

The influence of protected cottonseed meal supplementation of a concentrate/pasture diet on the secretion of progesterone in bovine milk

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Post-partum anoestrus along with poor embryo survival are the two major contributory factors to the low conception rates found in Australian dairy herds. While the anovulatory period post-calving has been attributed to the negative energy balance associated with peak lactation, the cause of the failure to conceive once cyclicity has resumed has not been identified. However, a positive relationship between the circulating concentration of progesterone (P4) during the luteal phase and subsequent conception rates to artificial insemination has been found. Thus any means of maximising P4 secretion may assist in improving conception rates.

The addition of linoleic acid to luteal cells in culture has been shown to enhance P4 secretion. We have investigated the influence of formaldehyde-treated cottonseed meal, a dietary lipid source rich in linoleic acid (C18:2) protected from ruminal biohydrogenation, on milk P4 levels in oestrus synchronized cows.

Multiparous Friesian cows lactating for 60–140 d were assigned to one of three groups (n=10) by stage of lactation and offered 10 kg DM of a concentrate ration balanced for energy and nitrogen content and containing either 0, 1 or 2 kg of PCM in addition to ryegrass/kikuyu *ad libitum*. Oestrus was synchronized using CIDR^R on days 6 and 26 following the commencement of dietary supplementation.

Daily (a.m.) milk samples were analysed for P4. Cows were inseminated at the time of detection of heat after, following the second synchronization.

The synchronization facilitated a distinct rise and then fall in P4 secretion characteristic of the oestrus cycle (Figure 1). However the PCM caused a decrease in P4 secretion which coincided with a decrease in pregnancy rate from 60% (6/10) in the control group to 40% and 20% for the 1 and 2 kg supplemented groups respectively. These changes were associated with a dose-dependent increase in the linoleic acid content in milk (Simos *et al.* 1999).

This study suggests that the provision of a source of linoleic acid to isocaloric diets decreases ovarian luteal cell function in the dairy cow. The challenge remains to determine at which level of the reproductive endocrine axis this effect occurs (Staples *et al.* (1998).

Simos, G.C., Della-Vedova, J.J., Myung, K.H., Fleck, E., Gooden, J.M. and Wynn, P.C. (1999). Manipulation of bovine milk composition through supplementation with a protected cottonseed meal. *Recent Advances in Animal Nutrition in Australia* **12**, 23A.

Staples, P.R., Burke, J.M. and Thatcher, W.W. (1998). Influence of supplemental fats on reproductive tissues and performance of lactating cows. *Journal of Dairy Science*, **81**, 856–871.

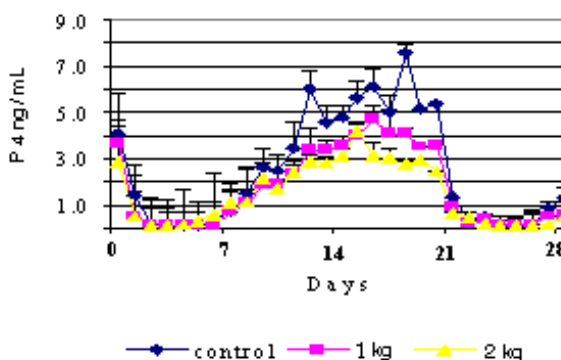


Figure 1 Effect of PCM on P4 levels in milk.