

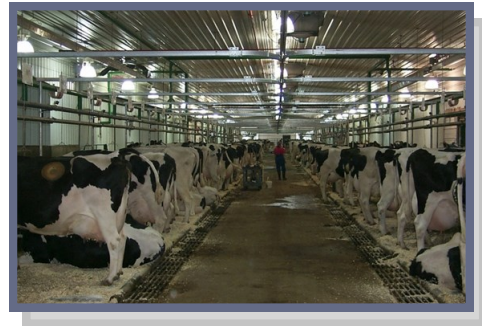
Feed restriction before calving negatively affects fertility in dairy cattle

Negative energy balance post-calving leads to fertility problems in dairy cows

During the transition from late pregnancy to lactation, most dairy cows decrease the amount of feed they consume. At the same time, their energy requirements increase, leading to a period of negative energy balance which may hinder future fertility by delaying the resumption of their reproductive cycle. Recent studies have shown that restricting feed intake prepartum may have beneficial effects such as increases in milk yield. Additionally, adding certain dietary long-chain fatty acids after calving has been shown to improve embryo development and reduce pregnancy losses.

But what effect do feed restriction and fatty acids have pre-partum?

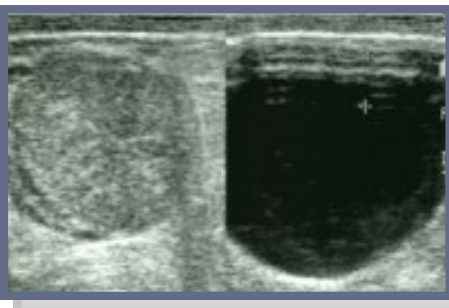
While previous studies showed the benefits of fatty acids after calving, our study examined the effects of these dietary modifications during the period just before calving. 72 cows were separated into free-fed and feed-restricted (24% restriction) groups; within these groups, cows were further subdivided into groups fed canola, linola, or flaxseed as fatty acid sources at 8% of the rations on a dry matter basis. After calving, all cows were fed a common diet with no oilseeds. Ultrasound examinations were used to monitor reproductive health and interval from calving to first ovulation. Lastly, after synchronizing ovulation, cows were artificially inseminated 75 days after calving and pregnancy determined 32 days later.



DRTC, Edmonton: site of experiment

Feed restriction appears to decrease fertility, but may improve health status

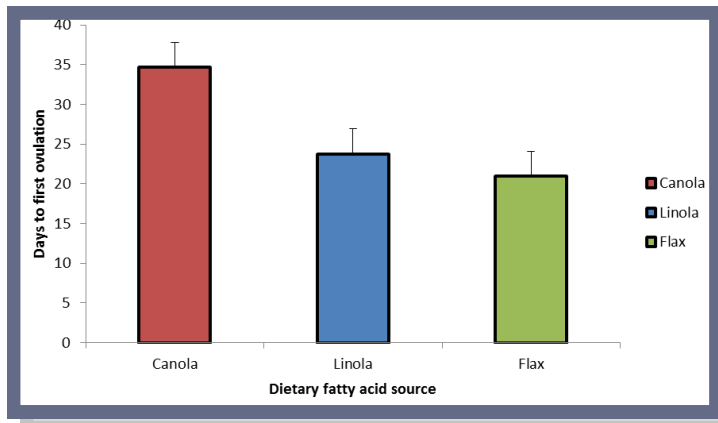
While the interval from calving to first ovulation was not different between cows that were feed-restricted and those that were free-fed, feed-restricted cows had lower pregnancy rates than free-fed cows (19% vs 47%) after the first artificial insemination and consequently took an average of 34 days longer to conceive (191 vs 157 days open).



Ultrasound image of ovarian cyst

28% of free-fed cows were diagnosed with uterine infections, but only 6% of feed-restricted cows were afflicted. However, more feed-restricted cows had ovarian cysts, although the presence of these cysts did not affect pregnancy rate. Other disease occurrences such as mastitis and milk fever were not affected by the level of feed intake.

Dietary canola may delay the return to the normal reproductive cycle



Canola-fed cows had an average period of 34 days between calving and first ovulation

As shown in the graph, cows fed linola or flax as their fatty acid source pre-partum had significantly fewer days between calving and first ovulation than those fed canola. In addition, canola-fed cows had higher levels of fatty acids in their circulation, suggesting that more fat was being mobilized for use as energy. Consequently, they experienced more weight loss after calving compared to the other two groups.

Energy balance postpartum was not different between the fatty acid groups,

suggesting that energy balance was not a cause of the delay of ovulation in canola-fed cows. Pregnancy rates were also unaffected by the fatty acid source; this may have been due to the small number of cows used in our study.

Feed restriction may result in a less severe negative energy balance after calving

Although energy balance was higher in free-fed cows before calving due to their higher levels of feed intake, this situation was reversed after calving. Free-fed cows were in a deeper state of negative energy balance after calving. Since a cow's ability to fight off infection is directly related to the strength of its immune system (which is in turn affected by its energy state) and nutritional management, this more severe negative energy balance may have contributed to the slightly higher proportion of uterine infections in free-fed cows. The dietary source of the fatty acid did not affect negative energy balance.

Conclusions

Restricting feed intake in dairy cows during the weeks before calving may result in fewer uterine infections, and a less severe negative energy balance postpartum; however, it is important to remember that these benefits are coupled with a severe reduction in pregnancy rates compared to free-feed cows. In addition, adding flax or linola instead of canola seed as a fatty acid source to the pre-partum diet of dairy cows could reduce the interval from calving to first ovulation.

Acknowledgements

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Source article: Colazo, M. G., A. Hayirli, L. Doepel, and D.J. Ambrose. *Reproductive performance of dairy cows is influenced by prepartum feed restriction and dietary fatty acid source*. 2009. *Journal of Dairy Science*. 92:2562-2571.