

Ionized calcium and glucose changes in refrigerated heparinized blood samples from dairy cows

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Introduction

Proper sample handling is required in order to obtain reliable biochemical measurements. Handling recommendations, as well as suggested interval between sample collection and processing, are somehow conservative, and limit the on-farm use of these diagnostic tools. The aim of the present study was to evaluate the changes of ionized calcium (iCa) and glucose in refrigerated heparinized blood samples from dairy cows to provide more detailed handling recommendations that could facilitate their use in large animal veterinary practice and research.

Materials and Methods

Blood samples were collected from the coccygeal vessels of 16 adult cows into vacuum tubes coated with heparin. Measurements of iCa and glucose were performed using a biochemical analyzer (Stat Profile PRIME CCS Analyzer, Nova Biomedical, Waltham, MA). After collection, samples were immediately refrigerated, stored at 39.2°F (4°C) and analyzed at 0, 5, 20, and 35 min, 1, 2, 4, 26, 50, and 74 h. Before each

analysis, samples were homogenized for approximately 30 sec using a tube rocker. After homogenization a specimen was extracted from the vacuum tube using a syringe to minimize gas exchange. The iCa and glucose changes were evaluated with the MIXED procedure of SAS with cow as a random measure and time as a repeated measure.

Results

Initial iCa ranged from 1.27 to 0.92 mmol/L and glucose from 58 to 87 mg/dL. There was a significant effect of storage time for glucose ($P < 0.001$) and a tendency for iCa concentration ($P < 0.10$). The observed changes in iCa over time were minimal ($< 1\%$). Glucose concentration remained stable from 0 to 26 h, but decreased 2.37% at 50 h and 5.24% at 74 h.

Significance

Our results suggest that iCa concentration remains stable for 74 h and glucose concentration for 26 h when heparinized samples are kept refrigerated in vacuum tubes.