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Use of the Relative Dose Response (RDR) Assay to Determine Vitamin A Status of Calves at Birth and Four Weeks of Age

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An accurate assessment of vitamin A status can be determined by analysis of liver biopsy samples; however, liver biopsies are not always feasible. Plasma concentrations of vitamin A do not provide an accurate indication of vitamin A status. The objective of this study, therefore, was to determine the ability of the relative dose response assay to indicate the vitamin A status of Holstein calves. Calves were obtained at birth and assigned to vitamin A treatments (0, 1700, 34,000, or 68,000 IU/d) added to milk replacer. Liver biopsies and relative dose response assays were per-formed at birth and 4 wk. Calves supplemented with 1700, 34,000, or 68,000 IU of vitamin A/d had adequate (greater than 20 µg/g) liver concentrations of vitamin A at 4 wk of age. The relative dose response assay at 4 wk was correlated with liver concentrations of vitamin A. Both the relative dose response assay and liver concentrations of vitamin A indicated that calves not supplemented with vitamin A had low vitamin A status, whereas other treatment groups had adequate vitamin A status. Plasma concentrations of retinol increased theby 4 wk of age in calves receiving supplemental vitamin A at 34,000 IU and 68,000 IU/d and decreased in unsupplemented calves; however, all calves had concentrations of <20 µg of retinol/dl of plasma. The relative dose response assay agreed with liver biopsies as an indication of vitamin A status, whereas plasma concentrations of retinol incorrectly indicated all treatment groups were deficient in vitamin A.

Key Words: calves • vitamin A • relative dose response assay

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