

## Screening and analytical facilities at SINTEF

### High throughput screening

The robotic screening facilities at SINTEF includes facilities for robotic liquid handling and colony picking as well as other equipment necessary for high throughput screening such as high capacity centrifuges and incubators.

### Robotic colony picking

Genetix QPixII is a robotic unit designed to enhance microbiological work. The unit is capable of transferring microorganisms or biological material from agar plates to microtiterplates or from microtiterplates to microtiterplates, agar plates or nylon filter membranes. The robot uses 96 or 384 well microtiterplates, and material from 8000-10000 colonies can be transferred to microtiterplates during a normal working day.

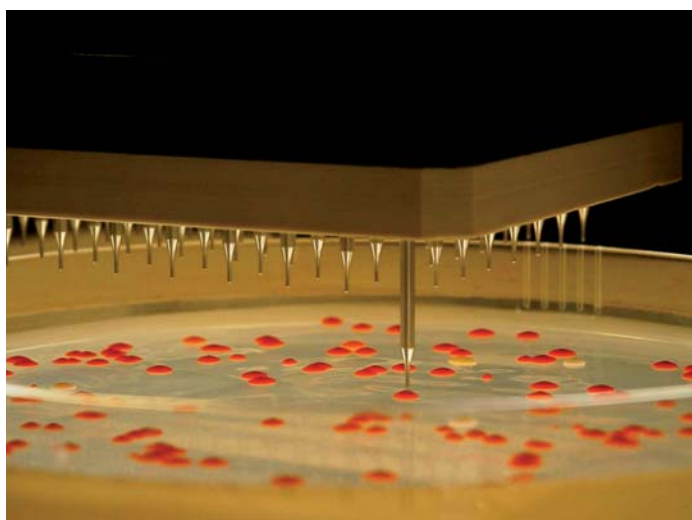
### Robotic liquid handling

Our two liquid handling workstations (Tecan Genesis 200 RSP and Beckman Coulter Saigan Core System) are equipped for washing, filling, shaking, filtration, solid phase extraction, incubation, cultivation (including fed-batch), ELISA, and spectrophotometric, luminometric or fluorometric reading of microtiterplates.

*Automated picking of colonies in the high-throughput screening laboratory*

Robotic arms move consumables and microtiterplates between the units on the workstations and/or a storage unit (total capacity approx. 180 microtiterplates) and/or a shaking incubator (total capacity 12 microtiterplates, 42 in static mode). The robots are equipped with pipetting tools for fast and accurate pipetting in microtiterplates (volume range 1 – 1000 µl), as well as for pipetting in tubes, trays and troughs, and can use disposable or fixed pipet tips.

There are two main reasons for robotizing liquid handling. First and foremost the robot is highly efficient, and can easily perform 30.000 pipetting cycles (aspiration, dispensing and mixing) in 8 hours. The other reason for robotizing liquid handling is high accuracy and elimination of human error in large pipetting operations. The 96-channel pipetting introduces a pipetting error of less than 2% at 50 µl.



## Analytical facilities

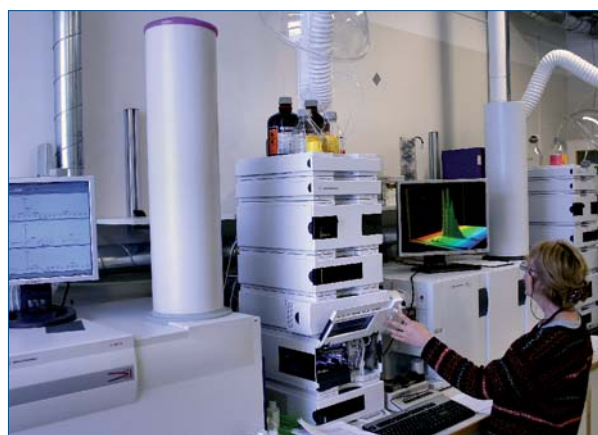
Mass spectrometry (MS) is a universal principle for detection of compounds based on molecular weight and structure, and makes it possible to identify and quantify compounds with a high degree of certainty and a high sensitivity. MS has therefore become the "gold standard" within several fields of analytical chemistry, from biological research to forensic analyses.

## The mass spectrometric laboratory

The MS laboratory at SINTEF / NTNU represents state-of-art of mass spectrometric instrumentation and consists of both gas (GC-MS) and liquid (LC-MS) chromatographic instrumentations. GC-MS is ideally suited for a wide range of compounds that can be identified on the basis of their unique mass spectra. For polar compounds, like metabolites, LC-MS is ideally suited and is used complementary to GC-MS.

The laboratory comprises both low-resolution mass spectrometers, ideal "workhorses" for high throughput screening analyses, and high-resolution instruments for elucidation of molecular structures. MS generally offers a very high analytical sensitivity that enables detection of extremely low concentrations (nanomolar/ppt levels), in combination with high specificity (ensuring identity).

Our analytical research has been within the fields of bioprospecting, biofuel, fermentation technology, food microbiology / technology, high throughput screening, metabolomics



*The Agilent TOF MS (left), the Agilent QTOF MS (middle) and the Agilent QQQ MS (right) in the MS laboratory.*

(metabolic profiling and metabolic fingerprinting), crude oil microbiology, process development, strain development, systems biology and structure elucidation.

Our instrument platform is:

- 3 GC-MS
- 4 LC-MS (singlequadrupole)
- 1 LC-IonTrap
- 1 LC-QQQ (triplequadrupole)
- 1 LC-TOF
- 1 LC-QTOF
- 1 GCxGC-QTOF (2009)

The facility is equipped for mass based analytical and preparative fraction collection. The preparative system enables isolation and purification of enough material (mg to g quantity) for e.g. NMR analysis or extended bioactivity testing.

In addition to the manufacturer supplied software for data analysis, we use GeneSpringMS and ACDLabs MS Manager for advanced MS chromatogram interpretation and database handling.



SINTEF Materials and Chemistry

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