

A. Steinwider, T. Guggenberger, J. Gasteiner, L. Podstatzky, L. Gruber, J. Häusler, M. Gallnböck and A. Schauer (2009): **Influence of protein supply on feed intake, milk yield, rumen and blood parameters and N-excretion of dairy cows** (in German). *Züchtungskunde*, 81, (2), 106-124.

Summary

In a two factorial experiment 108 multiparous cows (41 Holstein, 36 Simmental, 31 Brown Swiss) were randomly assigned to three levels of crude protein (XP14, XP16 and XP18) and three protein concentrate groups differing in ruminal degradability of crude protein (UDPn, UDPm, UDPh) in the beginning of lactation (21st - 105th lactation day). The hay and grass silage forage ration was supplemented with an energy concentrate and one of three protein concentrates according to experimental group. The protein concentrate UDP20 consisted of 66% peas, 20% rapeseed cake and 14% wheat bran. UDP29 consisted of 80% soybean meal and 20% sunflower seed meal and UDP43 of 40% protected soybean meal (SoyPass® : xylose and heat treatment), 40% soybean meal and 20% sunflower seed meal.

The UDP-rate of the protein concentrates (UDPn, UDPm, UDPh) had no effect on feed intake. At a concentrate percentage of 44% of total ration, feed intake was 22.1 kg DM and 168 - 170 g DM/kg LW^{0.75} respectively. In contrast to calculated ruminal N-balance (+52, +32, +20 g N/day), milk and blood urea contents were not affected by the UDP-groups. Milk yield (32.7, 33.9, 34.2 kg milk/day; 32.7, 34.5, 34.2 kg ECM/day resp.) and milk protein yield (1,044, 1,067, 1,053 g) in group UDPn tended to be lower compared to UDPm and UDPh. Even at the high CP-level (XP18) milk yield declined. Level of crude protein (XP14, XP16 and XP18) had significant effects on feed intake, milk yield, milk and blood urea content as well as N-excretion. At an increasing CP-content (14, 16 and 18% CP) feed intake increased from 165 to 170 and 172 g DM/kg LM^{0.75} (21.3, 22.1, 22.9 kg DM/day, resp.), whereas forage intake increased tendentially and concentrate intake significantly. With the exception of subgroup UDPnXP18, milk and protein yield increased almost linearly from CP-level 14 to 16 and 18%. In subgroup UDPnXP18 milk yield declined. The energy corrected milk yield increased in protein concentrate group UDPn from 31.9 (XP14) to 33.5 (XP16), in group UDPm from 31.5 (XP14) to 35.3 (XP16) and 36.6 (XP18) and in group UDPh from 32.2 (XP14) to 34.4 (XP16) to 36.1 (XP18), respectively. In subgroup UDPnXP18 the ECM yield was 32.7 kg. With the exception of UDPnXP18, milk protein yield increased about 2.5 - 3.5% (comparatively to XP14) per increasing CP percentage in the ration. On the other hand, N-excretion increased and N-efficiency decreased linearly from CP-level XP14 to XP18.

Keywords: Dairy cows, crude protein, lactation, energy concentration, feed intake, urea contents

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