

Update to FoodQS LC-HRMS Screening: Version 3.0 shows additional indication of starch syrup

For some time now, we have successfully offered the HRMS screening (**Version 1.0**) from FoodQS (article 38000). With the help of this method it is possible to detect the addition of syrups from C3-plants (e.g. sugar beet, rice), which were not or only with difficulty detectable with the previous methods. HRMS screening has established itself with many customers in the authenticity analysis of honey. Using the steadily growing honey database, the method has been continuously developed and new syrup markers have been added. Furthermore, the additional reference to APLinvert® was introduced (**Version 2.0**).

In addition to sugar syrups based on sucrose from sugar beet or cane, there are also syrups based on starch, e.g. from rice, corn or cereals. The long-chain starch molecules are broken down during syrup production to yield short-chain sugars such as glucose and maltose. This usually leaves residues of longer-chain sugar molecules in the syrup, so-called foreign oligosaccharides, which do not occur naturally in honey.

The latest release of **HRMS-Screening Version 3.0** now allows the additional detection of these foreign oligosaccharides and thus syrups produced from starch.

After evaluation of the last 700 honey samples of worldwide origin, foreign oligosaccharides were detected in 7 % of the samples (figure 1, left). A closer look at the results, taking into account the honey database, revealed different levels of foreign oligosaccharides. Almost 80 % of all positive cases showed low concentrations of foreign oligosaccharides and could be assigned mainly to the honey varieties spring blossom, rapeseed, acacia and mixture with high rapeseed content. These low amounts plausibly indicate residues from feeding, which are technically not always avoidable. Only about 1/5 of the positive samples showed high residues of foreign oligosaccharides (figure 1, right).

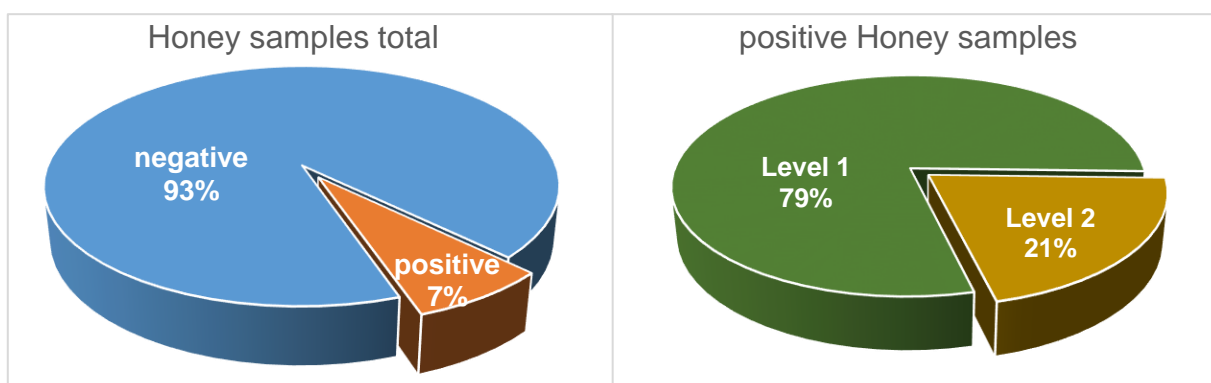


Figure 1: left: Proportion of foreign oligosaccharide-positive honey samples; right: classification of positive honey samples into stage 1 and stage 2

In the test report, the new **HRMS-Screening Version 3.0** now includes the additional analyte "HRMS Screening Foreign Oligosaccharides" along with the existing "HRMS Screening" and "HRMS Screening Apiinvert®" analytes. Based on the knowledge gained from the honey database, the detection of foreign oligosaccharides is indicated differentiated in 2 levels. Possible results on the test report are the following:

| Result | Meaning | Assessment „HRMS-Screening Foreign Oligosaccharides“ |
|--------|-------------------------------------------------|-------------------------------------------------------------|
| n.b. | No starch-based syrup detectable | - |
| 1 | Small amounts of starch-based syrup detectable | Indication of feeding residues |
| 2 | larger amounts of starch-based syrup detectable | Indication of addition or large amounts of feeding residues |

Small amounts of foreign oligosaccharides indicate a technically not always avoidable input as feed syrup. In contrast, larger amounts of foreign oligosaccharides are suspected to be an additive or indicate large amounts of feeding residues caused by poor beekeeping practices. Level 2 honey samples do not comply with Directive 2001/110/EC. The chromatogram in Figure 2 clearly shows the differences of two honey samples with foreign oligosaccharides of level 1 and level 2.

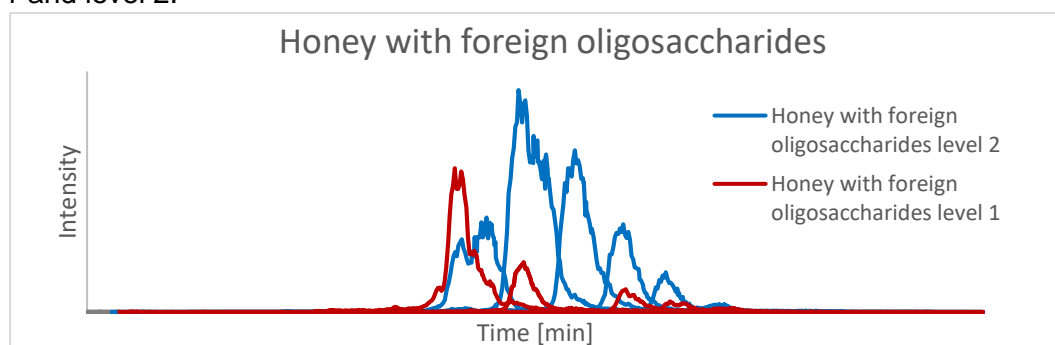


Figure 2: Chromatogram of honey sample with foreign oligosaccharides of level 1 and level 2

We are therefore very pleased to be able to offer the extended **HRMS-Screening Version 3.0** and thus present the authenticity analysis of honey again a bit more transparent and meaningful. Due to the increased information content, a more comprehensive assessment of the honey sample is possible – at the same costs, of course!

Reported results of HRMS-Screening Version 3.0 (Art. 38000) in the test report

- HRMS-Screening: Detection of sugar addition with focus on C3 sugar syrups
- HRMS-Screening APIinvert: Detection of APIinvert®, differentiated indication in two levels
- HRMS-Screening Foreign Oligosaccharides (NEW): Detection of foreign oligosaccharides, differentiated indication in two levels