

Easing Transition Phase in Dairy Cows through Chrono-Provision of Various Starches

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Abstract

This article develops a novel farm practice to chrono-feed transition dairy cows various starch sources to optimize rumen and host metabolism. This practice aims to ease transition stress on high-merit cows and improve animal health and longevity. More fermentable starches may rather be utilized more efficiently and more healthfully in evening and overnight. More research is a must before key definitive guidelines for global use can be formulated.

Keywords: Chrono-feeding; Starch; Transition bioprocess;
Dairy cows; Physiology

Introduction

Animals rely on circadian cycles of metabolism for healthy life. The almost 24-h period characterizes the type of physiology that maintains animal productivity and health via demanding certain optimal feeding behaviour and patterns [1,2]. For instance, recent extensive research revealed that dairy ruminants fed at night vs. morning experienced a more extensive rumen fermentation, greater rumen volume, and higher milk production [3-6]. These results were obtained with the support of maintained optimal rumen and intermediary metabolic health. This article develops a practical standard for on-farm practice and future research that specifies certain starch sources for provision at certain circadian times.

Innovation and Discussion

The fact that evening and overnight eating increases rumen and ruminant production capacity without compromising animal health and economy, suggests that ruminant biological systems are more tolerant of risky conditions during evening and night vs. morning and day times. Based on this practical and scientific rationality, more degradable starch sources including wheat, barley, and highly processed corn and sorghum may be more healthfully fed in evening vs. morning times. Concerning transition dairy cows undergoing metabolic adaptations in rumen and internal physiology and metabolism, timing of feeding various starches describes a farm strategy that aims to help ease the transition metabolic stress on rumen microbes and splanchno-peripheral cells [1,7]. In light of the increasing attention to optimizing starch and glucose assimilation in high-producing ruminants [8-10], optimal chrono-feeding will be an on-farm frontier in feasible betterment of nutrient metabolism and transition health in dairy ruminants. Practically, any managerial strategy that aims to improve transition health must be able to increase nutrient balance a foremost [1,11].

Should the more rapidly fermentable be tolerated better at certain times of the 24-h period, then feeding them at such times reduce the likelihood of subacute rumen acidosis and resulting deficiencies in immunity and overall cow health. This can facilitate the transition from heavy pregnancy into high-capacity milk production and enable a more persistent and smoother lactation curve. A key determining factor would be an accelerated rise in dry matter intake early postpartum, thereby reducing the gap between milk synthesis and nutrient intake peaks.

Implication

Chrono-feeding of various starch sources based on their ruminal extent and rate of degradation, provides a pragmatic farm strategy to help ease biotransition from gestation into lactation towards improved health and longevity.

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