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Number: 297

Mycotoxins VIII

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Testing variabilities

Even when using accepted sampling, sample preparation and analysis procedures errors (variabilities) will occur and these can be associated with any of the stages. Accordingly, true mycotoxin concentrations can never be determined with 100% certainty by measuring the mycotoxin concentration in a test sample taken from the lot. If replicated samples are taken, variations in mycotoxin concentrations will be seen.

Sources of variability

The total variability is a combination of sampling, sample preparation and analytical variabilities.

Sampling

This is usually the largest source of variability and, even when using accepted equipment and procedures, sampling variability is often large because of the significant distribution variance within a lot. To appreciate this all you need to do is to reflect on the impact of an extra contaminated grain or kernel contaminated with aflatoxin at a high level (for example, 5 million ng per g) even when a small percentage of these (<0.1%) are present.

Sample preparation

Breaking down of material in a grinder and selecting the sub samples can both impact significantly on result variability, but not as much as the original sampling variability. Grinder type and product type are both important at this stage.

Analysis

Analytical methods involve several stages, such as solvent extraction, centrifugation, drying, dilution and quantification, that can be affected by variabilities. Add all these up and considerable variabilities can occur. Coefficients of variability of 30% are not uncommon.

Reducing variability

This can only be done by reducing the variability associated with all three stages, for example by increasing sample size, increasing the degree of comminuting (grinding) and increasing the number of aliquots tested. However, these are not necessarily practical propositions under field conditions.

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