

Sperm concentration assessment: Gold standard vs. new technologies

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Currently, various methods are being applied to determine sperm concentrations in boar semen. These include haemocytometers, which are generally considered to be the “Gold Standard”, as well as photocolormeters, flow cytometry, and computer-automated semen analysis (CASA). It is critical to assess these technologies in order to identify the appropriate technique to be used in an AI center setting. The objective of the present study was to evaluate different techniques of determining sperm concentration for accuracy, repeatability and precision.

Ejaculates from ten boars were collected once a week over a 3-week period and evaluated for concentration using the following techniques: 1) Manual Haemocytometer (Manual-H); 2) CASA system using haemocytometer (CASA-H); 3) CASA system using Leja 4 chamber slides (CASA-Leja) and 4) photocolormeter (Colorimeter). All semen evaluations were performed by two well-trained individuals (A & B). Differences ($P < 0.05$) between evaluators were found only in the Manual-H technique, presenting a variation of less than 10%, which was considered acceptable. Manual Haemocytometer concentrations were highly correlated with values obtained with CASA-H ($r = 0.96(A)$ & $0.92(B)$); CASA-Leja ($r = 0.93(A)$ & $0.96(B)$); and colorimeter ($r = 0.91(A)$ & $0.93(B)$).

Sperm concentrations obtained with the three techniques tested were highly correlated with the “Gold Standard” haemocytometer values and presented less variation between technicians. Therefore, given the accuracy and repeatability of these techniques, cost may be the primary limitation to their application.

Implications: Knowing the relative merits and limitations of different techniques for determining semen concentration will allow AI units to select the technology most appropriate for their needs and to take appropriate measures to limit errors and enhance the accuracy of the system used.