

# Accuracy of Blood Electrolyte Measurements Taken with a Portable Measuring Device (PalmLab™) Compared to Standard Laboratory Procedures

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## Introduction

Large animal practitioners frequently must make treatment decisions without accurate knowledge of their patients' exact blood electrolyte status. The PalmLab™ device was specifically developed for veterinary practice. This trial was undertaken to evaluate the accuracy of measurements of the major blood electrolytes of interest in dairy practice (Ca, Mg, K, P) as measured by the PalmLab™, compared to results obtained from standard laboratory procedures performed by the Cornell University Clinical Pathology Laboratory.

## Materials and Methods

Between mid-February and mid-April 2000, blood samples were taken from 51 healthy animals of different age and in various stages of lactation. These served as control values. In addition, 25 sick animals that ambulatory veterinarians saw during their regular calls were sampled. The samples were taken back to the Ambulatory Pharmacy, labeled and stored in a refrigerator. On the next day the samples were centrifuged. The separated serum was divided into two portions, and one half was taken to the Clinical Pathology Laboratory (CPL) while the other half was kept in the Ambulatory Pharmacy and evaluated with the PalmLab™ (PL) device according to the manufacturer's instructions.

## Results

Scatterplots show weak relationships between the electrolyte values obtained from the PL and the CPL, respectively. Pearson's correlation coefficients reveal mostly weak correlations (see Table 1). This is true for the sick cows as well as the healthy controls except for phosphorus, which shows a much stronger correlation for the sick cows than for the controls.

## Conclusions

The PalmLab™ measuring device is a very handy, lightweight and relatively inexpensive device. However, according to practitioners who use it successfully, as well as in our experience, it does require a good number of samples processed by the same person to obtain a certain routine. Initial lack of said routine by the investigators should be taken into account when interpreting the results of this study. Moreover, these results represent only a small number of animals in the Ithaca area, and extrapolation should be done with much care. In this sample, it seems that some measurements (P) are more reliable than others and that some do not show good correlation with standard laboratory procedures. This points at possible weaknesses of the PalmLab™. Additional work with a larger number of animals is indicated to validate these results.

**Table 1.** Pearson's correlation coefficients (c=healthy control cows, s=sick cows)

	Ca		K		Mg		P	
	c	s	c	s	c	s	c	s
r	0.20	0.24	0.26	0.20	0.01	0.10	0.36	0.81

In accordance with the weak correlations found, only the phosphorus regression coefficients differed significantly from zero (p=0.0094 for controls, p<0.0000 for sick cows).