HOPSTEINER – NEWSLETTER APRIL 2012

TECHNICAL SUPPORT

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COMMITTED TO THE BREWER.

Interpretation of Hop Analysis Results

The basis for evaluation for the analysis results of hop products is the statistical data of the methods recommended in Chapter 7 of "Analytica-EBC". This annually updated collection of methods will soon be available online (www.europeanbreweryconvention.org).
All the prescriptions have been tested in ring analyses which provide a reliable source for the determination of statistical data. In some cases coefficients of variation (CV) and/or standard deviations (s) are used to characterize accuracy.
Newer methods which have been tested according to the Norm „Accuracy (trueness and precision) of measurement methods and results" (ISO 5725:1994), specify the errors of repeatability (r95) and reproducibility (R95) of an analysis with a statistical certainty of 95 %.

Based on this information, the determination of a permissible deviation is carried out using the critical difference (d_{crit}) according to the following formula, which is explained in more detail with the help of statistical data from the Analytica-EBC 7.7 Method (HPLC-Method for the determination of alpha- and beta-acids in hop products):

$$\text{Critical Difference } d_{crit} = \frac{1}{\sqrt{2}} \sqrt{R^2 - \frac{r^2}{2}}$$

Method EBC 7.7: Reproducibility (R) = 0.122 + 0.075 x Alpha
Repeatability (r) = 0.045 x Alpha

Product / Parameter	Value	r (95)	R (95)	d_{crit}	d_{crit}	Contract
Pellet / Alpha EBC 7.7	10.0 %	0.45 %	0.87 %	0.57 %	5.7 % (relative)	5 %

Our business partners can use this formula in order to fix the acceptable limit of deviation of an analytical verification of the nominal value of a hop delivery. The example demonstrates the alpha content of hop pellets as 10 % according to the HPLC method. The statistical data provided by the EBC 7.7 method result in a critical difference of 0.57 %, i.e. a claim would be justified for any deviation above this level. Generally Sales Contracts include a maximum acceptable deviation expressed in relative % terms. In practice, a relative tolerance of 5 % in Sales Contracts is very common. As is shown in the example, this level of analysis tolerance is appropriate. In fact, the method could even tolerate a higher level of deviation up to 5.7 % relative.

If you have further questions please don't hesitate to contact us!

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