Honey is in short supply due to consumers’ increasing demand and bee diseases. It is therefore rapidly becoming an attractive target for adulteration with various sugar syrups. To guarantee honey’s authenticity, researchers are looking for novel testing methods that help beekeepers and honey processors to determine product quality and help regulators ensure that honey jar contents mirror label claims.

**Testing of sticky samples**

Honey, due to its texture, has always been a notoriously difficult substance to handle. Sticky and viscous, it is difficult to weigh the precise milligram amounts required for the highly accurate authenticity analysis with modern spectroscopic methods.

ALNuMed are known for developing methods to verify the authenticity of food products and identifying bioactive compounds in natural products. Primarily, ALNuMed uses nuclear magnetic resonance (NMR) spectroscopy to determine product origin and uncover adulteration or improper treatment—an ideal method for honey analysis.

However, when researchers faced the challenge of accurately preparing honey samples as a prerequisite for the application of the highly sophisticated NMR measurements, ALNuMed turned to METTLER TOLEDO and they jointly developed an easier, less time-consuming way to handle honey samples.

With recent cases of adulterated foods and a growing desire for ecologically-produced items, consumers demand correct packaging claims. The research / analytical services company ALNuMed GmbH is using the Quantos automated dosing system to accurately prepare honey samples in the development of novel tools for rapid authenticity testing.

**Pure Honey? Easy Sampling Helps Verify Claims**
Cutting sampling time by 50%

An automated gravimetric approach, using METTLER TOLEDO’s Quantos dosing technology, was the perfect candidate to replace the current standard method of volumetric sampling by gravimetric sampling. Weighing a quantity of honey and then dosing the solvent based on the amount of honey present rather than the other way round seemed a promising strategy to speed up sample processing.

Testing the new process, ALNuMed dosed an approximate small quantity of honey onto their existing balance without needing to dose to a precise target weight thus greatly simplifying this step of the process. Then, based on the amount of honey, the Quantos system calculated the precise amount of solvent to be added automatically by gravimetric addition, thus producing a suitable solution for accurate analysis.

In order to ensure sample traceability and data management, a barcode reader identifies each sample and all relevant information about the sampling process is automatically transferred to LIMS. ALNuMed’s customers can now rest assured that their NMR analyses are highly accurate and significant.

Today, this approach reduces the time required for sampling honey for authenticity tests by 50%, resulting in significant savings for ALNuMed customers, including honey producers and regulatory agencies responsible for protecting consumers.

Text: Julia Schenk
Quantos Product Manager

Webinar: Weighing & Sample Preparation Tips

Learn how gravimetric weighing reduces the risks of Out-of-Specification results at sample preparation and weighing.

Book a seat in the webinar

www.mt.com/labtec-avoid-oos

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Simplified TGA Operation
Supports Routine Workflows

Routine thermal analysis testing of incoming goods requires not only excellent measurement performance, but also simple operation. The new TGA 2 allows less skilled staff to operate and evaluate TGA measurements.

Thermal analysis of incoming goods identifies and quantifies the components in a material. This is a routine measurement that can benefit from automated operation and workflows.

Simple routine operation

The new TGA 2 starts predefined measuring methods directly from the instruments’ touchscreen display with OneClick™. The 34-position sample robot with single axis movement handles crucibles of different size and volume operating continuously around the clock.

Experimental time is further reduced with the elimination of blank measurements. The TGA 2 automatically corrects influences on a measurement unrelated to the sample, such as buoyancy.

Automatic evaluations, based on defined conformity limits, can be pre-programmed. Pre-recorded TGA curves of good materials can be displayed for comparison purposes at any time.

Automated atmosphere control

The built-in mass flow controller (MFC) gas supply units guarantee optimal atmosphere around the sample where the chosen experiment requires the flow of a specific reactive gas or even gas switching during the measurement.

Accurate rubber characterization with TGA 2

A rubber sample is characterized with TGA 2 in order to quantify its components. The rubber sample is first heated to 600 °C under inert conditions. The pyrolysis of the polymer begins at about 400 °C. At 600 °C, the atmosphere is then switched from inert to oxidative, resulting in the combustion of the carbon black additive. The SBR sample analyzed in the example contained 59.6% polymer and 18.5% carbon black. The residue was 21.9%.

Text: Matthias Wagner,
Thermal Analysis Product Manager

www.mt.com/tga
Accurate Sample Pipetting in Pesticide Testing

Agricultural produce is strongly regulated with regard to the content of potentially harmful substances and nutrients. National agricultural departments test a variety of samples following stringent standards. Pipetting samples is a sensitive step where Rainin pipettes can improve the accuracy of results.

The State and National Agricultural Regulatory Departments in the United States are tasked with the job to strengthen the agricultural capacity of the country, while ensuring that products reach the consumer safely and sustainably. Agricultural testing departments assess agrichemical safety issues at state level.

A broad variety of samples and tests
Field inspectors collect a variety of samples from agricultural workplaces, including fertilizers, pesticides, feed, soil, water, vegetation and insects. The biochemical testing group performs analyses that quantify different chemical species depending on the initial sample. For instance, animal feed samples are tested for heavy metals, antibiotics and harmful bacteria.

The role of pipettes in agricultural testing
The majority of agricultural tests involve sample weighing prior to adding liquid solvents and homogenizing the resulting mixture. The homogenized sample is then filtered to remove particulate before samples are pipetted and analyzed with GC/MS, LC/MS or GCFID techniques. Pesticides, metals, antibiotics and other organic compounds are identified in this manner.

Positive displacement pipettes are recommended for use with the main organic solvents as they offer greater accuracy with volatile solutions and viscous solu-
This laboratory was serviced by a local provider, delivering poor quality. Since their pipettes started being serviced by METTLER TOLEDO’s service, all pipettes return ready in accordance with AOAC guidelines.

Pipette service meets analytical standards

The AOAC is a non-profit organization that sets analytical standards for companies and government agencies. One best practice of an agricultural testing laboratory that tests by AOAC guidelines was to service and, where necessary, repair their pipettes every six months.

For aqueous solutions, optimal accuracy is obtained with air displacement pipettes. Rainin pipettes offer both positive and air displacement pipettes that can aspirate and dispense from submicroliter amounts to the milliliter level.

Many of these high sensitivity tests contain critical contaminants, such as metals that could arise from the various liquid handling systems. Rainin offers Bio-clean tips tested for metal- and biological contaminants to ensure that such sensitive tests are only detecting molecules from the original sample and not from pipette tips.

This laboratory was serviced by a local provider, delivering poor quality. Since their pipettes started being serviced by METTLER TOLEDO’s service, all pipettes return ready in accordance with AOAC guidelines.

Text: Rishi Porecha
Rainin Application Specialist

www.mt.com/rainin-bioclean
Improved Reference Materials for Karl Fischer Titration

Accurate Certified Reference Materials (CRMs) for water content are required for the calibration and validation of Karl Fischer titrators. Using METTLER TOLEDO’s Karl Fischer titrators, the National Institute of Metrology in China has developed four new CRMs using an optimized methodology to achieve maximum accuracy.

The National Institute of Metrology is China’s highest technical authority in metrology. Within the Institute, the Division of Nanoscale Metrology and Advanced Materials Measurement (DN-MAMM) is responsible for the research and development of certified Reference Materials (CRMs).

When highly accurate and repeatable Karl Fischer titration is required, the methods should be calibrated by appropriate CRMs, which themselves must be certified to the highest level of accuracy. With the help of METTLER TOLEDO Karl Fischer titrators, the DN-MAMM has developed four new, fully-traceable CRMs for water content, which show increased accuracy over existing water standards.

**Optimized certification methodology**

The new certification process involved a METTLER TOLEDO V30 KF volumetric titrator and a DL39 KF coulometric titrator with Stromboli Oven Sample Changer, both managed by LabX Pro titration software. After exploring several combinations, a diaphragm-less electrode and Coulomat Anolyte AG plus a water content of 300 µg were found to produce the most accurate results for the coulometric method. Volumetric measurements were taken using 2-component KF reagents. Both KF methods were calibrated using in-house water standards, prepared and used the same day. In order to keep between-bottle uncertainty as low as possible, the CRMs were prepared, dispensed and sealed in a humidity-controlled environment.

**Certification of water saturated 1-octanol CRM**

A combination of optimized KF coulometry and volumetry, with quantitative nuclear magnetic resonance (Q-NMR) as an independent method, was used for the certification of a new water saturated 1-octanol (WSO) CRM (certified water content 4.76 %). The relative deviation of the water content between coulometry and volumetry was 0.06 %, which is much lower than that of existing CRMs (Table 1).

<table>
<thead>
<tr>
<th>Certified Reference Material</th>
<th>Rel. SD %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRM 2890</td>
<td>1.3</td>
</tr>
<tr>
<td>WSO CRM</td>
<td>0.06</td>
</tr>
<tr>
<td>Mixed solution: 10.01 mg/g</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Table 1: Rel. standard deviation of water content between an existing CRM (SRM 2890) and optimized coulometric and volumetric methods.
Low relative deviation of mixed solution CRMs

Three low-water content standards based on mixed solutions of 1-butanol, m-xylene and propylene carbonate were also prepared and dispensed in a humidity-controlled environment using the optimized method. The certified values of the CRMs were 10.01, 1.067 and 0.139 mg/g respectively. For the 10.01 mg/g standard, the optimized method resulted in a very low relative deviation of only 0.05 % between coulometry and volumetry. A slightly higher relative deviation was found in the two lower water-content CRMs, attributable to higher recovery because of a lower mass of water in each injection.

The optimized titration method has increased the accuracy for water content CRMs, which are suitable for the calibration of KF titrators. Full details of the optimized certification method can be found in the publications listed below.


Text: Giorgio Galimberti
International Sales

www.mt.com/karl-fischer
The new series of UV/VIS spectrophotometers from METTLER TOLEDO combines state-of-the-art optical technology with intuitive One Click™ user interface in a compact design to deliver accurate results within seconds. It is the ideal partner for optimizing your spectroscopic workflows and data management tasks to meet regulatory guidelines.

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Always meet process tolerances
The MinWeigh function puts a red warning onto the screen. The digits remain red until the net sample weight lies above the pre-programmed minimum value.

Easy to operate display
The 7” extra-large, color, TFT touchscreen display is operable with cotton, silicon and rubber gloves. An intuitive user interface and 18mm digits makes routine tasks more comfortable.

Extended balance lifetime
The full die-cast aluminum housing not only protects the weighing cell from environmental influences and impacts, but also remains resistant to harsh chemicals, including acetone.

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ISO 8655 defines the requirements for accurate, reliable pipette calibration. Calibrate 1 μL to 1000 μL micropipettes quickly and easily with the new XPE26PC and ensure meeting ISO 8655 requirements. Security features, such as StatusLight™ and LevelControl, give a clear indication when the balance is ready to use. Save time when carrying out several measurements thanks to the large 10mL water reservoir.

**Fast and Secure**
Micropipette Calibration

**ISO 8655** defines the requirements for accurate, reliable pipette calibration. Calibrate 1 μL to 1000 μL micropipettes quickly and easily with the new XPE26PC and ensure meeting ISO 8655 requirements. Security features, such as StatusLight™ and LevelControl, give a clear indication when the balance is ready to use. Save time when carrying out several measurements thanks to the large 10mL water reservoir.

**Fast and easy calibration**
Simply pass the tip of the pipette through the integrated light beam device to open/close the container lid automatically. Quick, convenient and suitable for left or right-handed use.

**Increase process efficiency**
The large 10 mL reservoir means that 10 μL can be pipetted 1000 times before it is necessary to empty the container. More calibration work can be carried out without this unnecessary interruption.

**Simplified data management**
The optional RFID feature simplifies processes by reading all data on the pipette automatically. Calibration results are stored correctly and the new data is written back to the pipette.

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