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Direct Fed Microbes: A Better Approach to Maximize Utilization of Roughages in Tropical Ruminants

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Abstract : Manipulating microbial ecosystem in the rumen is considered as an important strategy to optimize production efficiency in ruminants. In the past, antibiotics and synthetic chemical compounds have been used for the manipulation of rumen fermentation. However, since the non-therapeutic use of antibiotics has been banned, efforts are being focused to search out safe alternative products. In tropics, crop residues and forage grazing are major dietary sources for ruminants. Poor digestibility and utilization of these feedstuffs by animals is a limiting factor to exploit the full potential of ruminants in this area. Hence, there is a need to enhance the utilization of these available feeding resources. One of the potential strategies in this regard is the use of direct-fed microbes. Bacteria and fungi are mostly used as direct-fed microbes to improve animal health and productivity. Commonly used bacterial species include lactic acid-producing and utilizing bacteria (Lactobacillus, Streptococcus, Enterococcus, Bifidobacterium, and Bacillus) and fungal species of yeast are Saccharomyces and Aspergillus. Direct-fed microbes modulate microbial balance in the gastrointestinal tract through the competitive exclusion of pathogenic species and favoring beneficial microbes. Improvement in weight gain and feed efficiency has been observed as a result of feeding direct-fed bacteria. The use of fungi as a direct-fed microbe may prevent excessive production of lactate and harmful oxygen in the rumen leading to better feed digestibility. However, the mechanistic mode of action for bacterial or fungal direct-fed microbes has not been established yet. Various reports have confirmed an increase in dry matter intake, milk yield, and milk contents in response to the administration of direct-fed microbes. However, the application of a direct-fed microbe has shown variable responses mainly attributed to dosages and strains of microbes. Nonetheless, it is concluded that the inclusion of direct-fed microbes may mediate the rumen ecosystem to manage lactic acid production and utilization in both clinical and sub-acute rumen acidosis.

Keywords : microbes, roughages, rumen, feed efficiency, production, fermentation
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