

Assessment of Performance, Health and Welfare Indicators of Dairy Cows in Relation to their Feeding Management in a Greek Dairy Farm - Abstract

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Summary

The objective was to assess performance, health and welfare indicators of dairy cows in relation to their nutritional management. A dairy farm with 120 milking Holsteins was monitored for one year. Cows were housed in free stalls as one group and fed a total mixed ration (TMR) offered once daily (after morning milking). The farm was visited on a monthly basis by the same team of veterinarians. During each visit individual cows were assessed for their body condition score (BCS: 1 to 5 scale by increments of 0.25), locomotion score (LS: 1 to 4 scale) and manure consistency score (MCS: 1 to 5 scale). Moreover, the proportion of cows lying down and ruminating 2 h after feeding as well as the average number of chewing per cud were also assessed. Manure samples (one for every 10 cows), representative of all MCS recorded, were sieved to assess the presence of undigested fibers and grains. Moreover, a representative fresh TMR sample was collected immediately after feeding and its chemical composition was assessed on-farm using a portable NIR analyzer (AgriNIRTM, Dinamica Generale, Italy). The particle size of the TMR was evaluated with Penn State Particle Separator (PSPS) using a 1.18 mm screen. Percentages of particles retained on each sieve and the average particle size (APS) were calculated. The peNDF1.18 percentage was calculated as the product of the cumulative percentage of particles retained above the 1.18 mm screen multiplied by the NDF content of TMR. Monthly records of bulk tank and individual milk yield (MY), fat (F), protein (P) and lactose (L) content were available for all cows. Cows with F:P ratio <1.0 were considered at-risk for subacute ruminal acidosis (SARA) and those with F:P ratio >1.4 in the first 30 days in milk at-risk for subclinical ketosis (SCK). Non-parametric pairwise correlation coefficients (spearman's ρ) were calculated for all parameters. There was a remarkable inconsistency of TMR chemical composition and forage particle size. The percentage of particles retained on the upper sieve of PSPS ranged

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from 3.8% to 24.2% during the study. Constantly, about 2/3 of screened manure samples had >5 undigested grains. The TMR crude protein content was relatively low (range: 13.2% - 15.3%) considering herd milk production levels. The percentage of ruminating cows was constantly low (range: 32% - 54%) and the average number of chewing per cud ranged from 56 to 71. ADF and NDF were within acceptable levels (ADF: 17.7% - 23.8%; NDF: 30.5% - 38.7%). Individual MY (range: 26.91 L - 32.26 L) was negatively associated ($\rho = -0.806$, $P = 0.005$) with the percentage of cows at-risk for SARA (range: 6.5% - 25.5%) and with the percentage of lame cows ($\rho = -0.721$, $P = 0.019$). The latter was positively associated ($\rho = 0.727$, $P = 0.011$) with the percentage of thin cows ($BCS < 2.5$). The percentage of severely lame cows ($LS = 4$) was positively associated ($\rho = 0.673$, $P = 0.023$) with the TMR starch content (range: 21.8% - 28.4%). The percentage of cows ruminating was negatively associated ($\rho = -0.688$, $P = 0.019$) with APS (range: 4.9 mm - 7.7 mm) of TMR. TMR inconsistency in dietary starch content and particle size, favoring feed sorting by cows, were the most important findings. Hence, it was concluded that ration re-formulation considering protein-energy balance and lowering starch levels, together with appropriate TMR mixing and routine hoof-trimming procedure should be prioritized in planning of corrective interventions in the studied farm.

Keywords: Cattle; performance; health; nutritional management.

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