



Leaflet: Conformity assessment taking into account measurement uncertainty

Measurement uncertainty: How exact is a measurement result?

No measurement result captures the true value because every measurement result is subject to uncertainties that depend on a number of factors. If, for instance, different people measure a room to the exact millimeter with a measuring tape, they will probably all obtain different, but very similar measurement results. If the same people try to measure this room to the exact centimeter by counting their steps, the individual measurement results will differ from one another even more significantly.

Measurement uncertainty can be estimated by taking into account all key influencing factors (coincidental and systematic). This makes it possible to determine a measurement range within which the true value falls. This range is referred to as measurement uncertainty.

Decision-making rules: When is a product in conformity with the law?

Example: the maximum legal limit for mercury in swordfish is 1 mg/kg fish. Figure 1 shows four examples of potential results. The point indicates the measured value in each case, while the arrows indicate the measurement uncertainty calculated, i.e. the range within which the true mercury content in the sample measured lies (determined statistically with a certainty of 95 %).

In case 1 and case 4, the ranges within which the true values lie are below and above the statutory maximum value respectively, and a clear decision as to the conformity of the swordfish is possible. In cases 2 and 3, the measurement values are just below and just above the maximum value; taking into account measurement uncertainty, the true content of each is roughly around the maximum value. In both cases the owner of the goods must undertake further research as part of its own inspection to ensure that the goods do in fact conform to regulations.

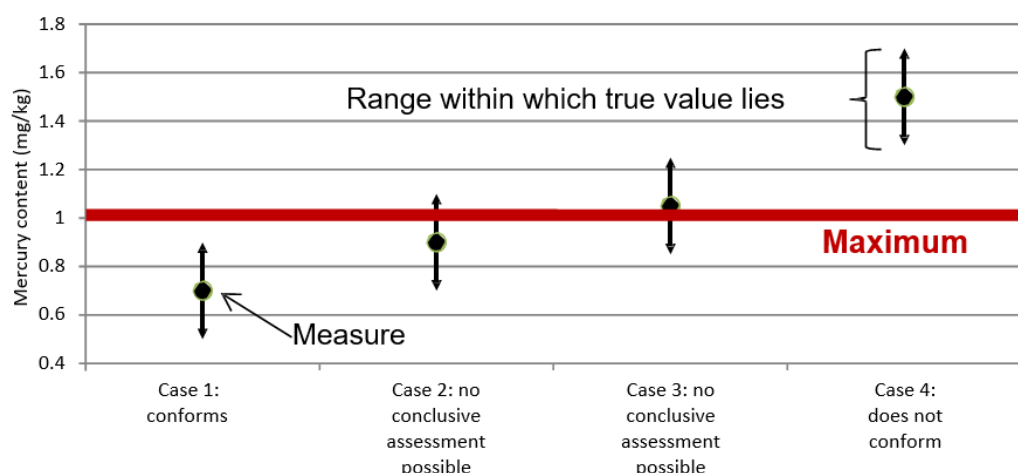


Figure 1: Illustration of four potential cases along with their respective measurement values, the associated measurement uncertainty, and the conformity assessment derived on the basis of this.



Conclusion from this example:

- The distributor of the swordfish can be sure only in case 1 that the maximum value has not been exceeded and that the swordfish conforms to the regulations.
- Only in case 4 can it be confirmed that the maximum value has been exceeded and that the swordfish does not conform to regulations.

Factoring in the measurement uncertainty of microbiological test methods in food legislation

According to information from the Federal Food Safety and Veterinary Office, measurement uncertainty is included in the legally prescribed microbiological criteria (Guidelines of the Swiss Accreditation Service (SAS) on the validation of microbiological test methods and estimating measurement uncertainty in food and environmental microbiology; document no. 328.dw).

Summary

Anyone assessing measurement results should be aware that they can lie on either side of the real value. This range of variation is referred to as measurement uncertainty. As such, to assess whether a product conforms to food standards regulations, the measurement uncertainty determined for the specific test method must be taken into account.

The responsible person must ensure, at all stages of production, processing and distribution, that the requirements of the food standards legislation that apply to their area of activity are fulfilled (case 1). The person must review compliance with these requirements or have this checked and then immediately take the necessary measures to ensure the food meets the statutory standard.

Do you have any other questions?

Feel free to contact us. Our customer service department will be happy to help you!

Thank you in advance for your order and for putting your confidence in us.

Kind Regards

UFAG Laboratorien AG

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