry matter intake was recorded T1 (26.16±0.17g) followed by T2 (31.79±0.39g) and Control group (33.80±0.267g). Gradual and significant increase in dry matter intake from 1st week to 10th week was observed in all treatment groups. Due to high moisture content in hydroponic maize fodder, low dry matter intake was observed on 100 per cent feeding of hydroponic maize fodder. Similar result was reported by Rajkumar *et al.* (2016) who stated that lower dry matter intake was observed on feeding of hydroponic maize fodder in Soviet Chinchilla rabbits.

Perusal of the Table 3 pertaining to the body weight and body weight gain particulars indicated that significant and highest body weight after 10th week was recorded in control group (1374.67±45.63 g) followed by T2 (1312.67±32.63 g) and T1

TABLE 1
Chemical composition of feed ingredients on per cent Dry matter basis

Feed ingredients	Moisture	DM	CP	EE	CF	NFE	Ash	AIA
Hydroponics maize fodder	81.56	18.44	11.56	3.78	8.36	72.91	2.97	0.42
Concentrate mixture	9.28	90.72	21.36	2.92	8.73	56.43	6.52	3.98

TABLE 2
Weekly dry matter intake (g) of New Zealand White rabbits in different treatment groups

Group	Weeks										Overall mean
	1	2	3	4	5	6	7	8	9	10	
Control	24.19±0.33	27.22±0.00	29.81±0.43	31.10±0.31	31.75±0.00	33.70±0.43	36.94±0.31	38.97±0.31	40.91±0.27	43.42±0.28	33.80±0.267
Treatment-1	20.81±0.34	22.13±0.00	23.71±0.26	23.71±0.13	24.89±0.00	25.82±0.00	27.13±0.34	29.50±0.35	31.22±0.24	32.27±0.00	26.16±0.17
Treatment-2	19.87±0.75	24.57±0.92	27.81±0.22	28.46±0.43	31.05±0.00	31.27±0.22	33.49±0.20	36.66±0.51	41.01±0.45	43.75±0.19	31.79±0.39

TABLE 3
Body weight gain of New Zealand White rabbits in different treatment groups

Parameter	Control	Treatment 1 (T1)	Treatment 2 (T2)
Initial body weight (g)	547.67±64.60	456.67±27.02	475.67±0.00
Final body weight (g)	1374.67±45.63	1300.00±50.33	1312.67±32.63
Body weight gain/week (g)	92.07±19.87	89.93±10.45	93.13±6.04
Body weight gain/day (g)	13.15±2.84	12.85±1.49	13.30±0.86

TABLE 4
Cost of feeding of different treatments in New Zealand White rabbits

Economics	Control	Treatment-1	Treatment-2
Cost of feeding/animal/10 weeks (INR)	123.00	39.72	87.54
Cost of feeding/100g body weight (INR)	13.00	4.00	9.00

(1300.00±50.33g). Significant and highest weekly body weight gain and daily weight gain was observed in T2 group (93.13±6.04 and 13.30±0.86g) followed by Control group (92.07±19.87 and 13.15±2.84g) and T1 group (89.93±10.45 and 12.85±1.49g). Lowest weight gain was observed in 100 per cent feeding of hydroponic maize fodder in New Zealand White rabbits. The results are in accordance with Rajkumar *et al.* (2016) and Mohsen *et al.* (2015) in their studies on rabbits.

The cost of feeding in New Zealand White rabbits for 10 weeks under different treatment groups was presented in Table 4. The values revealed that low cost of feeding and cost of feeding for 100 gram body weight gain was recorded in T1 (Rs. 39.72 and 4) followed by T2 (Rs. 87.54 and 9) and Control (Rs. 123 and 13) group. From the results it was evident that 100 per cent feeding of hydroponic maize fodder can reduce cost of feeding in New Zealand White rabbits.

CONCLUSION

Hydroponic maize fodder production under low cost devices produces laxative and nutrient rich fodder for rabbits. From the experiment it was observed that supplementation of 100 per cent hydroponic maize fodder decreased the dry matter intake and body weight gain in New Zealand White rabbits when compared with hydroponic maize incorporated and basal diets. Due to the reduced dry matter intake the cost of feeding also reduced accordingly. Hence, keeping in view of the body weights and weight gain it can be concluded that hydroponic maize fodder can be incorporated up to 50 per cent in the basal diet of rabbits.

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