magruder fertilizer
check sample program

STRIVING FOR EXCELLENCE IN ANALYSIS

Magruder Statistics:

Homogeneity Screening

Heterogeneity among the sample units ($\sigma^2_{Samples}$) can inflate the spread in sample results. This can mask the true Lab Bias and interferes with Z scores.

Sources of Variance for Check Sample Results can be expressed as follows:

$$\sigma^2_{Sample\,Results} = \sigma^2_{Analytical} + \sigma^2_{Labs} + \sigma^2_{Samples}$$

Ideally, to test for sample homogeneity we need to minimize the analytical variance ($\sigma^2_{Analytical}$) and the Lab Bias (σ^2_{Labs}) and isolate the variance due to the sample units ($\sigma^2_{Samples}$) .

Reduced Lab Bias is achieved using a single Lab!

Can We Estimate Homogeneity From the CSP Data?

➢ In N_2 by Combustion we have a very precise method with over 50 Analysts consistently reporting **Reproducibility < 2 %RSD** and **Repeatability < 1 %rsd** for each sample.

➢ This is an extremely narrow dispersion (Bias) for so many Labs.

➢ So looking at our sources of variance again:

- Reproducibility is heavily reflected in σ_{Labs} **and is low!**
- Repeatability is essentially the $\sigma_{Analytical}$ **and is low!**

$$\sigma^2_{Sample\,Results} = \sigma^2_{Analytical} + \sigma^2_{Labs} + \sigma^2_{Samples}$$

No other Analyte Methods have a consistently low bias as with N$_2$ by Combustion!

If this gets out-of-line, we have reason to question the Homogeneity.

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Questions?