Safety for
Toxic Substance Weighing

Sinking our teeth into freshly baked bread or tucking into our Sunday morning rolls without a moment’s hesitation is part of our daily routine that we take for granted. The main mission of The Federal Research Centre for Nutrition and Food (BfEL) is to safeguard the quality of the food we eat and protect consumer health. To perform these tasks safely, the lab relies on an XP56 microbalance and a Skan safety workbench.

Safety First
Beate Lippert, agricultural research assistant at the BfEL in Detmold, Germany, examines grains from all parts of Germany for highly toxic fungal metabolic products. Wheat and rye are scanned in the laboratory for mycotoxins. In order to protect the staff weighing-in such toxic substances, the BfEL purchased a Skan HFC-S 1200-MT safety workbench with an XP56 microbalance from METTLER TOLEDO. The two instruments make an ideal laboratory station, allowing laboratory technicians to weigh micrograms of dangerous samples with absolute safety, speed and high accuracy.

Fast and Precise Micro Weighing
The laboratory station is primarily used to prepare reference standards to record calibration series of various mycotoxin concentrations. The weighed-in samples are normally in the range of a few hundred micrograms. Therefore, fast balance stabilization, both after taring and subsequent weighing, makes the whole weighing process far more efficient. The balance’s outer and inner draft shields protect the weighing chamber from the constant airflow in the safety cabinet. In addition, the revolutionary grid weighing pan ‘SmartGrid’ further minimizes the turbulence in the weighing chamber. Moreover, the weighing area is detached from the surrounding working space to prevent any vibration transfer. This special innovative solution was developed through close collaboration between scientific measurement experts METTLER TOLEDO and the Swiss based company
Mrs. Beate Lippert, agricultural research assistant at the BfEL in Detmold, Germany

Skan with their expertise in the field of operator safety and product protection.

**Speed and convenience at work**

The feature which Beate Lippert, the agricultural research assistant, finds most convenient in her daily routine work is ‘SmartSens’. An infrared sensor on the balance terminal means that the door opens automatically when she passes her hand over it. “This function is particularly helpful as it prevents spillage when transferring small quantities of sample from the spatula tip into the tare vessel.”

Mrs. Annette Meyer-Wieneke from the laboratory next door uses the laboratory station to prepare standard solutions of very small and expensive samples. Therefore, direct weighing into the tare vessel is highly practical. “I used to have to weigh in about 20 mg”, explained Mrs. Meyer-Wieneke, “and then make the required concentrations through a series of dilutions. The large weighing range of the new microbalance allows me to place the analysis flask securely onto the weighing pan and weigh in directly 0.1 to 0.2 milligrams. This saves time and money and takes far less effort.”

The safety workbench has made life safer and easier for these two agricultural research assistants with improved handling, reliability and convenience.

> [www.mt.com/micro](http://www.mt.com/micro)
A Simple Technique to Characterize Candy

Candy is the term widely used for a variety of rich, sweet confectioneries that mainly consist of flavored sugars. Besides taste, their appearance, texture and consistency are also very important. These properties depend strongly on the structural aspects of the candy. Detailed knowledge of the glass transition, melting and crystallization behavior of a certain candy product provides valuable information for quality control, defining suitable production and storage conditions.

The structural aspects of candy can be investigated using a combination of differential scanning calorimetry (DSC) and thermal microscopy. DSC is a widely used thermal analysis technique that provides fast, accurate, reliable and reproducible results. The FP82 hot-stage microscopy system from METTLER TOLEDO is ideally suited to this task. The method allows a sample to be heated and at the same time continuously observed under a polarization microscope.

Analyzing the Properties of Candy with DSC and Thermal Microscopy

The example described in Figure 1 illustrates how certain candy properties can be investigated using the DSC. The outer layers of the sample were separately prepared and finely ground. The samples were heated from −40 °C to 120 °C at 10 K/min, cooled to −40 °C at 5 K/min, and then heated again to 120 °C at 10 K/min.

The first heating curve of the top layer (Fig. 1) shows two glass transitions at approximately 15 °C and 55 °C. The latter transition is accompanied by an endothermic peak. Thermal microscopy was then used to visually observe the endothermic peak and identify it as a definite melting process (Fig. 2). Following the first heating run, the two phases formed a mixture and in the second heating run showed only one glass transition at approximately 20 °C. Similar behavior was observed for the bottom layer. Both the top and bottom layers of the candy were found to be almost completely amorphous.

Thermal analysis is an excellent technique to characterize candy. The glass transition and melting behavior of the candy can be easily measured using DSC. The rapid and reliable measurements provide important information on the structural aspects of candy. In addition, the FP82 hot-stage microscopy system is a powerful tool to visually identify complex processes that cannot be interpreted from the DSC curves alone. The DSC and the FP82 hot-stage microscopy system are valuable instruments for use in quality control and for defining suitable production and storage conditions.

www.mt.com/dsc
Crispy Potato Chips
Guaranteed by METTLER TOLEDO

PepsiCo Foods (China) Co., Ltd. is a snack food company member of America’s Pepsi Group producing snack foods such as potato chips. In the QC lab of PepsiCo Company, operators control the quality of finished or semi-finished potato chip products from production lines 24 hours a day. The HG63 Halogen Moisture Analyzer and DL53 Titration system from METTLER TOLEDO are the perfect solution to ensure the quality of every batch of potato chips.

Moisture and Salt Content are Crucial
As the amount of moisture and salt content in potato chips can directly influence the taste and shelf life of the products, frequent analysis to ensure optimal production processes is required. Samples are controlled every half an hour in the quality control lab to analyze moisture and salt content. This can equate to 100-200 samples measured daily. Therefore, an instrument which offers intuitive operation, increased measurement speed and high accuracy is a top priority for PepsiCo Foods.

METTLER TOLEDO’s HG63 Halogen Moisture Analyzer provides fast and accurate results for the QC lab’s moisture determination which greatly shorten the drying time to significantly improve efficiency in the lab.

Great Efficiency Improvement
To measure the moisture content, potato chips are first crushed. As the moisture of products can differ due to different raw materials used, a fixed drying time can impact the final results. The PepsiCo Company gets around this problem by using the standard oven method to calibrate the HG63 moisture analyzer once each quarter: Firstly, the oven method is used to measure moisture so as to determine the current moistures of various products. Then, the HG63’s built in ‘test mode’ determines the drying time necessary to reach this specified moisture content. When measuring the product’s moisture content, operators just need to input the new drying time and the HG63 provides an accurate result.

Ms. Wang Wen, director of the QC lab of PepsiCo Company, said, “The HG63 gives us accurate and quick results. More than 100 samples can be easily measured daily. It has never had any down time in all these years and is very stable and reliable. It plays a key role in the control of the moisture measurement of our products.”
METTLER TOLEDO’s automated titration system, the DL53 titrator with the Rondo 60 sample changer, achieves an accurate and reproducible solution for the salt content determination in the potato chips. The Rondo 60 sample changer is the best choice for handling 300 - 400 samples per day. Miss Wang, responsible for the QC lab, reports: “The DL53 + Rondo 60 automated titration system is very easy to handle, all of our operators can easily operate it, which saves a lot of training time and money. Results are always accurate and reproducible meaning that we can finish 300 - 400 samples on time daily.” During the producing process, product line operators may have to adjust the salt content, so they must know the precise salt content of the product. Miss Wang continues, “The automated titration system, gave us more flexibility and increased sample throughput. We can give the accurate results to operators on the product line far quicker”.

Discover more about the successor of DL53, the T70 Titration Excellence line, and how it fulfills this and other snack food industry production requirements.

- [www.mt.com/moisture](http://www.mt.com/moisture)
- [www.mt.com/titration-excellence](http://www.mt.com/titration-excellence)
- [www.mt.com/one-click-titration](http://www.mt.com/one-click-titration)
Fruit and Vegetable Handling
Quick-Brix™ Brings Quality

Fruit and vegetable marketing today is a far cry from the old market stalls and peddling vendors. The whole value chain from farmer to consumer requires constant quality monitoring. Swiss company Steffen-ris achieves this with the new Quick-Brix™ portable, digital refractometer from METTLER TOLEDO.

Delivering Perfect Fruit and Vegetables
Steffen-ris is an integrated fruit and vegetable handling company in Switzerland, who offers a comprehensive service to big supermarkets and other retail customers. As part of their service they source fruit and vegetables from farmers all over the country, clean and prepare the produce for retailing, store it under controlled environmental conditions, pack it according to customers’ requirements and then forward it to distribution centers. Throughout the whole activity chain, the quality of fruit and vegetables must be continuously monitored as consumers require flawless products all year round even though most fruit and vegetables are only harvested once a year.

Brix Measurement for Improved Quality
One important quality check for fruit and vegetables is the measurement of sugar content. This is achieved with a Brix meter, typically a portable refractometer, which measures sugar concentration in juice based on the principle of optical refraction. Excellent quality fruit and vegetables have higher sugar levels, which is evident in taste, but also influences storability. Apples, for example, should have a Brix value higher than 14, whereas potatoes are considered good quality already at 7 Brix. Steffen-ris have recently purchased five Quick-Brix™ digital Brix

José Barros, quality control staff of Steffen-ris, controls Brix measurement of apples when they pass through the washing bath.
meters from METTLER TOLEDO to optimize and expand their quality control procedures. Quick-Brix™ delivers accurate readings independent of operator judgment, is easy to use, so small that it fits any coat pocket and comes completely splash proof so that it can be rinsed off under a tap. At Steffen-ris it is used by lorry drivers, who collect products from orchards, to perform a first check even before transportation, by stores operators upon delivery and during storage, by process workers during cleaning and packaging and by shipping operatives before it leaves the premises.

**High Customer Satisfaction**

Hans Rölli, member of the board of Steffen-ris explains what he likes about Quick-Brix™: “The instrument is so easy to use, we can literally trust all of our staff members to perform the tests. This allows us to do much more testing, even before we accept products, which helps to keep our cost down. Frequent testing during storage and processing means we can deliver better quality, which is good for our customers. The robust design of the instruments will ensure a long life time even with the rough handling that often comes with field use by non-specialists.”

> www.mt.com/quickbrix

Lorries of Steffen-ris transport fruit and vegetable around Switzerland.
New Products and Technologies
From METTLER TOLEDO

METTLER TOLEDO delivers powerful solutions that simplify work in laboratories around the world. Combining our state-of-the-art technologies with our applicative competence, we have a strong value proposition to make: accurate results and productivity second to none.

Weighing Solutions and Analytical Instruments

Great Food Thanks to Plug & Play Titration Sensors
A comprehensive range of 17 Plug & Play pH glass, platinum and silver titration sensors is now available. The sensors cover the entire applications spectrum from routine pH measurements to specialist titrations in difficult sample matrices. The sensor chip in the electrode head stores all relevant data with expiration dates and lifespan monitoring. Thanks to the clever sensor design, the new Plug & Play sensors easily master the accurate titration of quality determining components of snack foods such as salt content or acidity.

www.mt.com/one-click-titration

LabX Balance Version 1.4 – Avoid Mistakes Thanks to New Terminal Instructions
LabX Balance software is a single software platform for balances. It enables the centralized control of balances whilst maintaining user management and weighing applications. User guidance can be customized according to each weighing process in order to avoid errors and ensure SOP adherence.

www.mt.com/labx

The Next Level of One Click Titration™
The new version 2 of the Titration Excellence line offers many improvements that make titration simpler, more efficient and secure. The new Rondo 30 sample changer handles large batches with up to 30 samples. The powerful LabX titration PC software gives total control and saves all data in the database. The new Excellence line successfully executes all titration tasks of a snack food R&D or QC laboratory on one click.

www.mt.com/one-click-titration

Halogen Moisture Analyzer HB43-S – With 100+ Validated Food Methods
The new HB43-S combines METTLER TOLEDO halogen heating technology with analytical power. It is simple to operate, comes along with a rugged design and the integrated library offers application methods for 100+ food substances.

www.mt.com/HB43