

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

## BLOOD BETA-CAROTENE CONCENTRATION IN DAIRY CATTLE FED ON CORN SILAGE, HAY, AND CONCENTRATES: CASE REPORT

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Carotenoids, such as beta-carotene, can be converted to vitamin A, have antioxidant function, can enhance immune defense mechanisms, and can affect reproduction, lactation performance, and health of dairy cows. In confinement dairy production systems, total farm reliance on preserved forages is common. The carotenoid content of forages is reduced during storage as silage or hay and the content in grains is low. This survey evaluated the concentration of blood beta-carotene in a herd of Holsteins raised in total confinement based on corn silage, hay, and concentrates for the last ten years. The 10 ha farm is located at Ijaci, MG, Brazil, at 846 m above sea level, 21° 09' 52.41" latitude south, and 44° 55' 52.40" longitude west. At the day of sampling (April 23th, 2018) the herd of 109 animals had 7 calves from 0 to 3 months of age (CV), 45 heifers from 4 to 30 months (HE), 49 lactating cows, and 8 non-lactating pregnant cows. Lactating cows were milked 3x/day, mean milk yield was 31.2 kg/d, days in lactation 211, and body weight 630 kg. Diet formulation was based on NRC (2001) recommendations and feed analysis were performed routinely. Fifty-five animals were sampled: 3 CV (1.6 ± 0.4 months), 14 HE (14.0 ± 3.4 months, 303 ± 112 kg body weight), 11 cows in first lactation (C1. 28.8 ± 5.5 kg/d, 212 ± 174 days in lactation), 10 cows in second lactation (C2. 33.4 ± 8.1 kg/d, 218 ± 170 days in lactation), and 17 cows with more than two lactations (C>2. 34.4 ± 7.2 kg/d, 217 ± 151 days in lactation). Blood samples were obtained from the coccygeal vessels about 10 h post-morning feeding and the concentration of beta-carotene was immediately quantified with a single-step denaturation and beta-carotene extraction into organic solvent, followed by beta-carotene measurement using iCheck, a portable spectrophotometer (BioAnalyt GmbH, Teltow, Germany). Beta-carotene concentration was 0.63 ± 0.25 µg/mL, ranging from 0.06 to 1.15 µg/mL. Lactating cows had higher beta-carotene concentration than replacement heifers (0.49 vs 0.69 µg/mL, *P* < 0.01). Blood concentrations per group were (µg/mL): 0.24 for CV (a), 0.55 for HE (b), 0.75 for C1 (c), 0.78 for C2 (c), and 0.60 for C>2 (b) (*P* < 0.05, Tukey). Blood beta-carotene concentration was low (< 2 µg/mL) in all animals, suggesting that the supplementation or the inclusion of fresh forage in the diet may improve overall herd efficiency and health.

**Keywords:** antioxidant, carotenoid, dairy cows, vitamin A

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