

Validation of Lactate Scout+ for equine sports medical monitoring



Authors: Equi-Test, La Lande, Grez en Bouère (53), France, contact@equi-test.com, www.equi-test.com

Introduction

Lactate is a key substance in sports medical monitoring as it is indicative of the aerobic capacity of athletes. Portable analyzers available on the market are adapted for human use (capillary blood with levels of hematocrit under 50%). As such, these analyzers need to be validated for equine use, due to the specifics of taking blood samples and raised hematocrit levels under exertion.

The purpose of this study is to validate the use of a portable analyzer, Lactate Scout+ (EKF Diagnostics), on equine whole blood, in a sports medicine field environment, by comparing it with a reference method.

Materials and methods

During standardized tests on the track on a group of 29 trotters, 90 blood samples were taken from the jugular vein, placed in fluoride oxalate tubes.

Each sample of whole blood was analyzed using the Lactate Scout+ within 20 minutes of the sample being taken. Another sample (50 µL) was deproteinized using perchloric acid (250 µL) and then analyzed via Boehringer enzymic analysis using an COBAS 6000, the reference method.

The results obtained using the two methods were then compared and analyzed using linear regression, calculating the Pearson correlation and using a Bland-Altman plot. The significance level was set at 5%.

Results

The lactates observed ranged from 0.5 to 21 mmol/L, according to the reference method. For all the data, the regression line equation is $y = 0.9247x$ ($R^2 = 0.98$).

The Pearson's correlation coefficient ($R = 0.99$; $p < 0.000$) confirms this linearity.

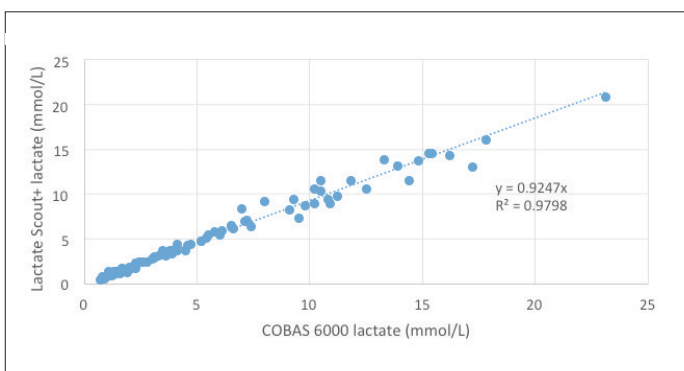


Figure 1. Regression line of COBAS 6000 and Lactate Scout+ analyses ($n = 90$).

Results continued

Finally, the Bland-Altman plot identified a weak bias of 0.4 mmol/L between the two methods.

For the values under 7 mmol/L ($n = 66$), the results are highly consistent with the reference method ($R^2 = 0.98$) and the calculated bias is very low (0.2 mmol/L). For higher levels of lactates (from 7 to 21 mmol/L) ($n = 26$), the results are less consistent ($R^2 = 0.89$) and the bias is higher (0.8 mmol/L).

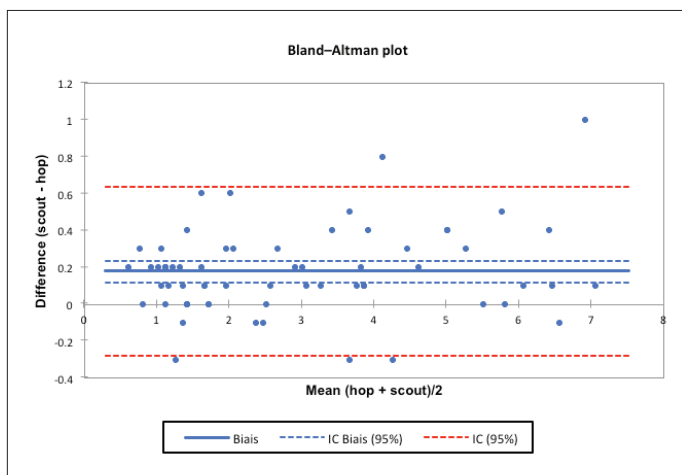
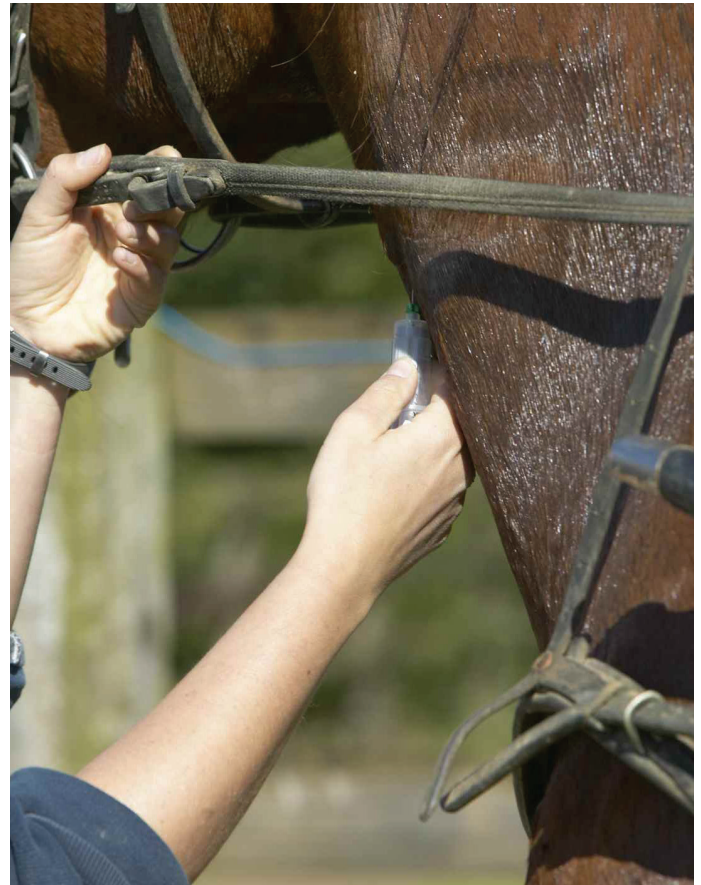


Figure 2: Bland-Altman plot of lactates under 7 mmol/L ($n = 66$).

Conclusion

For lactates levels under 7 mmol/L, the value range of interest for sports medical monitoring, the results of the comparison of the two methods are excellent.

For higher lactate levels, the loss of consistency between the two methods can be explained by the increase in hematocrit levels.

This is frequently described in portable analyzer validation studies.

The Lactate Scout+ is a rapid, portable lactate analyzer, that is reliable and adapted for field sports medical monitoring for equine athletes.

