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Precision feeding of small ruminants - A new frontier for veterinarians and nutritionists

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Precision feeding is the concept of providing feeds in amount and composition that match the requirements of animals according to their needs for maintenance and production. It evolved and is now well established in monogastric species and is becoming popular also in the cattle industry. Low feed costs/high feed efficiency and positive environmental impacts are the main benefits of the system. The concept should be applied to small ruminant production systems, as well. Intensive systems of dairy sheep and goats depend heavily on supplementary and expensive feeds to attain high productivity; however, animals are usually fed rations in excess of their requirements. The latter results in low feed efficiency and health/welfare related problems. Therefore, appropriate grouping strategies and lead factors for ration formulation, according to age and production stage, are a prerequisite to success, especially when accelerated breeding schedules are adopted. Less intensive or even extensive systems should not skip our attention, either. Such systems rely mainly on grazing natural pastures and their output depends on grass/shrub production and composition that is affected by climatic conditions. The application of precision feeding in these systems would greatly increase their efficiency and productivity and decrease health and welfare issues. Research focused on genotype x environment interactions is needed to quantify both the true nutrient requirements at different production stages and the effect of various management and nutritional strategies. Feeding an ever increasing human population with limited natural resources is a challenging task; precision feeding of farm animals and sustainability are inextricably connected.

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Detection of quantitative trait loci for meat quality and mineral content of Nelore longissimus dorsi muscle

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Production traits are mainly influenced by variation within several small-effect quantitative trait loci (QTL). Elucidate the hereditary bases of genetic variation of these traits is a bottleneck to incorporate molecular techniques in animal breeding programs. Developments in molecular genetics specifically high-throughput genotyping and sequencing methods offer a valuable opportunity to identify causal genes influencing complex traits. Recent studies have identified putative QTLs for production traits such as meat quality and mineral content in muscle of Nelore breed. These studies have indicated that gene clusters related to mineral transport as well as to metal binding influence meat quality. Supporting this finding, a study with the same population has shown that potassium level in longissimus dorsi muscle affect beef tenderness. Furthermore, the calpain system is highly sensitive to fluctuating levels of calcium ions indicating that calcium channel activity could generally influence postmortem tenderization. A Genome Wide Association Study (GWAS) performed for several mineral content of longissimus dorsi muscle detected similar biological mechanisms related to signal transduction, signaling pathways via integral membrane proteins, transcription regulation or metal ion binding influencing levels of different minerals. Genetic architecture of muscle mineral concentration potentially involves genes that control the transport and homeostasis of ions. These results may be useful to outline strategies to improve the mineral concentration of muscle and enhance both nutritional and meat qualityattributes.

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