

DEVELOPMENT OF SERUM VITAMIN E, A AND β -CAROTENE LEVELS IN HEIFER CALVES DURING THE FIRST 8 WEEKS OF LIFE

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The aim of the study was to determine the development of vitamin E, A and β -carotene levels in the serum of Holstein heifer calves during the pre-weaning phase (first 8 weeks of life). Another objective was to evaluate the correlations between serum vitamin levels and live weight in the heifer calves.

Serum vitamin E, A and β -carotene levels were measured in 11 Holstein heifer calves. The calves were included in the study in their first week of life. All the calves received 2 litres of colostrum within 2 hours from birth. Another 2L of colostrum were fed within 4–6 hours from the first dose of colostrum. Then the calves received milk replacer. Blood sampling and determination of serum vitamin E, A and β -carotene levels were performed weekly, from the week (wk) 1 to wk 8 of the calves' life. Blood was collected from the jugular vein into serum separation tubes. Serum levels of vitamins E, A and β -carotene were measured by HPLC. The calves were weighed after every blood sampling. The data were processed by one-way ANOVA.

Serum levels of vitamin A did not change significantly during the first 8 weeks of life ($P>0.05$). However, significant differences in serum vitamin E levels occurred between the week 1 and wks 3, 7, 8 ($P<0.05$), and between the wk 2 and wk 3 ($P<0.001$), wk 4 ($P<0.01$), wk 5 ($P<0.01$), wk 6 ($P<0.01$), wk 7 ($P<0.001$), and wk 8 ($P<0.001$). Vitamin E serum levels were increasing during the first 8 weeks of life. There were significant differences in serum β -carotene between the wk 2 and wks 5, 6, 7 ($P<0.05$). Significant correlations between serum vitamin A and E levels and live weight were found during the first 8 weeks of life ($P<0.01$). No significant correlations were observed between serum β -carotene levels and live weight ($P>0.05$).

The serum vitamin A levels were suboptimal throughout the pre-weaning phase, whereas the vitamin E levels were within the reference range. This implies that the milk replacer was insufficient in vitamin A, but had an optimal vitamin E content. Positive correlations were found between live weight and serum vitamins A and E during the the first 8 weeks of life. The serum level of β -carotene had no effect on the calves' growth.

Keywords: VITAMIN E, VITAMIN A, β -CAROTENE, HEIFER CALVES

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