STUDIES ON LIPID METABOLISM IN DAIRY COWS WITH SPECIAL REFERENCES TO THE CHANGES OF SERUM FREE FATTY ACIDS COMPOSITION BEFORE AND AFTER CALVING

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Changes of serum free fatty acid composition in normal dairy cows and in ketotic cows were examined during 8 weeks before and after calving. In addition, the concentrations of some serum lipids, such as free fatty acids (FFA), triglycerides (TG), phospholipids (PL), total-cholesterol (T-chol.) and esterified-cholesterol (E-Chol.), were also measured in these cows.

In normal cows, gas chromatography analysis demonstrated reversed phase changes of some serum FFA. Palmitic acid (16 : 0) and oleic acid (18 : 1) were increased at calving and then decreased. Linoleic acid (18 : 2) showed a marked decrease in the relative ratio before calving. After that, however, it increased to the maximum component at 8 weeks. The concentration of FFA showed rapid increase at calving followed by a decrease after calving.

Ketotic cows showed a greater increase of FFA than normal cows, and a high level of FFA was observed even after calving. Furthermore, the decrease of linoleic acid composition at calving in kekotic cows was more severe than in normal cows with a low rate of increase after calving.

TG concentrations were deceased and reached the minimal levels at 1 week after calving, and then slightly increased in both normal and ketotic cows.

The concentrations of PL, T-Chol. and E-chol. were all slowly decreased in the last stage of pregnancy and markedly increased after calving in normal cows. The concentrations of these in two of three ketotic cows examined were observed to be lower than in normal cows throughout the observation periods.