

Ultra-High Speed LCMS System for Multiplex Analysis

Nexera MX



Innovation in Multiplex Analysis

Higher throughput is of the utmost importance to laboratory efficiency and profitability. Nexera MX processes twice the number of samples as conventional LCMS systems in the same amount of time.

- With Shimadzu's proprietary Nexera™ MX Dual Stream Technology (MX-DST), the Nexera MX can process samples in half the time required by existing systems.
- The newly developed LabSolutions Connect™ improves the efficiency of required pre-analysis tasks, such as MRM optimization, method creation, and batch creation.
- LabSolutions Insight provides a fast and efficient data processing environment.

Quick and automatic optimization of MRM conditions

In the MRM optimization process for compounds in a library, which can range in number from several hundred thousand to several million, speed is required above all else. At the same time, intelligent MRM information management is needed. With LabSolutions Connect, MRM optimization is performed automatically with simple settings, and the results are registered in the database.

Double sample throughput with the same method

The Nexera MX Dual Stream Technology (MXDST) uses the existing method as is and enables processing twice the number of samples in the same time it takes for conventional systems.

More efficient, error-free analysis preparation

In continuous analysis of multi samples, a high emphasis is placed on reducing human errors and simplifying analysis preparation. With LabSolutions Connect, the MRM optimization information registered in the database can be loaded into a selected LC method, simplifying real-time batch analysis.



Quick and efficient data
processing using
LabSolutions Insight™

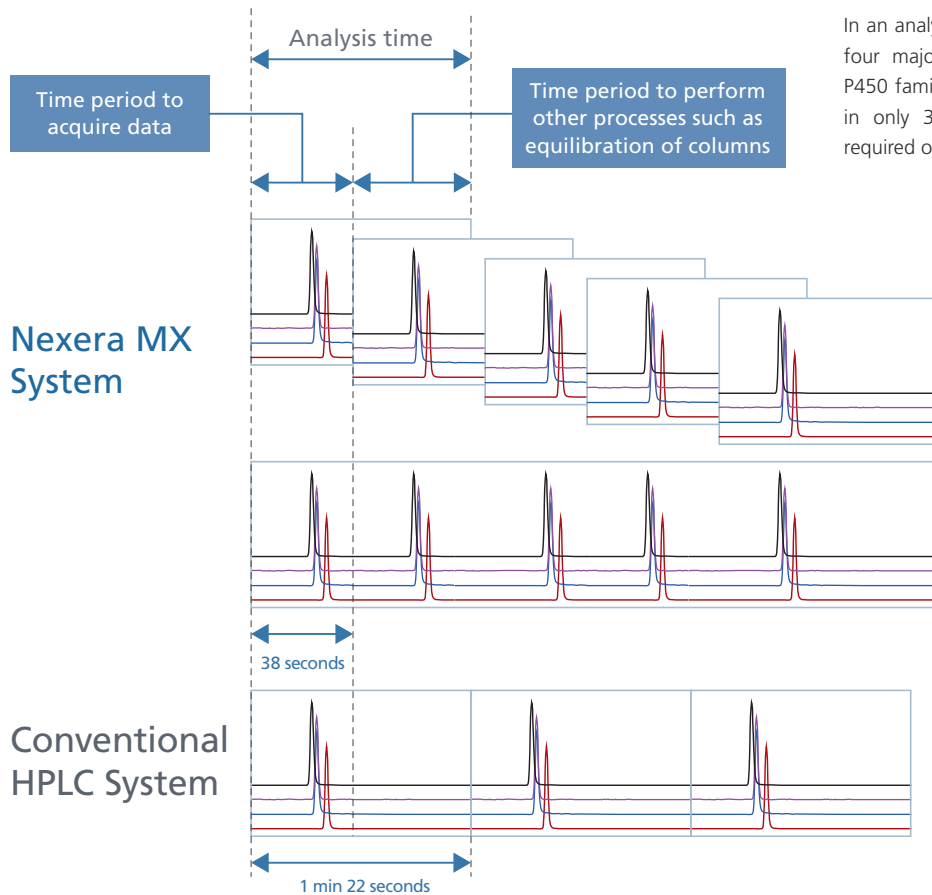
LabSolutions Insight provides an excellent judgment function that enables effective screening of a large number of analytical results obtained from continuous multiplex analysis.



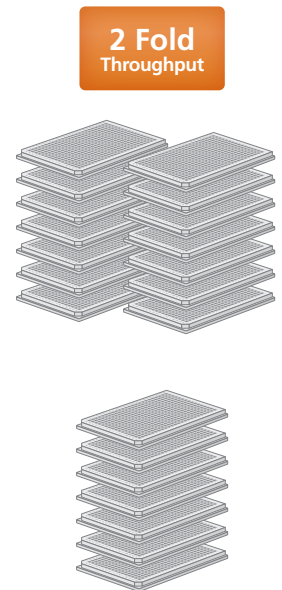
Original hardware control technology cuts analysis time in half!

Conventional analysis requires performing various processes such as column washing, equilibration at initial mobile phase concentrations, and the next sample injection by the autosampler during the analysis.

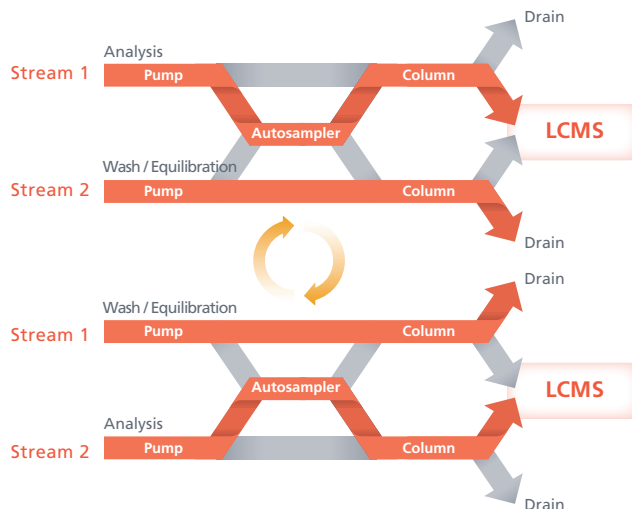
Therefore, demands have increased for LCMS systems that shorten the time spent for processes other than data acquisition in order to improve analytical throughput.



In an analysis of four biomarker compounds for the four major molecular species in the Cytochrome P450 family, the Nexera MX completed the analysis in only 38 seconds whereas conventional HPLC required one minute, 22 seconds.



▸ Nexera MX Dual Stream Technology (MX-DST)

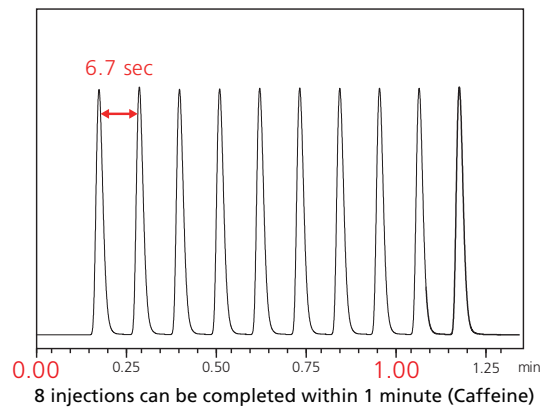


The MX-DST incorporates a special flow line structure and instrument control system, and performs overlap control of sample injection by using two analysis systems (streams) alternately. As a result, after one system completes data acquisition, the other system starts data acquisition immediately, making it possible to use nearly the whole time of LCMS operation for data acquisition.

▶ Ultra-fast and Ultra-low Carryover Autosampler SIL-40 Series High Capacity PLATE CHANGER

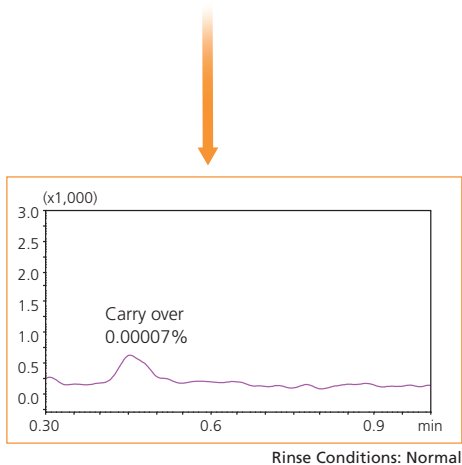
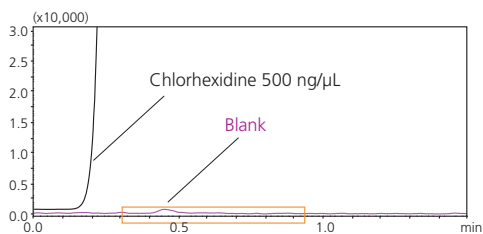
▶ Analysis Cycle Time Less Than 10 Seconds

The SIL-40 autosampler can process the entire injection cycle time in as little as seven seconds, twice as fast as the previous model. In addition, continuous analysis can be carried out on up to 44 MTPs (using 3 PLATE CHANGERS). Together these features dramatically increase analysis throughput.



▶ Ultra-low Carryover

The Nexera boasts ultra-low carryover, even on a high-sensitivity LC/MS/MS. This reduces time spent on rinsing, resulting in a shorter overall analysis time.



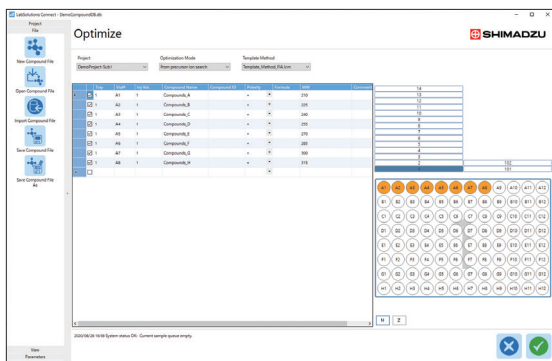
Simple Workflow Supports High Throughput

Cytochrome P450 (CYP) cocktail inhibition assay monitoring of multiple substrates is one of the major tests during early drug discovery. This section introduces the sequence of procedures for performing MRM optimization in advance for target compounds known to be substrates of CYP molecule species, creating an analysis method from the MRM transition information registered in the database, and performing real-time batch and data analysis.

▶ LabSolutions Connect

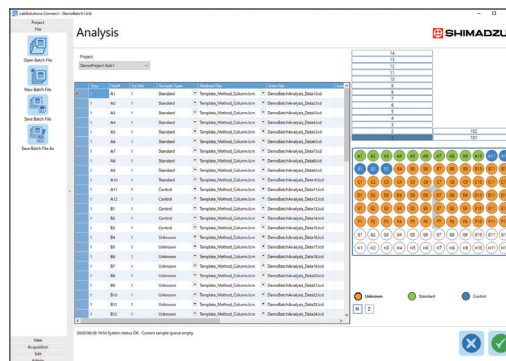
1 Extract MRM transitions

- Open a compound database file.
- Select a compound list of drugs for analysis.



2 Create method and batch files

- Select the LC method used for analysis.
- Enter the settings required for real-time batch (vial positions, settings for calibration curves, etc.).



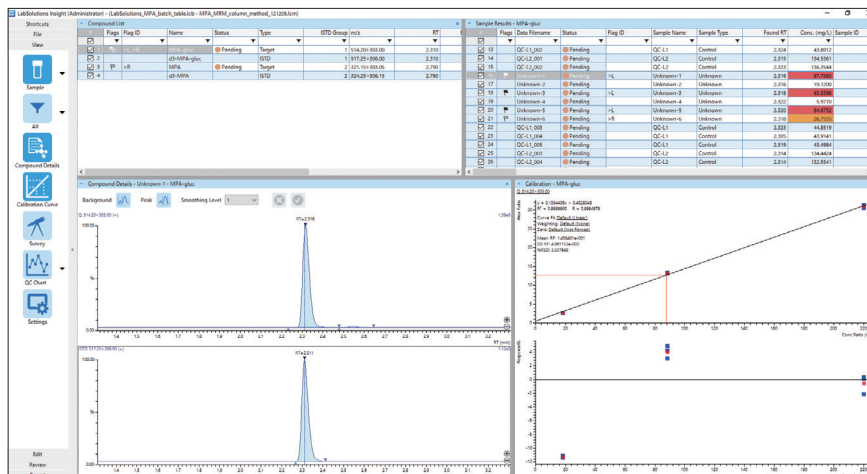
3 Execute analysis and manage batch queue

- Start real-time batch.

▶ LabSolutions Insight

Data Analysis and Report Creation

- Check the concentration values for substrates while displaying in parallel the substrates for analysis and the configured IS peaks.

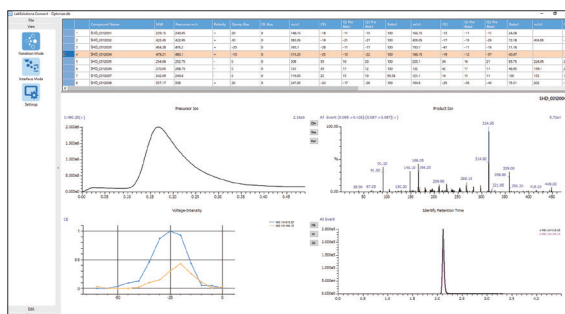


Even when multiple drugs are grouped for cassette administration, it is easy to extract only the required MRM transition information from the registered database, and then create an analysis method. LabSolutions Connect is a very powerful tool for automating and heightening the efficiency of the entire sequence, from creating method files to performing analysis, and even analyzing data.

LabSolutions Connect make full use of the high-throughput performance of Nexera MX. It seamlessly supports the series of operations from MRM optimization to batch queue execution, improving process efficiency.

Supporting MRM Optimization

The easily configured automatic MRM optimization function and the data browser function for checking optimization results reduce the work involved in the optimization process for multiple samples.



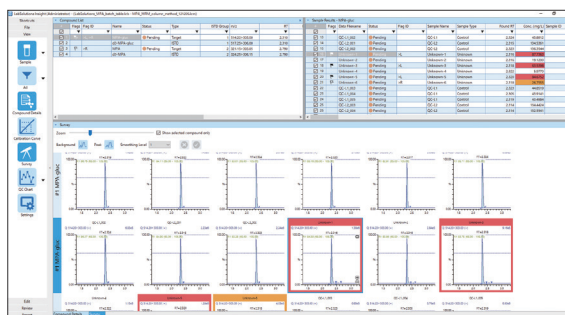
Creating Method and Batch Files, Executing Analysis, and Managing the Batch Queue

With LabSolutions Connect, the required information from MRM optimization results registered in the database can be accessed by loading in a text file, and then a method file used for analysis can be easily created. In addition, the settings for the batch file saved in a text file can be loaded, speeding up the process of batch file creation. The intuitive graphical user interface reduces the burden on the user when configuring a real-time batch analysis.

Compound Name	Group#	File Name	Type	ISTD Group	Ion
Cyromazine	1	Demo_Me1/Std1	Target	1	1
Fluorenicol amine	1		Target	1	1
D9 Terbutaline	1		ISTD	1	1
Lincomycin	2	Demo_Me1/Std2	Target	2	1
Nitarsone	2		Target	2	1
Imidocarb	2		Target	2	1
D9-Cimbuterol	2		ISTD	2	1

Processing Large Amounts of Data by LabSolutions Insight

Large-volume data sets obtained after data acquisition are analyzed using LabSolutions Insight. With LabSolutions Insight, the MRM chromatograms to be reviewed can be displayed in a stack. In addition, peak identification can be collectively processed via manual operation for peaks displayed. This reduces the time required for data processing, enabling more efficient data review.



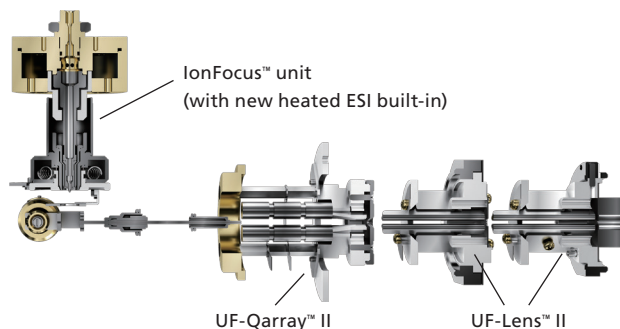
▶ The Culmination of Shimadzu's Expertise in Triple Quadrupole Mass Spectrometry LCMS-8060NX



The LCMS-8060NX is a triple quadrupole mass spectrometer with world-class sensitivity and detection speeds. It boasts increased robustness and ease of use as well as Analytical Intelligence functions to maximize your laboratory's output.

▶ World-class sensitivity and speed

Inheriting the excellent speed and sensitivity of the LCMS-8060, the LCMS-8060NX improves the desolvation efficiency through increasing the ESI heat transfer efficiency and the maximum gas flow rate. Optimum ionization conditions can be set for a wider range of compounds, enabling even higher sensitivity in analysis.



▶ High robustness minimizes downtime

The newly-developed IonFocus unit introduces ions into the mass spectrometer with greater efficiency while expelling unneeded neutral particles, reducing matrix effects and contamination inside the instrument. The new ion guide UF-Qarray II and the UF-Lens II increase the robustness of the instrument while maintaining a high ion transmission rate.

▶ Excellent ease-of-use for greater workflow efficiency

New parameters enable high sensitivity without manual optimization, while features such as automated start-up and shutdown (with LabSolutions Connect MRM) allow unattended operation. Combining the MS with the Nexera series UHPLC provides multiple Analytical Intelligence functions to further increase the efficiency of your overall workflow.



- Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.
- Allows a system to monitor and diagnose itself, handle any issues during data acquisition without user input, and automatically behave as if it were operated by an expert.
- Supports the acquisition of high quality, reproducible data regardless of an operator's skill level for both routine and demanding applications.

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