

Romer Labs Check Sample Survey (CSS)

Aflatoxins and Fumonisin in Corn

(CSSMY025-M23411AF)

August – December 2023

Aflatoxins are toxic and carcinogenic. They are metabolites of the fungi *Aspergillus flavus* and *Aspergillus parasiticus*. There are four principle types of aflatoxin. B1, B2, G1 and G2, which are named for their respective innate fluorescent properties. Aflatoxin B1 is the most frequently encountered of the group and the most toxic. Aflatoxins can be found mainly in cereals, corn, peanuts, cottonseed and nuts. Aflatoxins can cause liver disease in animals and may cause decreased production (milk, eggs, animal weight, etc). Aflatoxin B1 is a potent human carcinogen, and may contribute to human liver cancer.

Fumonisins are a group of toxins, primarily FB1, FB2 and FB3, which are mainly produced by *Fusarium verticillioides* and *Fusarium proliferatum*. Corn is the major commodity affected by this group of toxins, although a few occurrences have been reported in rice and sorghum. The fumonisins are tumor promoters and also suspect entities in neural tube defects in humans. Regardless of the other effects on animals, the liver is often involved in the toxicity. A major disease of horses that includes a softening of the white matter in the brains is caused by fumonisins.

As part of its integral service approach Romer Labs offers a Check-Sample-Survey (CSS) for mycotoxins. The objective of the Romer Labs CSS is to provide an interlaboratory comparison study of AFLA and FUM analysis in corn and a platform for laboratories to assess the effectiveness and accuracy of their test methods as part of their internal analytical quality management.

The Romer Labs CSS aims to industry- and service labs that perform mycotoxin analysis on a routine basis. The method employed for analysis is up to the participating laboratory.

Each participant will receive a foil sachet containing approximately 60 g of homogeneous and characterized test material. The foil sachet has to be re-sealed properly after usage and stored at - 20 °C.

Methods and Results:

Participants should treat the test material as if it was a sample for routine analysis, i.e. they can use the analytical method of their choice. Participating laboratories will be asked to provide information on the employed method. This information is subsequently presented in the final report of Romer Labs Check Sample Survey.

The on-time submission of results in the specified units (ppb = $\mu\text{g}/\text{kg}$) and before the submission deadline is considered to be part of Romer Labs CSS. Results must be submitted online via the website:

<https://engage.romerlabs.com/en/css-afla-and/or-fum-in-corn-2023>

Participating laboratories should report the results after analyzing their common number of replicates. Individual replicate values shall not be reported. Results reported in a semi-quantitative manner as “less than” or “more than” a specific value, together with qualitative results, will be collated and listed in the Romer Labs CSS report, but they cannot be included in the statistical analysis.

Kindly consider that **only one result per participant** can be accepted. Where appropriate, i.e. for GC or HPLC analyses, results should be reported corrected for recovery.

Performance Assessment and Statistical Evaluation:

Performance assessment and statistical evaluation will be done for the reported results of AFLA and FUM, provided that sufficient, satisfactory results are submitted.

The object of the statistical procedure employed is to obtain a simple and transparent result which the participant and other interested parties can readily interpret.

The following statistical parameters will be calculated based on the submitted data. Formulas and results will subsequently be disclosed in the report.

- Assigned Value (X):

The assigned value X (the best estimate of the true concentration of the analyte) will be set as the consensus of the results submitted by the participants. In order to derive this consensus the following procedures will be used: removal of non-valid data, calculation of the robust mean and uncertainty assessment.

The procedure is straightforward and the robust mean will be considered to be the most appropriate measure of central tendency of participants' results.

- Target Standard Deviation (σ_p) for the Test:

The value of σ_p determines the limit of satisfactory performance in the Romer Labs Check Sample Survey. It is set at a value that reflects best practice for the analysis in question. The standard deviation of reproducibility (RSD_R) found in collaborative studies is generally considered as an appropriate indicator of the best agreement that can be obtained between laboratories.

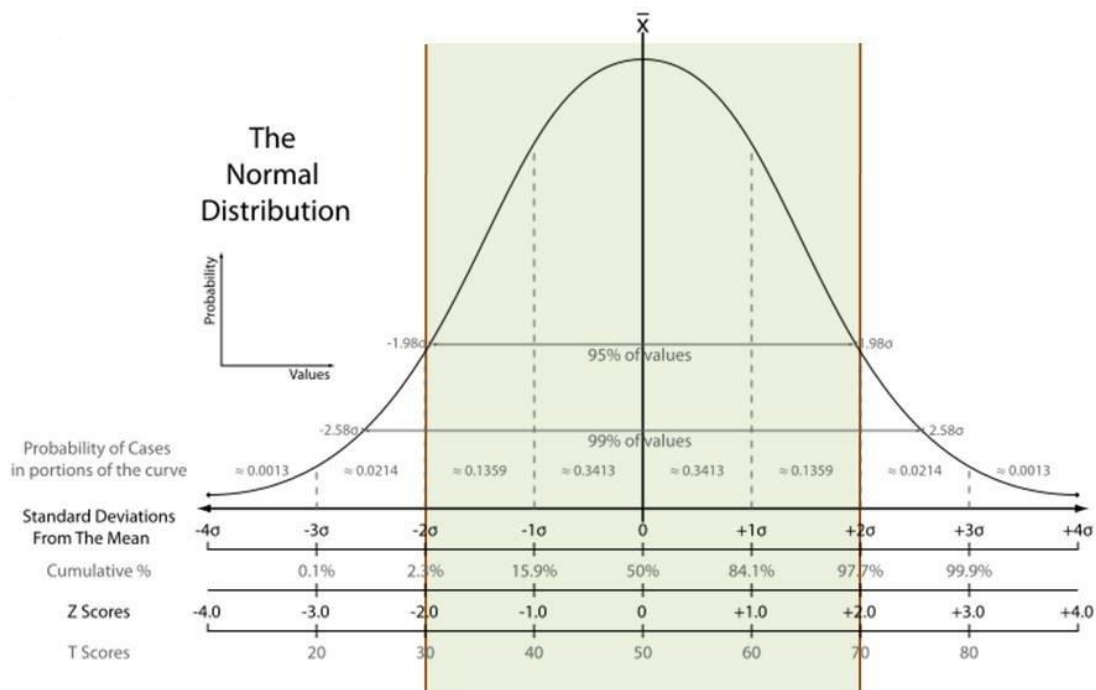
- z-Score:

The z-score relates the error in the result to the target standard deviation (σ_p) which is set ahead of the test and reflects 'best practice' or fitness for purpose.

The performance assessment of the participating laboratories in the Romer Labs CSS is expressed in the standardized form of a z-score.

In a normal distribution only about 1 out of 20 results will be outside a range of two standard deviations from the mean hence Romer Labs CSS z-scores of $|z| \leq 2$ are considered to be satisfactory. If a participant receives a z-score outside the range $|z| \leq 2$, it is much more likely that this is due to poor performance rather than it being a "good" result that just happens to be at the extremes of the distribution.

A z-score within the satisfactory range does not automatically classify participants as "competent". The results from the Romer Labs CSS should be seen as one of several tools that enable participants to evaluate their performance.



Timeline of the survey:

- Material available for ordering: **September 2023**
- Submission deadline for results: **November 24th, 2023**
- Distribution of reports to participants: **Mid of December 2023**

Confidentiality of Participant Information:

All information held by Romer Labs about participants of the Romer Labs Check Sample Survey, including their z-scores, is confidential and will not be disclosed to anyone unless explicitly agreed by the participant for a particular purpose. To preserve this confidentiality participants of the Romer Labs Check Sample Survey will receive a report with anonymized data/results. These laboratory code numbers used in the report are assigned in order of receipt of the results from the participants.

Although Romer Labs is part of DSM, all other companies that are part of this organization do not have access to Romer Labs Check Sample Survey participants' details.