

Automated Semen Analysis – The end of Manual Analysis?

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Aim: To compare semen analysis parameters between an automated system (SQA-V Gold) and manual semen analysis.

Method: 100 fresh semen samples were manually analyzed following WHO 5th Edition and tested on the SQA-V system. Scientists used for manual analysis were never more than +/- 1SD in external QAP. 56 samples were analyzed once by a human operator and once by SQA-V. 42 samples were analyzed twice by different human operators and then twice by the SQA-V Gold. Passing-Bablok regression plots were produced for concentration and ROC analysis was used for motility and morphology comparisons. Latex beads of known concentration were also counted by 2 operators and then twice by SQA-V Gold to obtain mean and CV for accuracy and precision.

Results: The SQA-V system demonstrates a high degree of precision and much lower intra sample variation than a human. Concentration was the only parameter where manual analysis mean was similar to automated, although the CV from replicate analysis was 12.8% vs 2.3% Progressive motility had a low CV, however the manual reported mean was significantly larger (58.3% vs 38.7%) with a much narrower dynamic range. Manual morphology showed the greatest inter-operator variability with a CV of 29.9%, with a narrower dynamic range of morphologies than the automated system. Despite the differences in morphology value, 84% of manual morphology results were in the same <4% or >4% Reference range.

Semen Parameter	Mean		CV, %	
	Manual	SQA-V	Manual	SQA-V
Sperm Concentration, M/ml	60.0	63.0	12.8	2.3
PR Motility, %	58.3	38.7	6.4	4.9
Normal Morphology, %	4.9	10.7	29.9	7.3

Conclusion: This simple analysis methodology for concentration, motility and morphology, shows much lower CV than humans can count. Concentration is the only manual parameter similar to the automated system. Motility tends to be significantly over-estimated by manual methods, and morphology is confirmed to have the largest variation between operators. The ranges show that humans subconsciously have a low morphology reported range and higher motility range.

During a 75 second test the SQA-V Gold System demonstrates the best precision between the 2 analysis methods, can accurately count concentration, motility and concentration, and will count tens of thousands of sperm at the lower concentrations and millions at high concentrations, reducing the counting error compared to manual systems, where only 400 sperm may be counted.