



## IR Biotyper<sup>®</sup>

- Microbial typing for real-time quality control and source tracking

Not for use in clinical diagnostic procedures.

# Proactive monitoring of contaminants and easy QC of technological strains

## Hygiene control and source tracking

Implementing a comprehensive approach for relevant and cost-effective hygiene control throughout the production lines requires the combination of several systems, from surface sampling to molecular analyses.

Routine fingerprinting of the collected microbial isolates enables proper monitoring of the contaminations, and hence facilitates proactive root cause analyses and corrective actions in the cleaning process management.

When time matters during a contamination crisis, fast screening prior to Whole Genome Sequencing definitely helps in setting up efficient epidemiological study plans.

The IR Biotyper is Bruker's infrared spectroscopy solution for microorganism typing to meet the above needs. The discriminatory power is comparable to routine molecular genetic methods. The fast and easy workflow allows real-time monitoring and source-tracking, and fits with routine testing requirements.

## Quality control of biotechnological processes

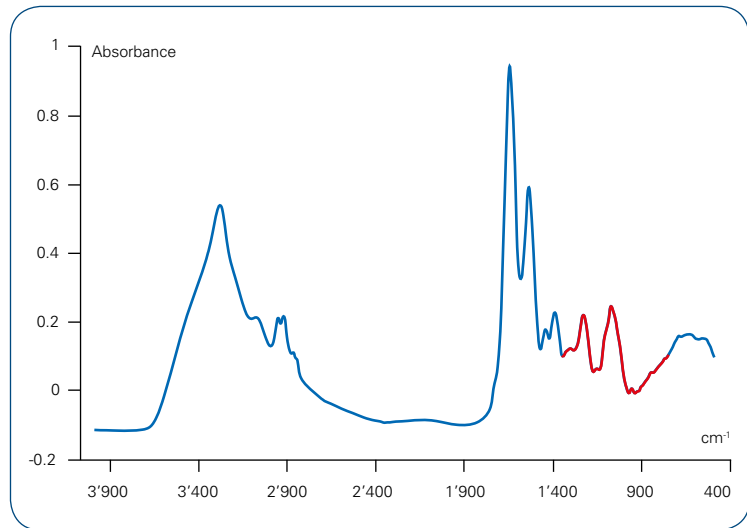
Quality control testing strategies play an important role in monitoring biotechnological processes, and ensure the quality and consistency of the products derived from beneficial microorganisms.

Fingerprinting of the technological strains is, of course, one of the most important steps, in order to assure that the product intermediates and the final formulation meet predefined quality and functional properties.

With the IR Biotyper, fingerprinting and data analyses are performed in less than 3 hours, fitting perfectly with real-time monitoring of technological processes. Needing only 30 minutes for the sample preparation of a maximum of 30 isolates, Bruker's typing solution is easy to implement in a routine laboratory workflow.

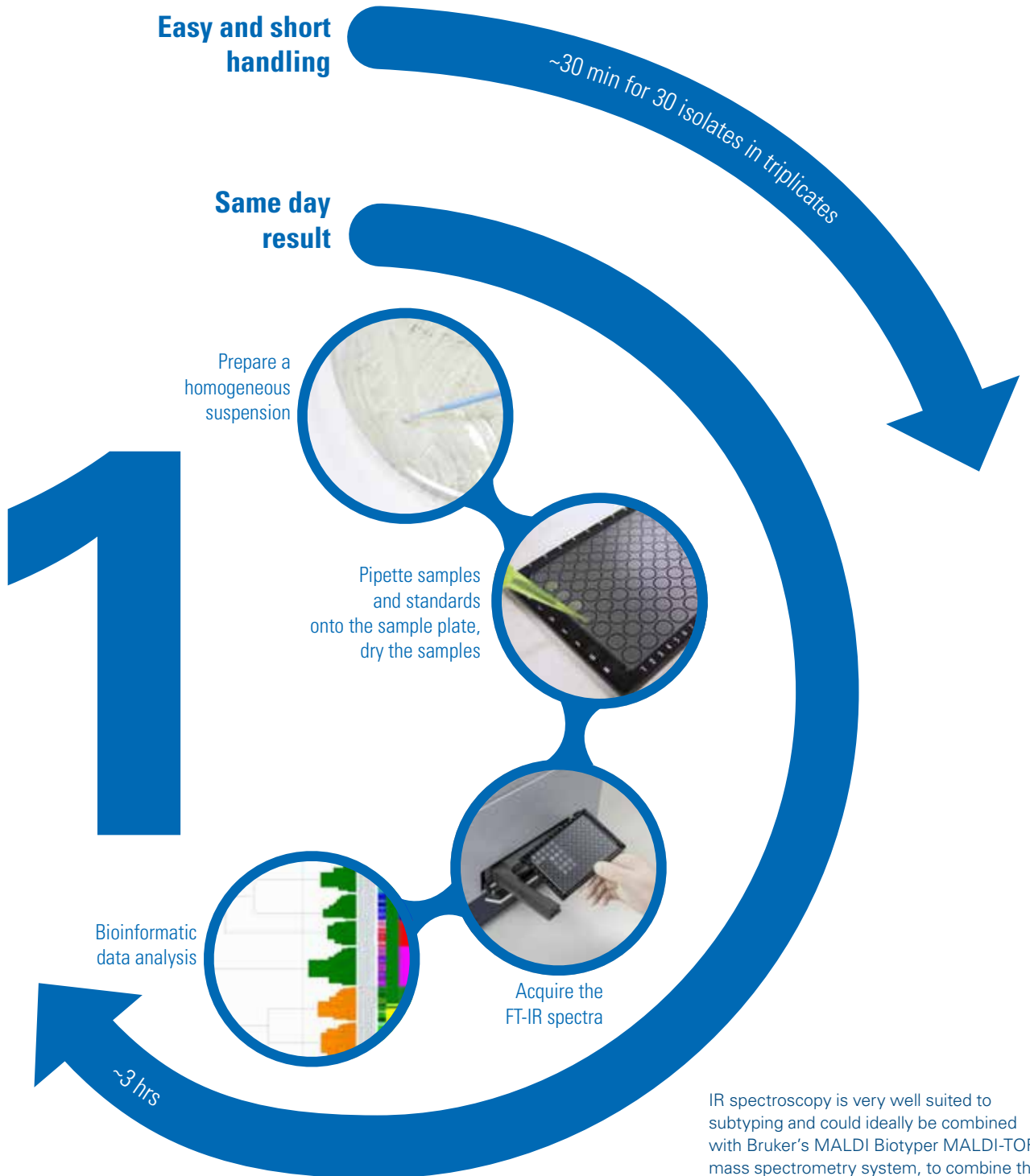
### The principle

IR Biotyper is a Fourier Transform Infrared (FT-IR) Spectroscopy system analysing the molecular vibrations of carbohydrate constituents present in many molecules such as glycoproteins. This FT-IR spectrum is like a fingerprint allowing the classification of microorganisms with comprehensive bioinformatic analysis.



The IR Biotyper analyses IR spectra in the wavelength range typical for carbohydrates, as indicated by the colored spectrum area. Spectra are then analysed further for microbial isolate characterization.

# Workflow - Fast and easy



IR spectroscopy is very well suited to subtyping and could ideally be combined with Bruker's MALDI Biotyper MALDI-TOF mass spectrometry system, to combine the strength of rapid and easy microorganism confirmation and identification via MALDI-TOF with IR strain typing into one workflow.

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# System components including consumables

## **Part-No. 1845471**

### IR Biotyper

The IR Biotyper is a spectroscopic system for analysis of microorganism samples. The system is composed of a high performance FT-IR spectrometer (Fourier Transform Infrared), a high throughput screening extension intended for analyzing silicon microtiter sample plates (96 spots), and software for system control and automatic measurement of spectra.



Management of isolate metadata, creation of runs and data exploration are performed with the IR Biotyper software which features, for example:

- customizable metadata (biological: MLST, PFGE, virulence factors, resistances, etc.; and circumstantial: location, isolation date, matrix, etc.)
- easy measurement run creation via templates
- easy project creation to evaluate isolate relationships
- data exploration with hierarchical cluster analysis (HCA) and result display as dendrogram or distance matrix which can be exported in PNG data format
- two metrics (Euclidean & correlation) and four linkage types (single, average, complete, Ward's) available
- results from principal component analysis (PCA) and linear discriminant analysis (LDA), for enhanced discriminatory power, can be displayed as a scatter plot

## **Part-No. I23258P**

### Silicon 96 spot microtiter plates

Set of 5 reusable plates each with 96 positions designed for use with the IR Biotyper.



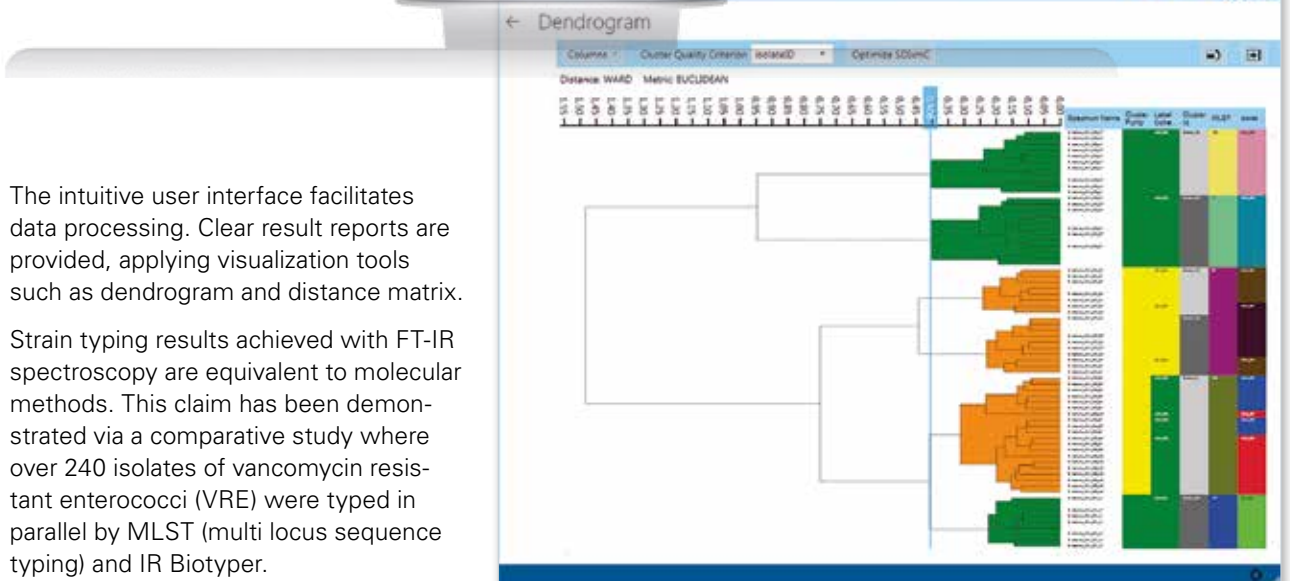
## **Part-No. 1851760**

### IR Biotyper Kit

Includes two bacterial IR Test Standards (IRTS 1 and IRTS 2) for five runs and sample preparation vials for 50 isolates.



# Distance matrix and dendrogram



The intuitive user interface facilitates data processing. Clear result reports are provided, applying visualization tools such as dendrogram and distance matrix.

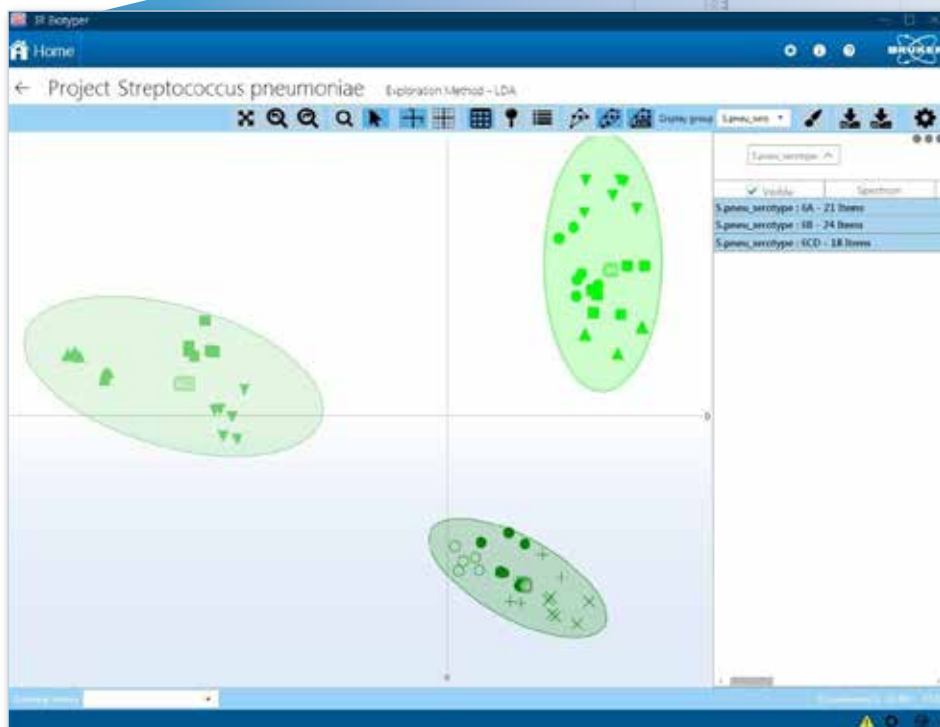
Strain typing results achieved with FT-IR spectroscopy are equivalent to molecular methods. This claim has been demonstrated via a comparative study where over 240 isolates of vancomycin resistant enterococci (VRE) were typed in parallel by MLST (multi locus sequence typing) and IR Biotyper.

# 2D Scatter plot

## Enhanced discriminatory power

30 *Streptococcus pneumoniae* isolates, serotyped by slide agglutination, were measured via FT-IR. Hierarchical cluster analysis (HCA) of 160 spectra clearly shows grouping of the 7 serotypes, displayed in 7 colors on the top line of the dendrogram.

7 serotypes



The more difficult to distinguish serotype complex of 6A, 6B and 6CD (corresponding to the 3 shades of green in the dendrogram) can be successfully grouped by application of linear discriminant analysis (LDA) as shown in the image on the left.

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