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DRY PERIOD ENERGY AND SUBSEQUENT REPRODUCTION

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Getting dairy cows pregnant presents a challenge in most herds. In recent years more emphasis has been placed on transition cow management in an attempt to improve both production and reproduction of cow's after they calve. How prepartum nutrition affects postpartum reproductive performance has been a difficult question to address through research. Typically 100 cows per treatment are required to identify significant changes in common reproductive outcomes, driving up the cost of research.

Recently researchers from the University of Illinois were able to combine data from seven studies to evaluate energy intake prepartum. They created two groups, one had NE_L intake restricted to less than or equal to 100% of requirements (CE or controlled energy) and the other group was allowed ad libitum dry matter intake (HE or high energy). The data from 408 cows were then used to determine if reproductive performance in the subsequent lactation differed depending upon energy intake prepartum.

The CE diets fed during the studies summarized here were either of moderate energy, restricted to 80% of NRC requirements for NE_L, or they were high-bulk, low energy type diets. The high-bulk diets prepartum were formulated with low-energy ingredients, such as straw or low-quality forage, so that cows could eat ad libitum without receiving excess energy.

There was no difference in days to first service between cows fed the HE or CE diets in either the far off or in the close-up dry period. Interestingly enough, the cows that were on the CE diet during the close-up period became pregnant ten days sooner than those on the HE diet.

A subset of 69 cows was classified as either thin (n=43) or fat (n=26) at four weeks prior to calving. It took longer for the thin cows (median = 207 days) to become pregnant again than it did the fat cows (median = 116 d). A similar trend was seen at one week after calving, with thin cows taking longer to become pregnant again then those that were in moderate body condition (median = 170 and 148 days, respectively).

The cows fed the CE diets the last four weeks before calving lost less body condition during the first six weeks of lactation than those fed HE diets. In addition, there was a tendency for cows on the CE diet to consume more dry matter during the first four weeks after calving than those on the HE diet during the close-up period. These two factors indicate that the time cows are in negative energy balance after calving may be shortened. Reducing the time in negative energy balance may reduce the time to first ovulation, which is positively related to improved fertility.

Nonesterified fatty acids (NEFA) were lower during weeks one, two and three after calving if cows were fed CE diets during the far off dry period compared to cow fed the HE diets. Higher NEFA levels, indicative of fat mobilization, have been associated with increased risk of disease in this and other studies. Increased risk of disease has also been associated with decreased reproductive performance.

Controlling the energy intake of cows throughout the dry period appears to have long-term beneficial effects on reproduction. Although the exact mechanism by which this effect occurs was not determined, the beneficial effects may be a result of improved energy balance in the early postpartum period.

Reference

Cardoso, F.C., S.J. LeBlanc, M.R. Murphy, and J.K. Drackley. 2013. Prepartum nutritional strategy affects reproductive performance in dairy cows. J. Dairy Sci. 96:5859-5871.