

amc technical brief

Analytical Methods Committee

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GMO Proficiency testing: Interpreting z-scores derived from log-transformed data

In some proficiency tests concerned with measuring the proportion of genetically modified organism (GMO) in food the results produced are log-transformed (converted into logarithms) before z-scores are calculated [1]. The transformation can be justified both theoretically and practically. However, the transformation gives rise to z-scores that are not on the same type of scale as the original data, and are therefore less readily interpreted. A certain amount of background in logarithmic transformation may be

le. It is asymmetric, with a positive skew and all values of x necessarily greater than zero. If alternatively we plot the density against the logarithm of x , we see the familiar shape of the normal distribution (Figure 2). (Note that logarithms base ten are implied throughout this Brief.)

Definition: a variable x is lognormally distributed if $\log x$ is normally distributed.

While all normal distributions are essentially symmetric, lognormal distributions are asymmetric. The asymmetry is due to the fact that the logarithm of a variable x is only defined for $x > 0$. This means that the distribution of x is skewed to the right, with a long tail extending towards larger values of x . The skewness of a lognormal distribution is a function of its variance, and increases as the variance increases. The skewness of a lognormal distribution is always positive, and is never zero. The skewness of a lognormal distribution is a function of its variance, and increases as the variance increases. The skewness of a lognormal distribution is always positive, and is never zero.

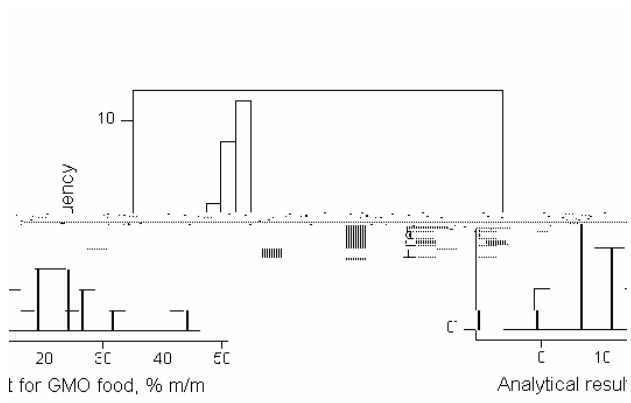


Figure 4. Results from a single round of a proficiency test involving measuring the concentration of GMO soya.