ANALYSIS OF BODY FLUIDS: AUTOMATED CELL COUNT USING HORIBA® Yumizen H2500

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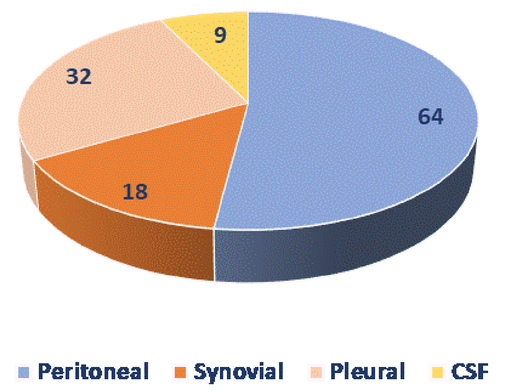
Introduction

The analysis and quantification of cells in body fluids play a critical role in the diagnosis and prognosis of a disease as well as in the establishment of the therapeutic plan. Traditionally, the cell count was performed by manual microscopy using a counting chamber. This method is time-consuming, labor-intensive and requires experienced laboratory staff around the clock. In order to turn this analysis easier several hematology analyzers were validated for automated cell count in body fluids. The aim was to evaluate the analytical performance of the automatic analyzer, the HORIBA® Yumizen H2500, to compare the results with those obtained with the UniCel® DxH 800 Coulter® analyzer, and with the results from slide review, in different body fluids.

Methods

123 body fluids were analyzed including cerebrospinal fluid (CSF), pleural, peritoneal, and synovial fluids. All fluids were analyzed up to two hour after their collection. The Yumizen H2500 analyzer offers a channel to quantify the total cell count of body fluids using impedance and another channel to assess leucocytes differential based on the Double Hydrodynamic Sequential System "DHSS" flow cytometry. The results obtained with the Yumizen H2500 analyzer were compared to those obtained with the DxH 800 and to those obtained with slide review. For the Yumizen H2500 analyzer the measure intervals were: WBC > 15.10^6cells/L and WBC < 10.000.10^6cells/L; RBC > 10.000.10^6cells/L and RBC < 5.000.000.10^6cells/L. For the DxH the measure intervals were: WBC > 20.10^6cells/L and WBC < 89.000.10^6cells/L; RBC > 10.000.10^6cells/L and RBC < 6.200.000.10^6cells/L.

Results



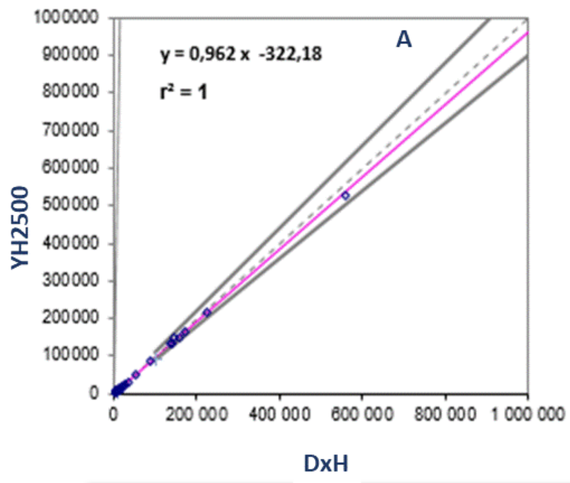
Distribution of the 123 samples involved in correlation study

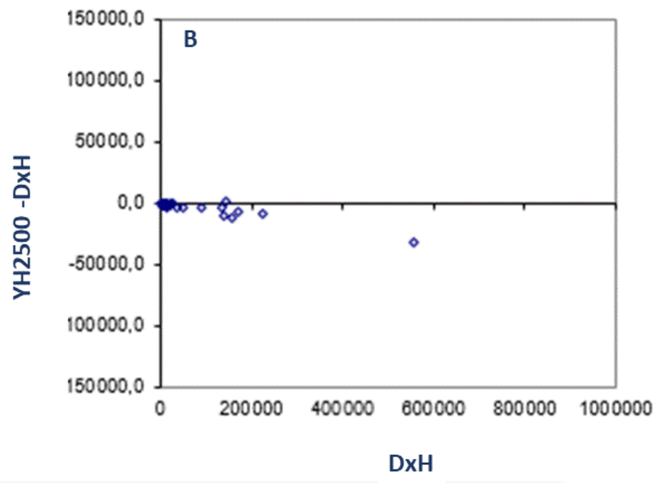
Parameter	Level 1		Level 2		Level 3	
	CV limit (%)	Range	CV limit (%)	Range	CV limit (%)	Range
BFRBC (10^6/L)	10	10.000 – 100 000	5	100 000 – 5 000 000	--	--
BFWBC (10^6/L)	20	15-100	15	101-600	5	601-10 000
BFMN# (10^6/L)	35	15 -100	20	101-600	10	601-10 000
BFMN (%)	35	5-30	25	30-80	15	80-100
BFPN# (10^6/L)	35	15 -100	20	101-600	10	601-10 000
BFPN (%)	35	5-30	25	30-80	15	80-100

Precision study: Repeatability performances

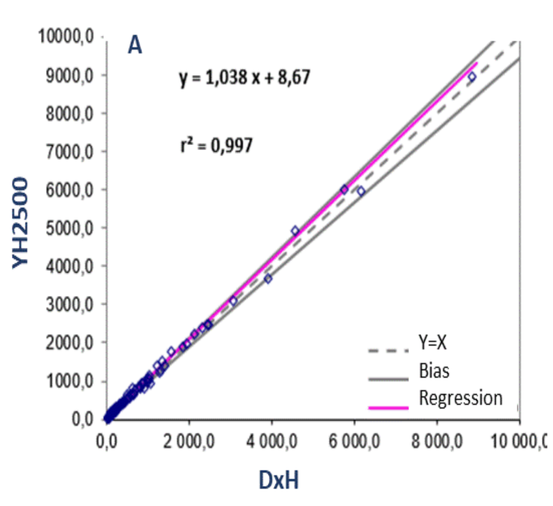
Parameter	Bftrol level 2		Bftrol level 3	
	CV limit (%)	CV limit (%) within-run	CV limit (%)	CV limit (%) within-run
BFWBC (10^6/L)	10%	5%	5%	3%
BFRBC (10^6/L)	6%	5%	4%	3%

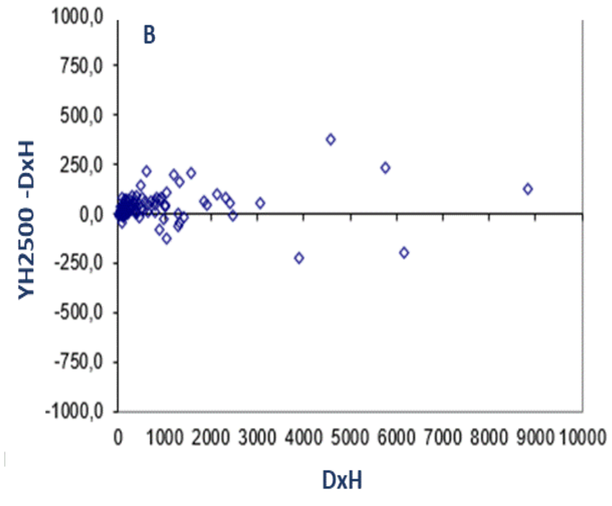
Precision study: Reproducibillity performances



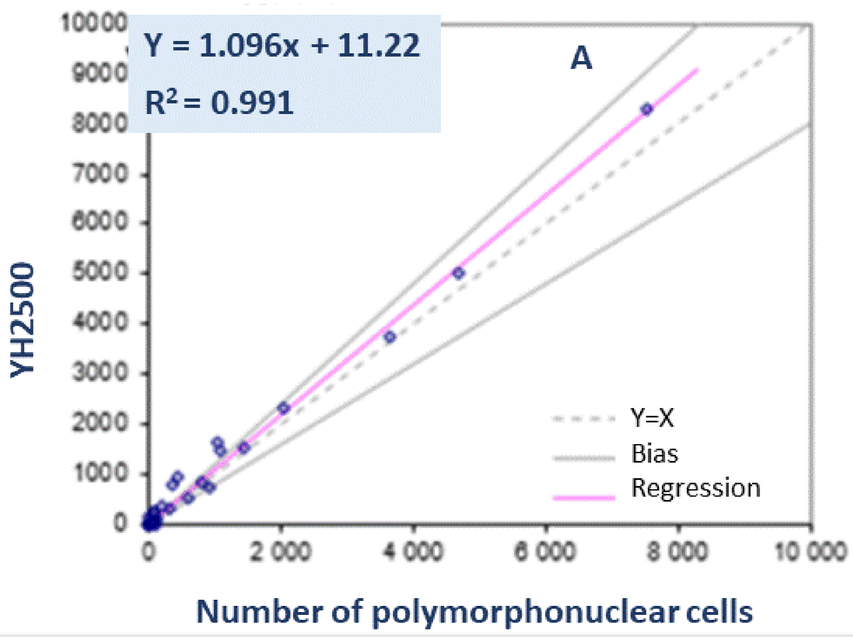


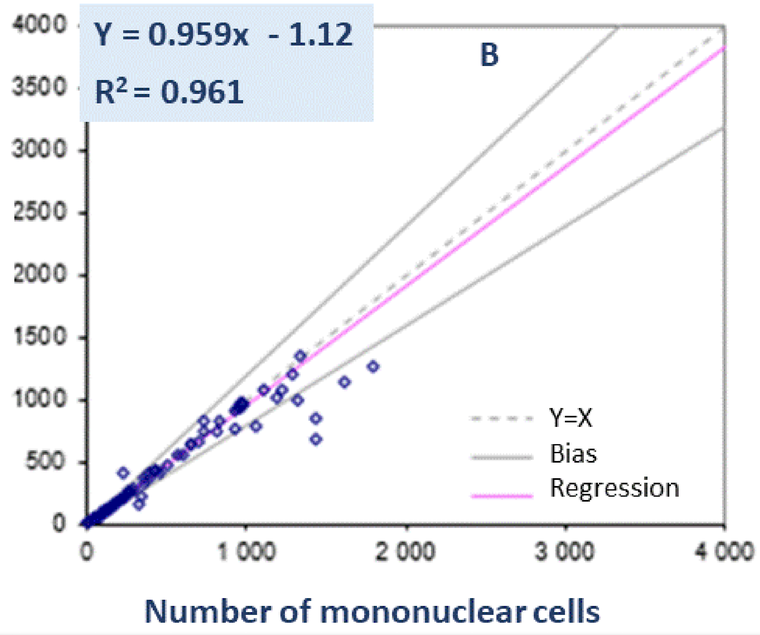
A. Evaluation of the correlation of RBC according the expression: YH2500=f(DxH800). **B**. The bias was calculated according the expression: DxH800=f(YH2500-DxH800)





A. Evaluation of the correlation of WBC according the expression: YH2500=f(DxH800). B. The bias was calculated according the expression: DxH800=f(YH2500-DxH800)





Evaluation of the correlation between differential count determined by YH2500 and slide review. **A**. Polymorphonuclear cells **B**. Mononuclear cells

Conclusions

In spite of the cytomorphological characteristics of the different fluids, the Yumizen H2500 analyzer had the ability to evaluate all type of fluids and to report total cell, RBCs and WBCs with an adequate linearity, a good limit of detection and a good correlation coefficient as compared to the results obtained with DxH 800.

References: Hussong JW, *et al.* Chicago, IL: ASCP Press; 2015; Sandhaus LM. Clin Lab Med. 2015; 35(1): 93-103