Quality Specifications for EQA materials

Inger Plum
DEKS

Commutable EQA-material

- ISO 17043: Proficiency test items should match in terms of matrix, measurands and concentrations, as close as practible, to the type of materials in routine testing in order to simulate the measurement process as closely as possible.

Commutable EQA-material

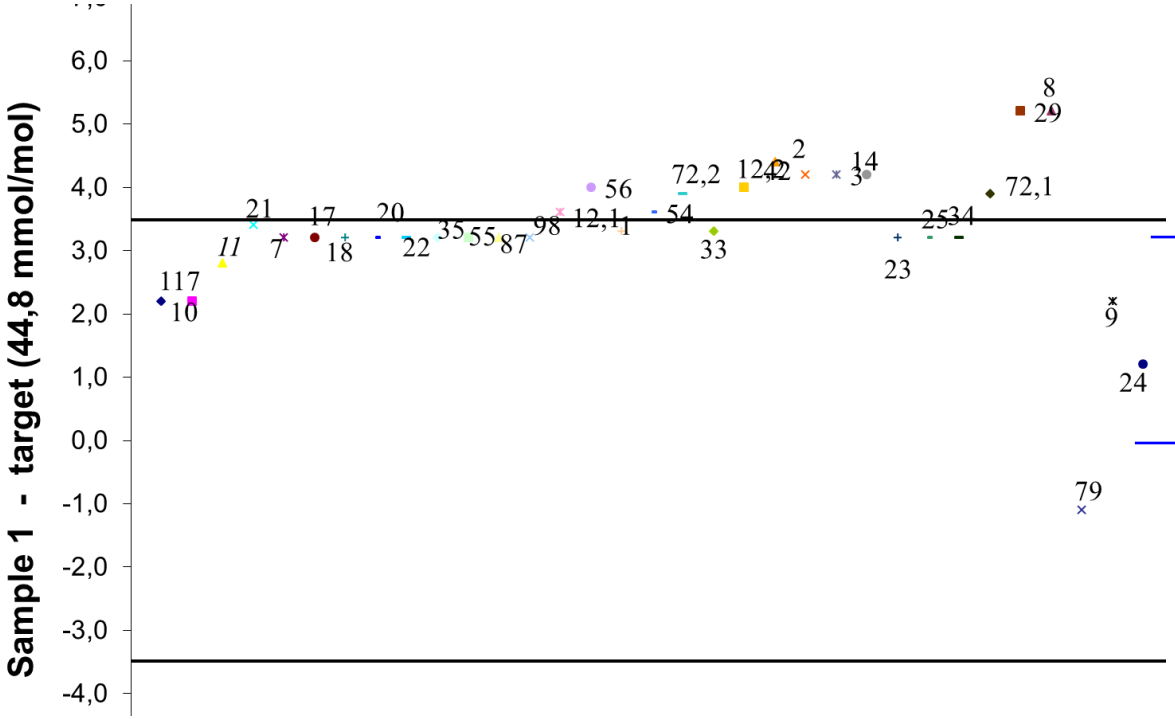
- Commutable material makes us able to compare results between methods
- Commutable material makes us able to compare results with a target value based on reference methods or material

Technical Specifications
Liquid, whole blood

- Matrix: Human blood
- Blood, human?
  - Example: Sedimentation Rate
- Single donation?
  - Example: Single donations >< a pool of 3 for HbA1c

Technical Specifications

Liquid, whole blood



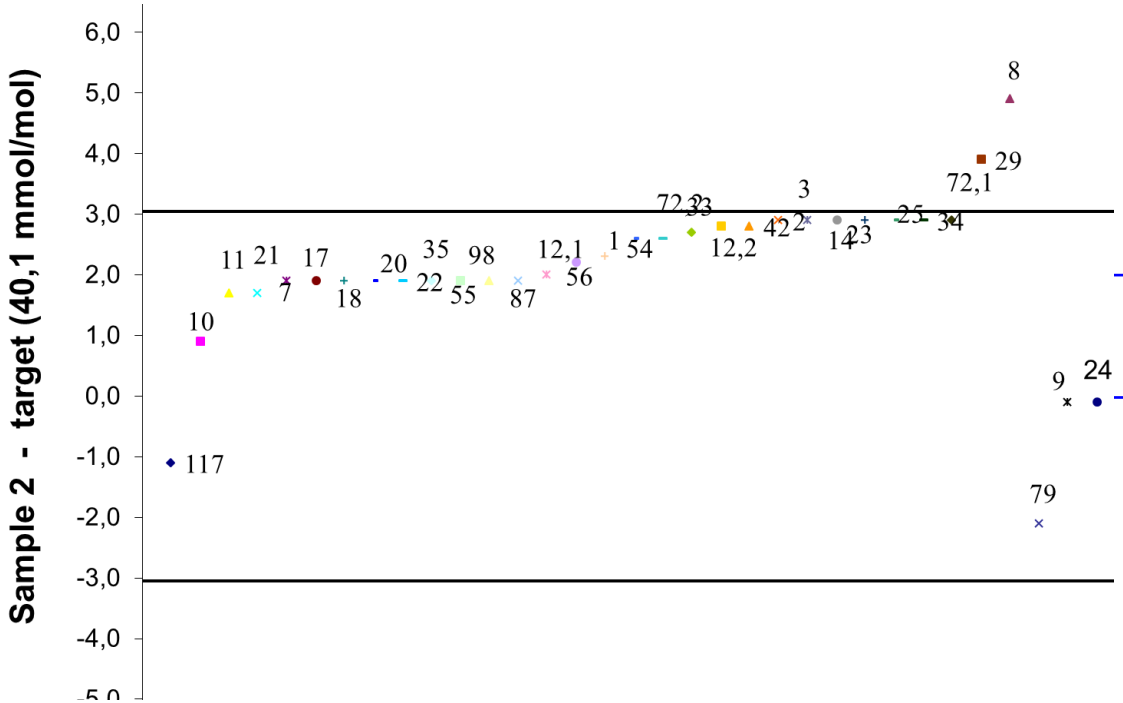
Mean: 48.1 mmol/mol

Target: 44.8 mmol/mol

=> 7.8% deviation

Technical Specifications

Liquid, whole blood



Mean: 42.2 mmol/mol

Target: 40.1 mmol/mol

=> 5.2% deviation

Technical Specifications
- liquid sera

- Stability, matrix, virus screen, homogeneity, contamination, additives

pH

Sterile filtration => CO_2 evaporates

=> pH ↑

Vigorous mixing => CO_2 → $HCO3^-$

=> pH ↓

Technical Specifications
- lyophilised sera

- pH: 7.2 – 7.6 at 37 °C
- Matrix: Human serum
- What do you expect?

Technical Specifications

- lyophilised serum. What do you expect?

Component	Conc.	Normal range	Unit
Albumin	30	40 - 51	g/L
Ca ion	0.11	1.15 - 1.35	mmol/L
Chloride	140	98 - 106	mmol/L
Creatinine	<4.4	50 - 120	µmol/L
Glucose	0.7	4.2 - 6.2	mmol/L
Lactate	0.2	0.7 - 2.1	mmol/L
Methyl Malonate	0	0.08 - 0.28	µmol/L
Potassium	1.5	3.5 - 5.0	mmol/L
Sodium	170	136 - 146	mmol/L

Technical Specifications
- lyophilised sera

- pH: 7.2 – 7.4 at 37 °C
- Matrix: Human serum on the clot

Technical Specifications
- citations and explanations

- *I expected: Human serum on the clot. I got:*
- We use serum as a matrix for many of our products including this one
- We does a fair amount of manufacturing processes on the human plasma in order to convert it to human serum
- The material is extensively dialyzed in order to remove anticoagulant
- We have to remove certain chemicals, which we added in order to reactivate the clotting
- This reduces most of the organics (and salt) to an extremely low level
- We believe that this is an industry standard in the manufacturing community for control material

Technical Specifications
- lyophilised sera

- Matrix: Human serum on the clot
- pH 7.2 – 7.4
- Stability: > 4 years at 4 °C
- Virus screening: Negative for HIV and Hepatitis
- Contamination: Bacterial counts < 100 cfu/mL
- Homogeneity: Vial to vial variation, CV shall be < 0.5% for any component (enzymes CV< 2%). Documentation should be sent for approval
- Stabilizers and non physiological buffers must not be added
- List of desired components with desired concentration

Technical Specifications
- lyophilised sera, continued

- Water content < 2%
- Osmolality < 350 mOsmol/kg
- Turbidity: At 340 nm: < 5.0; at 461 nm: < 4.0; at 550 nm: < 1.0;
  at 700 nm: < 0.8
- Pilot batch for investigation
- Deviation of concentration of listed components < ± 25%
  K, Mg and Ca etc.< ± 5% and Na < ± 4%

Technical Specifications
- lyophilised sera, stabilizers

- Contamination: Colony forming units < 100/mL

- But the company had added Vancomycin
- How was this revealed?
- - by a matrix effect on some components.

Technical Specifications
- lyophilised sera, stabilizers

- Bovine and other animal components – are cheap
- NaN_3 for conservation,
- Stabilizing agents for the lyophilisation process
- Surfactive substances
- Other stablizers: Glycerole, amino acids, etc.
- - all causing a matrix effect on the analyses of some components