

A comparison study between the Siemens Advia 120 and the manual method for the differential WBC count in goats

T.K. Tsouloufi, C. Brozos, M. Kritsepi-Konstantinou, E. Kiossis, I.L. Oikonomidis

School of Veterinary Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, Thessaloniki, Greece

Background

- The differential WBC count provided by the Advia 120 (A-Diff) using the ovine setting has been previously evaluated and compared with the M-Diff in sheep.¹ Although differences were observed between the A-Diff and the manual count (M-Diff), it was proposed that the Advia 120 can be used for routine screening of the differential WBC count in sheep.¹
- The Advia 120 is equipped with caprine-specific software; however, the analyser has not been previously validated for determining the differential WBC count in goats.

Objectives

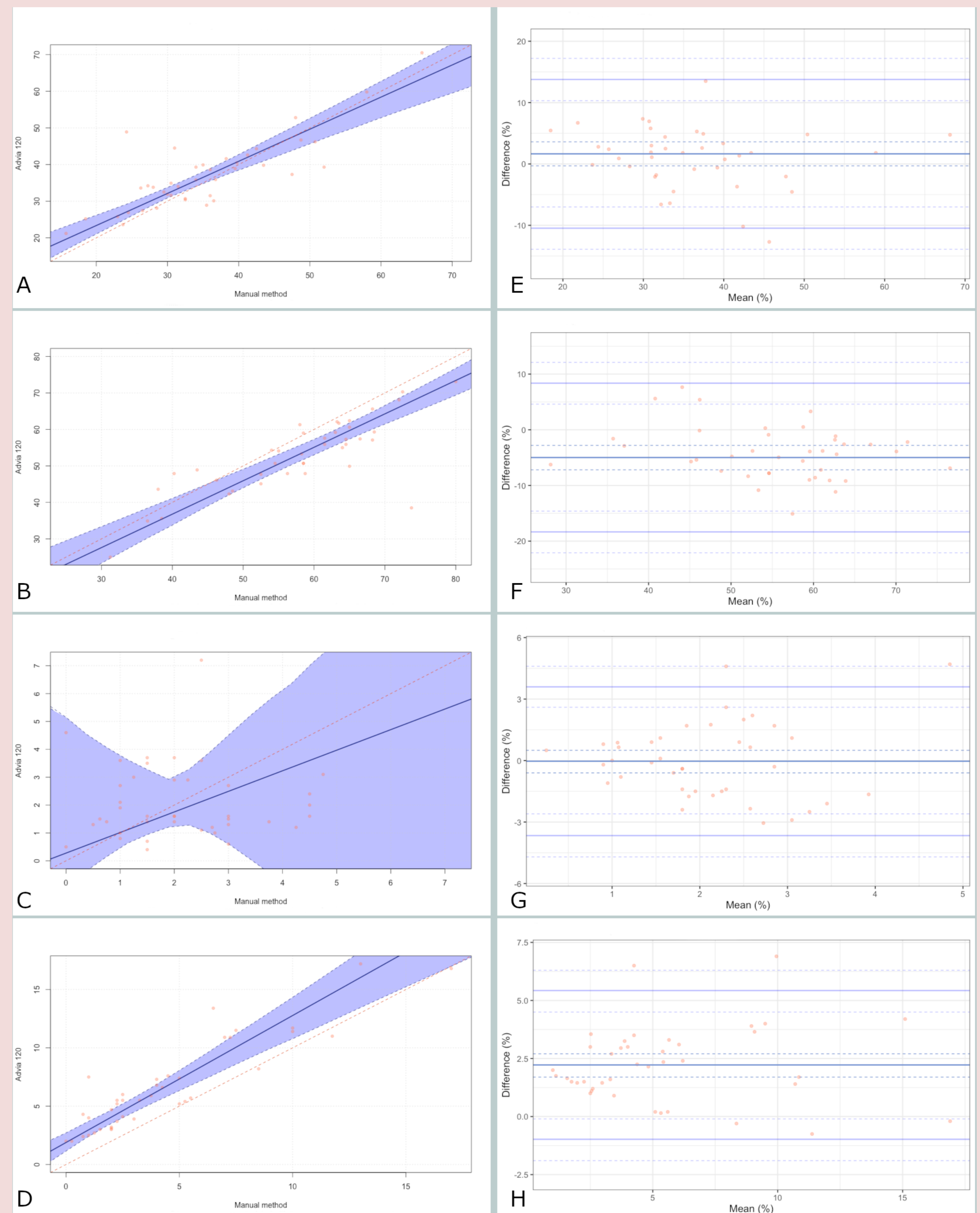
- The aim of this study was to compare the A-Diff provided by the Advia 120 using the caprine setting with the M-Diff in goats.

Materials & Methods

- The blood samples were collected into 10mL K₃EDTA evacuated tubes and the CBC was performed within 4h of blood collection.
- CBCs were performed using the species-specific software of the Advia 120 haematology analyser (Siemens Healthcare Diagnostics, USA).
- Two independent observers performed the M-Diffs using Giemsa-stained blood smears by counting a total of 200 WBCs.
- The exclusion criteria were: i) tubes that were inappropriately filled or contained clots; ii) erroneous Advia peroxidase cytograms; and iii) blood smears of poor diagnostic quality due to the presence of a substantial population of leukocytes that appeared lysed or trapped in platelet clumps or because of the uneven distribution of the leukocytes in the blood smear.
- The ASVCP guidelines² for method comparison were followed and the statistical analysis was performed using the language R (R Foundation for Statistical Computing, Austria).

Results

- Our study initially included 48 blood samples. After applying our exclusion criteria, 8 samples were excluded from further analysis.
- The correlation between the A-Diff and M-Diff was very strong for eosinophils ($r=0.870$, $P<0.001$), and strong for lymphocytes ($r=0.796$, $P<0.001$) and neutrophils ($r=0.730$, $P<0.001$), while no significant correlation was observed for monocytes ($r=0.026$, $P=0.872$).
- The Passing-Bablok regression analyses revealed statistically significant constant errors for neutrophils [5.83%; 95% confidence interval (CI): 0.41%, 12.18%] and eosinophils [1.89%; 95% confidence interval (CI): 1.17%, 2.71%].
- Bland-Altman analyses showed a statistically significant negative bias for lymphocytes (-5.0%) and a statistically significant positive bias for eosinophils (2.2%).
- The very low basophil percentages precluded a meaningful method comparison.



The results of the Advia 120 differential count are compared to the manual method. Passing-Bablok regression analysis plots of A) neutrophil, B) lymphocyte, C) monocyte, and D) eosinophil percentages. The red diagonal line is the line of identity and the blue line is the calculated Passing-Bablok line of regression. The purple area represents the 95% confidence intervals (Cis). Bland-Altman plots comparing the E) neutrophil, F) lymphocyte, G) monocyte, and H) eosinophil percentages. The difference between the 0 line and the blue line indicates the bias of the Advia 120 minus the manual differential counts. The blue dashed lines represent the 95% CI of the mean bias. The two purple lines represent the 95% Cis of the calculated bias. The purple dashed lines represent the 95% Cis of the lower and upper 95% confidence limits.

Conclusions

- The Advia 120 overall demonstrated good performance for the differential WBC count in goats and it can be considered suitable for routine haematological screening.
- Nonetheless, it should be emphasized that any abnormal result should be confirmed with a blood smear evaluation.

References

- Oikonomidis IL, Brozos C, Kiossis E, Tsouloufi TK, Kritsepi-Konstantinou M. A comparison study between the results of the Siemens ADVIA 120 analyzer and the manual method for differential leukocyte counts in sheep. *Veterinary Clinical Pathology*. 2021;50(2):203-208.
- Arnold JE, Camus MS, Freeman KP, et al. ASVCP Guidelines: Principles of Quality Assurance and Standards for Veterinary Clinical Pathology (version 3.0). *Veterinary Clinical Pathology*. 2019;48(4):542-618.