

ECONOMICS OF FEEDING HYDROPONIC MAIZE FODDER IN MADRAS RED SHEEP

Pasupathi, Karu*¹, V. Jeichitra², M. Suganthi³ and D. Balasubramanyam⁴

*Post Graduate Research Institute in Animal Sciences
Tamil Nadu Veterinary and Animal Sciences University
Kattupakkam, Chengalpattu district, Tamil Nadu, India*

ABSTRACT

An experiment was conducted to assess the growth performance of Madras Red sheep on hydroponic maize fodder replacing Bajra Napier grass Co(CN)-4 at 50 and 100 per cent level. Madras Red ram lambs of about 4 months of age (33 Nos.) were randomly divided into three groups. All the lambs of three groups were fed with concentrate feed @ 100 g/day. In addition, Group-1 lambs were fed with 100 % Co(CN)-4; group-2 lambs were fed with 50 % Co(CN)-4 and 50 % hydroponic maize fodder and group – 3 lambs were fed with 100 % hydroponic maize fodder to meet out their dry matter and nutrient requirement. The trial was conducted for three months. During the trial period the data collected were initial body weight, monthly body weight, final body weight, feed intake, and cost of feeding. No significant differences were observed in the average weight gain, dry matter intake and feed conversion ratio among the treatment groups. Cost of feeding per kg live weight gain was found higher as the inclusion level of hydroponic fodder included increased in the ration. Hence, hydroponic fodder can be recommended when acute fodder deficiency occurred especially during summer.

Key words: Co (CN) -4, Economics, FCR, Growth rate, Hydroponic maize fodder, Sheep

Sheep farming plays a vital role in the rural economy of farmers in Tamil Nadu. The sheep population in Tamil Nadu is found to be 4.5 million (Anonymous, 2019), decreased by 5.98% compared to the previous livestock census of India. A mutton type sheep breed, Madras Red

is distributed around Kancheepuram, Chengalpet, Thiruvallur, Thiruvannamalai, Villupuram, Vellore and Kallakurichi districts of Tamil Nadu. Due to urbanization the land area for grazing the animal is decreasing which necessitates the farmers to go for semi-intensive or intensive system of management.

*Corresponding author, email:
drkarupasupathy@gmail.com

¹Associate Professor

²Professor

³Assistant Professor

⁴Dean-in-charge, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Theni, Theni District, Tamil Nadu, India

Hydroponics is the recent system of fodder production and very much useful for the landless and small land holding farmers, which requires less space for fodder cultivation as well as lesser quantity of water as compared to conventional fodder

production system. However, the results on economics of feeding hydroponics fodder to sheep are scanty. Hence, the trial was conducted to assess the economic feasibility of feeding hydroponic maize fodder in Madras Red sheep.

The Madras Red ram lambs available at sheep and goat breeding unit of Post Graduate Research Institute in Animal Sciences (PGRIAS), Kattupakkam, TANUVAS was utilized for this study. Ram lambs of about 4 months age (33 Nos.) were randomly divided into three treatment groups *viz.*, Group-1 lambs were fed with Bajra Napier hybrid grass [CO (CN)4]. Group-2 lambs were fed with 50 % of the dry matter requirement through Bajra Napier hybrid grass and remaining 50 % through hydroponic fodder maize and Group-3 lambs were fed with 100 % hydroponic maize fodder. The trial was conducted for three months. The hydroponic maize fodder was produced in the low-cost hydroponic device available at PGRIAS. After 18 hours of soaking the dry maize and followed by 18 hours of germination in gunny bag, then the seeds were spread in the perforated plastic tray and allowed to grow for 8 days. Every day, 5 minutes water sprinkling was done for every three hours. The parameters observed in the trial were initial live body weight, monthly live body weight, final live body weight, quantity fed and cost of feeding. The average daily gain, dry matter intake, feed conversion ratio and cost per kg live weight production were worked out. The facilities available at Institute of Animal Nutrition were utilized for dry matter and proximate principles estimation in fodder. The Proximate principles were analyzed as per AOAC (1990). For economic analysis,

the rate of concentrate feed was kept as Rs. 25/kg (prevailing market rate) and Co(CN)4 and Hydroponic fodder maize were kept as Rs. 1.60 and 3.20 respectively. The data were analyzed using IBM SPSS 20 software.

The hydroponic maize fodder yield from one kg of maize seed was found to be 5.74 ± 0.24 kgs. The proximate composition of the Co(CN)4 maize as well as hydroponic maize fodder is presented in Table 1. The proximate principles of hydroponic maize fodder are in accordance with the earlier findings of Kide *et al.* (2015); Naik *et al.* (2017) and Jemimah *et al.* (2020).

The growth performance of Madras Red lambs is presented in Table 2. The weight gain observed during the trial period was 3.47 kg, 3.70 kg and 3.56 kg in Group-1, 2 and 3, respectively. Better weight gain was observed in 50% hydroponic maize fodder fed group than 100 % hydroponic maize fodder fed group. The average daily gain (g) observed in group-2 was highest 41.21 g ($P > 0.05$). This is in accordance with the Gebremedhin (2015) who observed increased weight gain in hydroponic fodder fed animals.

The dry matter intake is higher (258.27 g in 50% and 253.91 g in 100%) in hydroponic maize fodder group than Co(CN)4 fed group (251.48 g). This result is in accordance with Jemimah *et al.* (2017). The feed conversion efficiency was found to be better in hydroponic fodder fed group. But efficient feed conversion was observed in 100 % hydroponic fodder fed group (6.18) than 50 % hydroponic fodder fed group (6.23). It may be due to higher

digestibility of hydroponic fodder. This result is corroborated with Mekonnen *et al.* (2019). Economic analysis of feeding cost on lambs(kept other variables constant) revealed that the hydroponic fodder fed group had higher cost per kg live weight production than the Co(CN)-4 or 50 % Co(CN)-4 fed group mainly due to high price for the hydroponically grown fodder (Rs. 3.20 vs 1.60). However, lower cost of production per kg live weight gain on hydroponic fodder fed group was reported

by Jemimah *et al.* (2017) and Adebisi *et al.* (2018).

Hydroponic maize fodder could be recommended to the Madras Red lambs only during the lean fodder season like summer than the year around feeding due to its cost of production. However, experiment with more number of animals need to be conducted to validate the economic feasibility of hydroponic maize fodder feeding in Madras Red sheep.

Table 1: Proximate composition of Hydroponic Maize fodder and Co(CN)-4

Sl. No.	Proximate Principles	Per cent	
		Hydroponic Maize fodder (n=3)	Bajra Napier grass [Co(CN)-4] (n=3)
1.	Dry Matter	18.13±0.31	15.17±0.81
2.	Crude Protein	13.74±0.53	9.31±0.62
3.	Ether Extract	4.21±0.19	2.14±0.31
4.	Crude Fibre	9.84±0.47	34.29±1.74
5.	Total Ash	2.59±0.14	9.03±0.57
6.	Nitrogen Free Extract	51.42±0.76	30.12±1.03

Table 2: Growth performance of Madras Red lambs (Mean±SE)

Parameter	Group-1 (n=11)	Group-2(n=11)	Group-3 (n=11)
Initial body weight (kg)	9.80±0.56	9.80±0.55	9.80±0.53
Final body weight (kg)	13.27±0.41	13.50±0.32	13.36±0.47
Weight gain (kg)	3.47±0.20	3.70±0.29	3.56±0.19
Average daily gain (g/day)	38.58±2.26	41.21±3.23	39.59±2.17
Avg. Dry Matter Intake (g/day)	251.18±4.99	258.27±2.25	253.91±2.17
FCR	6.34±0.67	6.23±0.36	6.18±0.42
Cost (Rs.)/kg body weight gain	106.42 ^a ±5.77	119.03 ^{ab} ±8.60	132.01 ^b ±6.17

REFERENCES

- Adebiyi, O.A., Adeola, A.T., Osinowo, O.A., Brown, D. and Ngambi, J.W. (2018). Effects of feeding hydroponics maize fodder on performance and nutrient digestibility of weaned pigs. *Applied Ecology and Environmental Research*, **16**(3): 2415-2422.
- Anonymous, (2019). All India 20th Livestock Census, Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi.
- AOAC (1990). Official methods of analysis, Association of Official Analytical Chemists, 15th Edn. AOAC Inc., Arlington, VA, USA.
- Gebremedhin, W.K. (2015). Nutritional benefit and economic value of feeding hydroponically grown maize and barley fodder for Konkan Kanyal goats. *Journal of Agriculture and Veterinary Science*, **8**(7); 24-30.
- Jemimah, E.R., Gnanaraj, P.T., Muthuramalingam, T., Devi, T. and Bharathidhasan, A. (2017). Effect of hydroponic horse gram fodder and hydroponic sum hemp fodder with replacement of concentrate mixture on the post weaning growth performance of Tellicherry kids. *Indian Journal of Animal Science*, **87**(2): 191-194.
- Jemimah, E.R., Gnanaraj, P.T., Sivakumar, T., Gopinathan, A. and Sundaram, S.M. (2020). Growth performance of Tellicherry crossbred female kids supplemented with variable levels of hydroponic maize fodder. *Journal of Entomology and Zoology Studies*, **8**(3): 81-85.
- Kide, W., Desai, B. and Kumar, S. (2015). Nutritional improvement and economic value of hydroponically sprouted maize fodder. *Life Sciences International Research Journal*, **2** (2): 76-79.
- Mekonnen, E., Mekuriaw, Y., Tegegne, F. and Asmare, B. (2019). Evaluation of fodder biomass yield of hydroponically grown barley and oats and the effects on intake, digestibility and weight gain of Washera sheep when as fed as a supplement to a basal diet of natural pasture hay in Ethiopia. *Tropical Grasslands-Forrajes Tropicales*, **7**(5):519-526.
- Naik, P.K., Dhawaskar, B.D., Fatarpekar, D.D., Karunakaran, M., Dhuri, R.B., Swain, B.K., Chakurkar, E.B. and Singh, N.P. (2017). Effect of feeding hydroponic maize fodder replacing maize of concentrate mixture partially on digestibility of nutrients in lactating cows. *Indian Journal of Animal Science*, **87**(4): 452-455.