International Journal of Veterinary Sciences and Animal Husbandry

ISSN: 2456-2912
NAAS Rating (2025): 4.61
VET 2025; 10(8): 293-296

www.veterinarypaper.com
Received: 24-06-2025
Accepted: 26-07-2025

Bhosale GK
Student M.Sc., Department of Agriculture, Dr. Sharadchandra Pawar College of Agriculture, Baramati, Pune, Maharashtra, India

Bhoyar AR
Assistant Professor, Division of Animal Husbandry and Dairy Science, College of Agriculture, Baramati, Maharashtra, India

Dr. Deokar DK
Associate Professor, Division of Animal Husbandry and Dairy Science, Post Graduate Institute, MPKV, Rahuri, Maharashtra, India

Sonawane YB
Student M.Sc., Department of Agriculture, Dr. Sharadchandra Pawar College of Agriculture, Baramati, Pune, Maharashtra, India

Chormale TK
Student M.Sc., Department of, Dr. Sharadchandra Pawar College of Agriculture, Baramati, Pune, Maharashtra, India

Corresponding Author:
Bhosale GK
Student M.Sc., Department of Agriculture, Dr. Sharadchandra Pawar College of Agriculture, Baramati, Pune, Maharashtra, India

Effect of amaranth (*Amaranthus hybridus*) seed powder on growth performance of Osmanabadi male kids

Bhosale GK, Bhoyar AR, Deokar DK, Sonawane YB and Chormale TK

DOI: https://www.doi.org/10.22271/veterinary.2025.v10.i8e.2492

Abstract
This study evaluated the effect of amaranth (*Amaranthus hybridus*) seed powder on growth performance of Osmanabadi male kids. Twenty 3-month-old Osmanabadi kids were randomly assigned to four treatment groups (N=5) in a randomized block design: T_0 (basal diet only), T_1 (basal diet + 10 g amaranth seed powder in concentrate), T_2 (basal diet + 20 g amaranth seed powder in concentrate), and T_3 (basal diet + 30 g amaranth seed powder in concentrate). The feeding trial lasted 90 days. Body weights were recorded weekly. At the end of the experiment, kids fed the highest level of amaranth (T_3) showed significantly greater total weight gain and higher final body weight compared to contro. Statistical analysis (RBD, $p<0.05$) confirmed significant treatment effects. These results indicate that including up to 30g amaranth seed powder in the ration can enhance growth performance of Osmanabadi kids, likely due to improved protein and nutrient intake. However, our findings contrast with some previous reports (e.g. Leukebandara *et al*. 2019) and suggest that young growing kids may benefit more from amaranth supplementation. The study highlights amaranth seed powder as a promising feed supplement for meat goats, with implications for local feed resources and goat production.

Keywords: Amaranth seed powder, goat, kids, body weight

1. Introduction
India possesses the largest livestock population globally, totaling 535.78 million animals. This remarkable statistic encompasses 192.52 million cattle, 109.58 million buffaloes, 74.26 million sheep, 148.88 million goats, and approximately 9.06 million pigs, as reported in the 20th Livestock Census of 2019. Furthermore, according to this census, India ranks second in the world for goat population, with 148.88 million goats, which represent 27.80% of the total livestock in the country. In terms of production, goats contribute 2.93% of the milk and 13.63% of the meat consumed in India, as noted in the BAHS Annual Report of 2022. Livestock are vital to rural livelihoods and the economies of developing nations, serving as sources of income and employment for producers and others engaged in often intricate value chains. They are essential assets and safety nets for impoverished populations, particularly for women and pastoralist communities, and they provide a significant source of nutrition for billions of households, both rural and urban (Herrero M *et al*., 2012) [2].

An additional aspect of significance in the production of small ruminants is their status as a sustainable resource, offering remarkable potential for economic profitability and demographic stability, particularly crucial for arid, semi-arid, and other challenging regions of the globe. These species, which are utilized in such areas under extensive or semi-extensive management systems that emphasize indigenous breeds, play a vital role in maintaining genetic diversity while keeping production costs low through the effective utilization of natural resources. The products generated, specifically milk and meat (from young animals), are of exceptional nutritional quality. Goats, traditionally raised for their milk and meat, represent one of the most widely consumed meats globally, serving as an excellent protein source. Goat meat and milk encounter minimal religious restrictions among the varied human populations. They are low in fat and cholesterol while being rich in vitamins and minerals. Consequently, goat products have emerged as highly sought-after commodities in developed nations (Sinn and Rudenberg, 2008) [3].

Amaranthus hybridus seed oil can be regarded as a source of n-3 polyunsaturated fatty acids (PUFAs). The omega-3 polyunsaturated fatty acid, docosahexaenoic acid (DHA), serves several biologically significant functions, especially within the nervous system, where it is present in notably high concentrations in cellular membranes. In infants, DHA is essential for both the growth and functional development of the brain; a deficiency in this fatty acid can lead to various learning and cognitive impairments (Dhellot *et al*., 2006) [5]. In adulthood, DHA is crucial for sustaining normal brain function, and recent studies indicate that a decrease in DHA intake among adults is associated with several neurological conditions, including schizophrenia and depression. While n-3 polyunsaturated fatty acids may offer protection against vascular diseases, their excessive accumulation in membranes could heighten lipid peroxidation (Turner and Else, 2005) [4].

2. Materials and Methods

2.1 Experimental design

Twenty healthy Osmanabadi male kids (Capra hircus), 3 months old, were procured from local markets. After one month of adaptation on a standard diet (concentrate mixture, wheat straw, maize silage), kids were stratified by weight and randomly allocated into four treatment groups (T_0-T_3) of five animals each following a randomized block design. The treatments were: T_0-basal diet (control); T_1-basal diet + amaranth seed powder at 10 g of concentrate; T_2-basal diet + amaranth seed powder at 20 g; T_3-basal diet + amaranth seed powder at 30 g (i.e., approximately 10 g, 20 g, 30 g of amaranth per day per kid, replacing equivalent concentrate). The basal concentrate mixture was formulated to meet nutrient requirements as per NRC (2007) guidelines for a target gain of 50 g/day. Wheat straw and maize silage were offered ad libitum throughout.

2.2 Housing and management

Animals were housed individually in ventilated pens with facilities for individual feeding and watering. Standard husbandry practices were maintained; kids were vaccinated against PPR, B.Q and H.S and dewormed prior to and during the trial. Clean drinking water was available twice daily. A strict hygiene and management regime was followed throughout the 90-day feeding trial.

2.3 Feeds and Feeding: Each morning at 9:30 AM, kids received their allotted amount of concentrate mixture (including the prescribed amaranth supplementation for T_1-T_3). After concentrate intake, wheat straw and maize silage were offered ad libitum. Concentrate allocations were adjusted biweekly based on body weight to continuously meet the kids' crude protein and energy (TDN) requirements. This feeding protocol was maintained for 90 days.

2.4 Measurements and data collection

Body weights of all kids were recorded weekly at the same time of day (morning) before feeding, using an electronic balance. Feed offered and refusals were weighed daily to estimate feed intake. Feed samples were collected weekly for proximate analysis (dry matter, crude protein, etc.) following AOAC (2000) methods. Daily dry matter intake (DMI) per animal was calculated from the difference between feed offered and refused, adjusting for dry matter content.

2.5 Statistical analysis

Data were analyzed using a randomized block design as per Amble (1975) for significance testing. Treatment means were compared using critical difference (CD) at $p<0.05$. Growth performance parameters (initial weight, final weight, total gain, daily gain) were tabulated and statistically evaluated. All statistical calculations were performed using Microsoft Excel.

3. Results and Discussion

The goal of the current study "effect of amaranth (*Amaranthus hybridus*) seed powder on growth performance of Osmanabadi male kids" was undertaken at Goat Farm, Division of Animal Husbandry and Dairy Science, Dr. Sharadchandra Pawar College of Agriculture, Baramati. During the period of 2024-2025 for 90 days to know the growth performance and dry matter intake of Osmanabadi male kids. The result of the present investigation is depicted and discussed in the chapter with the following subheads.

3.1 Body weight

Amaranth seeds are rich in high-quality protein, which supports muscle development and promotes weight gain. They contain all essential amino acids, especially lysine and tryptophan, enhancing the nutritional value of the diet. Additionally, their strong antioxidant properties help reduce oxidative stress, leading to better overall health and performance in livestock.

Table 1: Average weekly body weight of kids under different treatments (kg)

Week	T_0	T_1	T_2	T_3	SEM	CD At 5%
0	9.18	9.13	9.26	9.15	0.0297	NS
1	9.28	9.24	9.37	9.26	0.0307	NS
2	9.43	9.41	9.55	9.43	0.0370	NS
3	9.54b	9.55b	9.90a	9.93a	0.0345	0.1065
4	9.67c	9.73c	10.27b	10.44a	0.0399	0.1232
5	9.79c	9.90c	10.62b	10.93a	0.0457	0.1411
6	9.90d	10.07c	10.97b	11.43a	0.0526	0.1623
7	10.02d	10.25c	11.32b	11.95a	0.0597	0.1840
8	10.16d	10.44c	11.69b	12.48a	0.0639	0.1971
9	10.29d	10.64c	12.05b	13.02a	0.0669	0.2063
10	10.42d	10.84c	12.42b	13.57a	0.0699	0.2155
11	10.56d	11.05c	12.81b	14.13a	0.0728	0.2244
12	10.70d	11.26c	13.20b	14.70a	0.0762	0.2349
13	10.86d	11.48c	13.61b	15.30a	0.0793	0.2445

Table 2: Effect of Amaranth seed powder on total body weight of kids (kg)

Treatment	Initial body weight (kg)	Final body weight (kg)	Total body Weight gain (kg)
T_0	9.18	10.86	1.67
T_1	9.13	11.48	2.34
T_2	9.26	13.61	4.35
T_3	9.15	15.30	6.15
Mean	9.18	12.81	3.62
SEM	0.0297	0.0793	0.0660
CD At 5%	0.0918	0.24451	0.2034

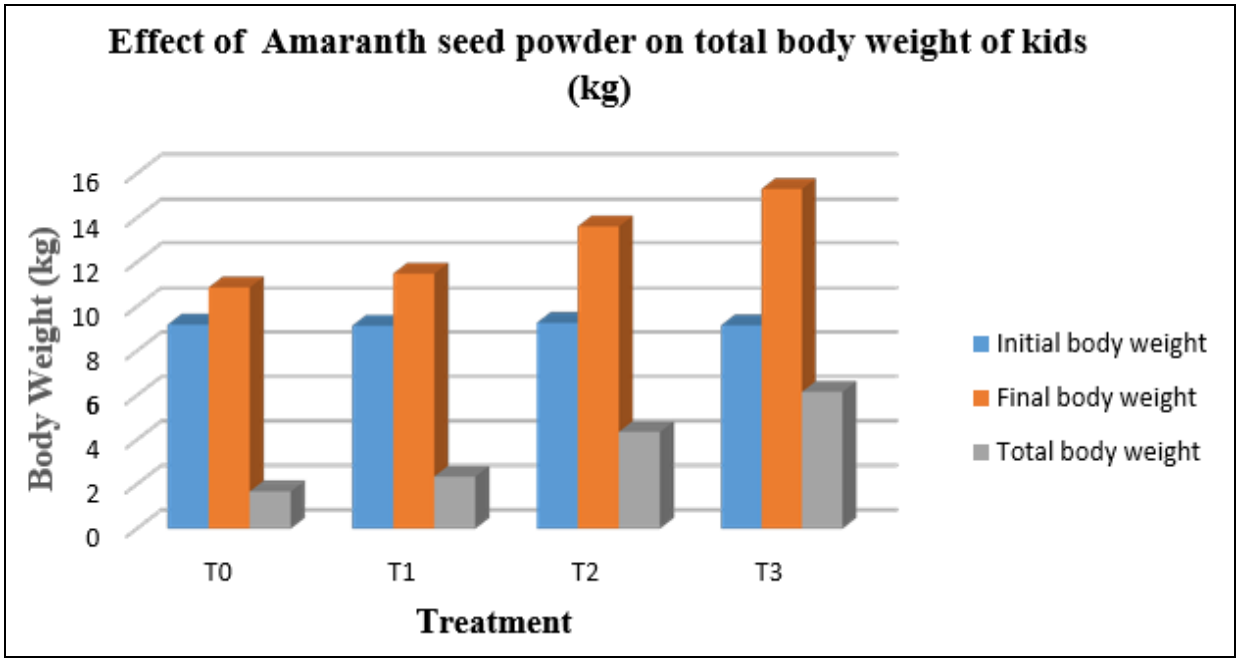

Fig 1: Effect of Amaranth seed powder on total body weight of kids (kg)

Initial and final body weights. At the start of the trial, mean initial body weights did not differ significantly among groups (T_0: 9.18 kg; T_1: 9.13 kg; T_2: 9.26 kg; T_3: 9.15 kg; $p>0.05$), indicating successful randomization. Over 90 days, all kids gained weight, but the gains differed by treatment. The final mean weights (kg) were T_0: 10.86, T_1: 11.48, T_2: 13.61, and T_3: 15.30. Thus, the T_3 group (30 g amaranth) achieved the highest final weight, which was significantly greater than T_0 ($p<0.05$). Correspondingly, total weight gains (kg) were highest in T_3 (6.15 kg), intermediate in T_2 (4.35 kg) and T_1 (2.34 kg), and lowest in T_0 (1.67 kg). These differences were statistically significant (CD, $p<0.05$).

4. Conclusion

Dietary supplementation of (*Amaranthus hybridus)* amaranth seed powder markedly enhanced the growth performance of Osmanabadi male kids. Body weight gain and average daily gain (ADG) increased in a dose-dependent manner, with the 30 g/day treatment yielding the greatest gains ($p<0.05$) relative to the control group. This statistically significant improvement at the highest inclusion level indicates that amaranth seed powder is an effective growth-promoting feed additive. Amaranth seeds are known to be rich in protein, vitamins and minerals a high-quality feed resource for ruminants which likely underlies the observed enhancement in growth. Thus, feeding 30 g/day of amaranth seed powder over 90 days substantially improved weight gain in Osmanabadi kids compared to lower supplementation levels and the unsupplemented control.

The significant gains at 30 g/day have important implications for goat nutrition and production. Osmanabadi goats are prized for their fine-quality meat and milk, and improvements in growth rate can directly translate into higher meat yield and better producer returns. These results suggest that incorporating amaranth seed powder into the diets of growing Osmanabadi kids can help exploit the breed's genetic potential for meat production. For practical application, further research is warranted. Future studies should investigate optimal inclusion rates and feeding durations of amaranth seed, as well as effects on additional performance traits (e.g. feed conversion efficiency, carcass quality, and lactation yield). Investigations into the long-term health, metabolic and economic impacts of amaranth supplementation would also be valuable. Together, such work will clarify how best to use amaranth as a sustainable feed resource to enhance the productivity of small ruminant systems.

Conflict of Interest

Not available

Financial Support

Not available

Reference

1. Leukebandara IK, Premaratne S, Sivakanesan R, Madugith T, Wimalasiri S, Sivananthawerl P, *et al*. Effect of feeding amaranth (*Amaranthus hypochondriacus*) seeds on blood serum parameters and body weights in lactating Saanen goats. Int J Agric Sci. 2020;4(1):57-65.

2. Herrero M, Grace D, Njuki J, Johnson N, Enahoro D, Silvestri S, *et al*. The roles of livestock in developing countries. Anim. 2012;7(1):1-16.
3. Sinn R, Rudenberg P. Raising goats for milk and meat. Little Rock (AR): Heifer International; 2008.
4. Hulbert AJ, Turner N, Storlien LH, Else PL. Dietary fats and membrane function: Implications for metabolism and disease. Biol Rev. 2005;80(1):155-69.
5. Dhellot JR, Matouba E, Maloumbi MG, Nzikou JM, Ngoma DS, Linder M, *et al*. Extraction, chemical composition and nutritional characterization of vegetable oils: case of *Amaranthus hybridus* (var 1 and 2) of Congo Brazzaville. Afr J Biotechnol. 2006;5(11):1095-1101.

How to Cite This Article
Bhosale GK, Bhoyar AR, Deokar DK, Sonawane YB, Chormale TK. Effect of amaranth (*Amaranthus hybridus*) seed powder on growth performance of Osmanabadi male kids. International Journal of Veterinary Sciences and Animal Husbandry. 2025;10(8):293-296.