

Research Insight

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Feeding Strategies for Improving Growth Performance in Goats

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Abstract Improving goat growth performance is a key objective in modern livestock production, directly influencing economic efficiency and product quality. This study systematically explores feeding strategies that enhance growth performance in goats by integrating nutritional management, feeding practices, genetic improvement, health control, and environmental regulation. The research analyzes critical growth indicators such as weight gain, feed conversion efficiency, and immune status, and evaluates the effects of optimized diet formulation, including balanced roughage-to-concentrate ratios and functional feed additives. In addition, different feeding systems and management approaches are compared to identify optimal practices. The role of genetic selection and marker-assisted breeding in improving growth traits is also discussed. A case study is presented to demonstrate the practical application and effectiveness of these strategies under farm conditions. The findings provide a comprehensive framework for improving goat production efficiency and offer valuable insights for sustainable and scientific goat farming.

Keywords Goat growth performance; Feeding strategies; Nutritional management; Feed efficiency; Genetic improvement

1 Introduction

Feeding management is a central lever for improving productivity and profitability in modern goat production systems. Goats contribute substantially to food security and rural livelihoods by supplying meat, milk, and high-value by-products in both intensive and smallholder settings, particularly in tropical and subtropical regions where they are often better adapted than larger ruminants to heat, poor-quality forages, and feed scarcity (Teixeira et al., 2024). However, suboptimal nutrition and poorly designed feeding programs remain major constraints to realizing the genetic growth potential of goats, leading to low average daily gains, delayed market age, and reduced reproductive efficiency. Recent work in replacement breeder goats has shown that relatively modest adjustments in diet composition and quantity—such as increasing total daily feed allowance and rebalancing roughage–concentrate ratios—can substantially enhance body weight gain, body condition score, and overall growth performance under smallholder conditions (Ghani et al., 2017). At the same time, climate change and rising temperatures are intensifying heat stress, altering nutrient requirements and increasing maintenance costs for thermoregulation, which makes context-specific feeding strategies even more critical for sustaining growth in hot environments. Against this background, evidence-based feeding strategies tailored to production goals, production systems, and environmental constraints are essential for improving growth performance in goats.

Goat growth performance is shaped by a wide array of interacting nutritional, managerial, and environmental factors. At the most fundamental level, growth depends on meeting energy and protein requirements that vary with genotype, physiological state, body weight, and ambient temperature. Under- or over-feeding energy markedly alters average daily gain, carcass yield, and the allometric development of muscle and internal organs in growing dairy goats, with restricted feeding decreasing growth rate, carcass meat yield, and visceral development in a weight-stage-dependent manner (Huang et al., 2024). Beyond total nutrient supply, the feeding system and diet structure strongly influence performance. Comparative assessments of stall feeding, pasture grazing, and grazing plus supplementation in small ruminants show that finishing kids and lambs solely on pasture typically reduces average daily gain and carcass yield, whereas supplemented grazing or intensive stall-feeding can match or exceed growth and carcass traits of confined systems when rations are appropriately balanced. Within intensive systems, diet form and ingredient selection are important: pelleted or hydroponic-fodder-based rations can increase intake,