

## 7 Summary

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#### ***Ex vivo*-changes of metabolic profile parameters in bovine blood – A contribution to the development of quality standards for blood sampling in cattle**

Blood examination in cattle can be an important factor regarding the health status of single animals or of the herd. In the last few years, analytic methods have been refined and quality management was introduced in laboratory procedures. Thus, analytical errors could be reduced significantly.

The objective of this study was to create the general framework for dealing with blood samples *ex vivo* and to provide guidelines for the quality assurance in cattle practice. To this end, the influence of different systems for blood sampling and transport conditions were examined with regard to serum concentrations of selected metabolic parameters.

Open and closed serum monovettes<sup>®</sup> and vacutainers<sup>®</sup> with or without separator gel were used for the comparisons of different systems for blood sampling. Statistically significant differences were found for certain parameters, which could be related to the different materials from which the blood tubes were made. Certain differences were of clinical importance, since they bear the risks of diagnostic misinterpretations of laboratory results.

In order to examine the relevance of different transport conditions, vacutainers<sup>®</sup> containing separator gel were transported at different temperatures, for differing periods of time and were either centrifugated or not. Apparently, centrifugation of blood samples was more important than temperature regarding the stability of most parameters. Short-term transportation caused more accurate results of blood analyses than if the samples had been transported for a longer period of time, since certain metabolic processes continue within the serum. However, activity of metabolic processes is less than in whole blood samples. Examination of NaF/KOx tubes for determination of glucose showed a greater variety in uncentrifugated plasma samples than in centrifuged serum samples. Moreover, glucose concentrations were significantly lower in the plasma than in the serum.

Recommendations based on the results of this study are:

- citation of reference ranges according to the blood sampling system used;
- centrifugation of serum prior to the transport of the blood samples;
- certain parameters should not be examined in cases of long periods of transportation;
- serum tubes should be used for determination of glucose if a centrifuge is available.

This study shows that preanalysis can be an important factor for the stability of parameters in bovine blood samples. Thus, standardisation of this process is necessary to obtain diagnostic reliable results when analysing blood samples. Accordingly, further studies on the interaction of serum and the material of blood tubes, standardised prerequisites on the centrifugation methods of bovine blood samples and individual reference ranges for glucose concentrations in serum as well as in plasma are necessary.