Video « Metrology – Reference materials »

Time	Text
00 :08	In this video, we will talk about the reference solutions or materials.
00 :15	There are several types of reference samples and, traditionally, they are considered different. These samples could be standard solutions or quite complex materials like milk, soil or different matrices. But, whatever the considered sample, there are two main types of reference materials: - The first one is simply called “reference solutions” or “reference materials”. As defined in one of my colleague article cited here, a “reference material” is a sample for which one/several value(s) is/are homogenous enough to use it either to calibrate a device, or to assess a method which aims to measure a specific value of the sample, or to set specific values to a material or a solution. Therefore, a “reference material” is used in the process to determine the trueness of a method. - The second type of reference sample is called “certified reference material”. In that case, the rigor on the value(s) of the sample as well as the quality of the sample are better than for a simple “reference material”. Indeed, for this type of material (or solution), the organism in charge of their production and selling will provide a certificate (on the opposite, there is no certificate for a simple “reference material”). In that case, the concentration value(s) which is/are provided in the certificate was/were obtained by performing measurements which had been certified. It means that these values are the true values of the sample. So, a certified reference sample provides true certified values of the sample.
2 :25	Moreover, as you can see on this figure, the precision of the certified value is also provided with it. So, this type of certificate will be interesting for the laboratories who want to develop a measurement method or to assess the trueness and the precision of their method by confronting their results with the values of the certificate.
02 :51	Here is an example of two different CRMs (CRM means “certified reference material”). In both case, it is powdered milk. They are both available for buying as the 188 and the 187. In this table, you can see that the 188 is a milk powder with different organochloride pesticides. Each line represents a molecule with its abbreviation and for each molecule, there is its certified concentration with its precision, represented by the uncertainty. It works in the same way for the 187. There are only some of the molecules from the 188, giving in that case less certified values. But, more importantly, the difference between the 188 and the 187 is that the molecule concentrations are different. Indeed, the concentrations in the material 188 are 10 times higher than concentrations in the 187.
03 :52	Obviously, you must choose the material which corresponds to the method you want to develop or to the sample you want to analyse. In that case, the sample to analyse has to be powdered milk with hydrophobic molecules, like organochlorides, and then you choose the material for which the concentrations correspond to the concentrations expected in your sample.
04 :08	Therefore, there are several criterion to choose a reference material or solution due to the several types of reference materials, certified or not. Obviously, the certified reference standard solution or certified reference materials get the most interesting traceability and stability. On the other hand, they are much more expensive and they are not necessary available for the considered application and in the required quantities because making certified reference materials is very expensive and takes a long time.
04 :43	Usually, for the validation of a method, the laboratory uses simple reference materials in the first time. These materials are often intern to the laboratory, so it means that

	they had been prepared by the laboratory itself. Therefore, they will be less relevant for the traceability and the stability, but they will be more available and in higher quantities. So, it will be much easier to use them for the method development. After that, laboratories can use an extern reference material or solution. It means they have to buy it from a provider. Obviously, they will try to find a reference material which has the same composition, or at least close enough, than the material they want to analyse. This reference material has to have the same type of matrix or, if it is a solution, the same solvent, in order to reproduce as best as possible the application conditions.
05 :34	Therefore, the external reference materials are an intermediate between the reference material from the lab and the certified reference material which is the best reference material which could be used in order to validate a method.