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Effects of Type of Concentrate Feed and Timing of Supplementation on Performance of Lactating Dairy Cows Grazing an Alfalfa-Rye-Grass Sward in the Peruvian Highlands

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Abstract

Alfalfa is an important forage source for grazing dairy cattle in the Peruvian highlands. Moderate metabolisable energy contents and high concentrations of rapidly rumen degradable protein in alfalfa necessitate the supplementation of concentrates rich in non-structural carbohydrates. The aim was thus to evaluate the effects of two different cereal grains differing in ruminal starch degradation and timing of supplementation on milk yield of dairy cows grazing a mixed alfalfa-rye-grass sward.

A feeding trial was conducted at the research station of National Agrarian University La Molina in Jauja, Peru (11°51'36.3" South, 75°23'48.8" West; 3,350 m above sea level), between November 2017 to February 2018. The trial comprised three periods of 14 d adaptation and 7 d sampling and tested four treatments in a Youden Square design. Twenty-four lactating Brown Swiss cows were used with (mean ± standard deviation) 458 ± 48.4 kg live weight (LW), 141 ± 52 days in milk, and 15.3 ± 1.8 kg d^{-1} milk yield at the start of the trial. All cows grazed an alfalfa-rye-grass sward for 8 h d^{-1}. They were divided into four groups that were randomly assigned to one of the four treatments. Dietary treatments included 3.5 kg d^{-1} (as-fed basis) of two types of cereal grains differing in starch degradation (i.e., ground corn (C) and oat (O)) along with 0.5 kg d^{-1} (as-fed basis) of corn cobs. While two groups received their concentrate mixtures at 1 kg cow^{-1} during morning and 2.5 kg cow^{-1} and day during afternoon milking (Cpm, Opm), 2.5 kg cow^{-1} of the concentrate mixtures were fed during morning and 1 kg cow^{-1} and day during afternoon milking to the other two groups (Cam, Oam).

Mean daily concentrate intake was 3.2 (Cpm), 3.1 (Cam), 3.1 (Opm), and 3.3 kg DM cow^{-1} (Oam). Mean daily milk yield was 15.6 (Cpm), 14.8 (Cam), 14.1 (Opm), and 15.0 kg cow^{-1} (Oam). Timing of supplementation appears to affect performance of grazing cows, but the effect differs depending on the type of concentrate feed used. Results on milk composition, apparent total tract nutrient digestibility, and feed intake are still pending, but will be used to explain observed differences in milk yield.

Keywords: Dairy cows, grazing, non-structural carbohydrates, supplementation

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