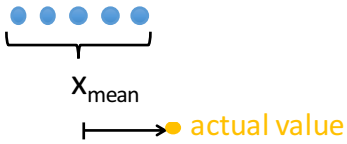
Recovery, ionization suppression and process efficiency



Trueness relates to the systematic error of a measurement system.

$$\text{bias} = X_{lab} - X_{ref}$$

Agreement between the mean value of replicate measurements and the true value of the measured quantity

Important! Bias takes into account the effects that are systematic over a long term, occurring at any stage of the analytical process

Bias in LC-MS

$$\text{bias} =$$

Bias in LC-MS

$$\text{bias} = B_{stab} \times$$

(in)stability refers to analyte stability or instability during analysis

Bias in LC-MS

recovery

refers to analyte loss during sample preparation step

$$\text{bias} = B_{stab} \times R \times$$

(in)stability

$$R = \frac{m_{\text{analyte extracted}}}{m_{\text{analyte in sample}}}$$

Bias in LC-MS

recovery

$$\text{bias} = B_{stab} \times R \times ME_{ionization} \times$$

(in)stability

matrix effect

refers to the suppression or enhancement of analyte ionization by co-eluting compounds originating from the sample matrix.

$$ME = \frac{m_{\text{analyte detected}}}{m_{\text{analyte extracted}}}$$

Bias in LC-MS

recovery

$$\text{bias} = B_{stab} \times R \times ME_{ionization} \times B_{other}$$

(in)stability — matrix effect — eg. purity of the standard substance, calibration bias of volumetric ware.

Bias in LC-MS

recovery

$$\text{bias} = B_{stab} \times R \times ME_{ionization} \times B_{other}$$

(in)stability — matrix effect

Process efficency, PE

$$PE = \frac{m_{\text{analyte detected}}}{m_{\text{analyte in sample}}}$$

Bias in LC-MS

recovery

$$\text{bias} = B_{stab} \times R \times ME_{ionization} \times B_{other} - 1$$

(in)stability

matrix effect

Process efficency, PE

$$PE = \frac{m_{\text{analyte detected}}}{m_{\text{analyte in sample}}}$$