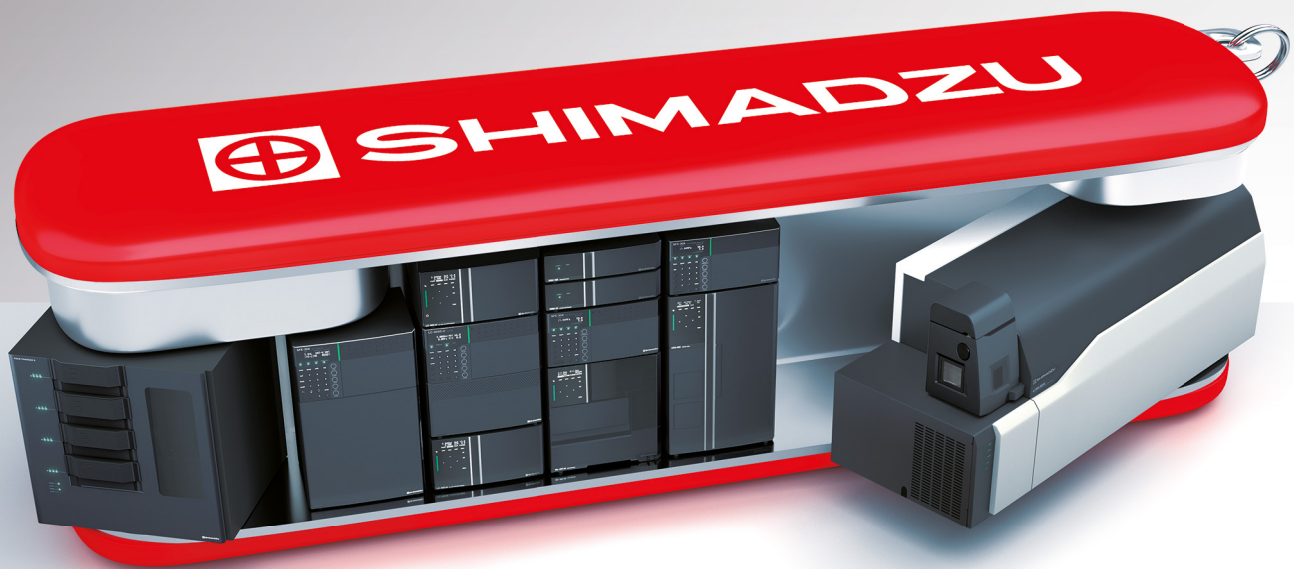


Nexera UC – Supercritical Fluid Chromatography system

The Swiss knife of analytics

Inspired versatility and reliability – the next era of SFC



Inspired versatility and reliability

Supercritical fluid chromatography (SFC) – chromatography that utilizes pressurized CO₂ in the mobile phase – is seeing a surge in popularity due to its many advantages compared to conventional chromatographic techniques:

- The lower viscosity of the mobile phase allows use of faster flow rates, resulting in higher throughput with reduced solvent consumption.
- In addition to the SFC's green credentials, cost per sample can be cut substantially.

- It also offers complementary chromatographic selectivity to standard reversed phase LC separations, especially beneficial in the separation of chiral compounds.
- Also, hyphenation of SFC to mass spectrometry (MS) can lead to a significant increase in sensitivity.

Unique hardware innovations make the Nexera UC the state-of-the-art choice for challenging sample separation in a wide range of application areas. This includes chiral screening, pesticide analysis, investigation of biomarkers and determination of polymer additives in the pharmaceutical, chemical and food industries.



The Nexera UC enables customer- and application-specific solutions supported by a variety of system configurations. Depending on the set-up, Nexera UC covers highly sensitive SFC-MS applications, offline or online supercritical fluid extraction in an SFE-SFC-MS combination or flexible choice between SFC and LC methodology on a single system, using the LC/SFC switching system.

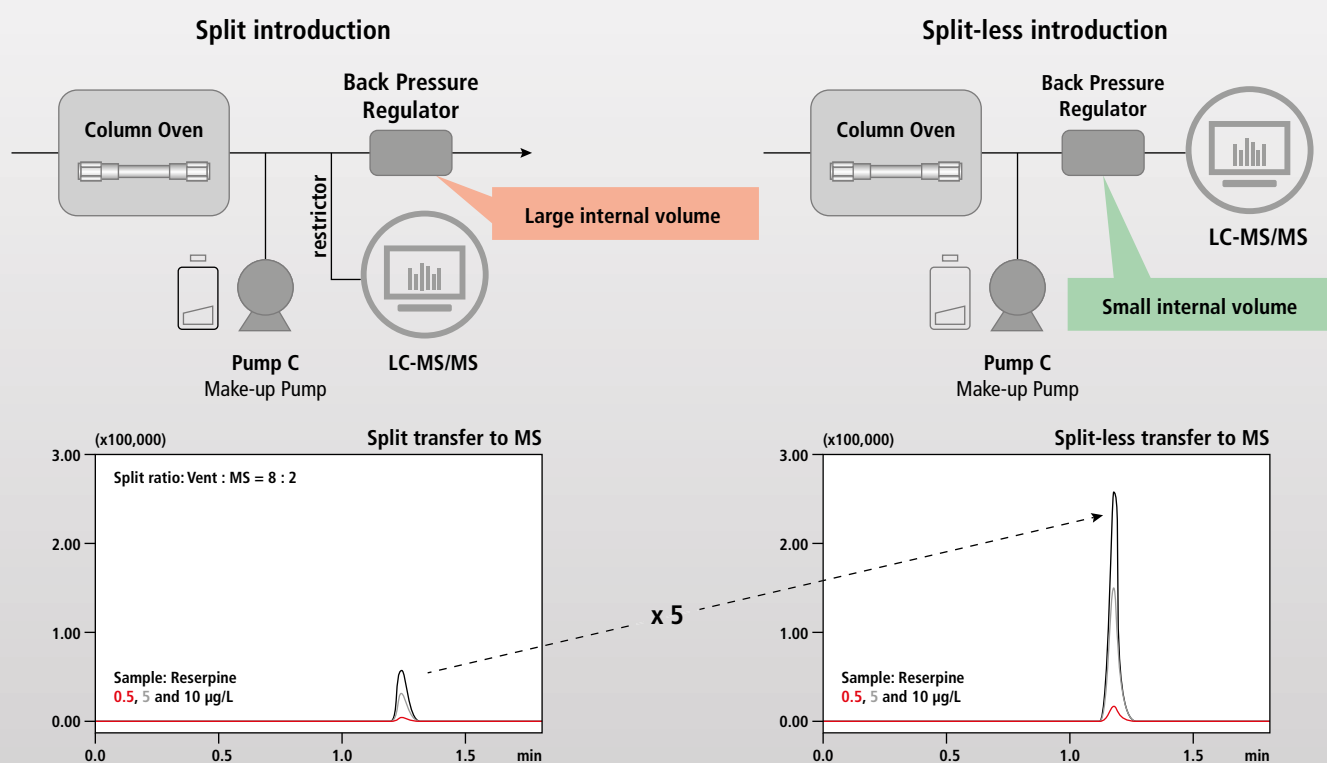
“SFC is changing the way we operate by opening the doors to new applications.”

Caroline West, Associate Professor, University of Orléans, France,
in 'The Analytical Scientist' May 2020

A new era of SFC instrumentation

Patented BPR technology ensures accuracy, reproducibility and reliability

Robust SFC methods rely on stable pressure control by the backpressure regulator (BPR) unit. BPR performance is a key feature of any SFC instrumentation. The unique design of the patented SFC-30A BPR enables unparalleled pressure stability with virtually no fluctuation in a wide flow rate and pressure range, ensuring reproducible results. Furthermore, it also responds quickly to any changes in pressure settings, minimizing wait time during method development.



The simple, elegant design allows for easy maintenance. With a dispersion volume of less than 1 µL and integrated temperature control, the SFC system can be connected directly to a mass spectrometer without the need for a special interface or flow splitter. The introduction of the entire amount of eluent has the potential to significantly increase MS sensitivity.

Shim-pack UC SFC columns

Excellent stability, selectivity and performance for diverse separation needs

Shim-pack UC-X series columns are designed specifically for use in SFC systems. Retention behavior can vary significantly depending on the type of stationary phase. During method development, a variety of columns should be tested to achieve optimum separation. The Shim-pack UC-X series offers a wide range of different selectivities and available column sizes to enable seamless scale-up from analytical to preparative SFC applications.



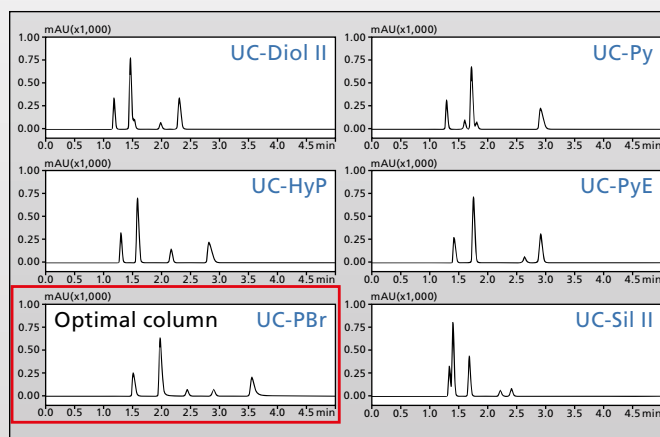
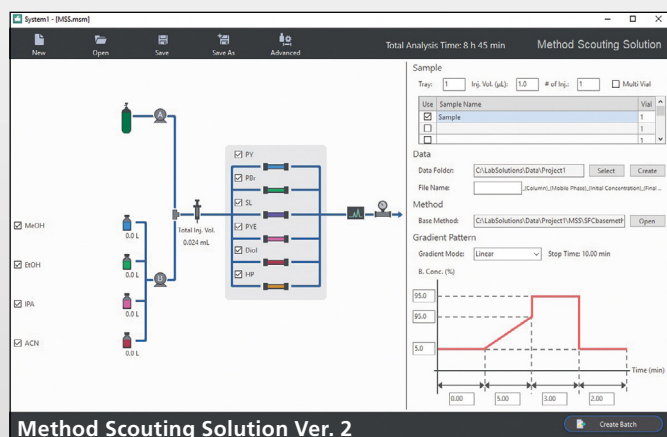
Get more information:

www.shimadzu.eu/columns-sfc

Fast and efficient method development

Chiral screening system to optimize separation conditions

Method screening with a set of columns offering a variety of selectivities is standard practice when developing a new SFC method, to determine optimum column and separation conditions. The Nexera UC chiral screening system and dedicated Method Scouting Solution software offer a highly efficient workflow using automated column screening with a selection of mobile phases. The auto-blending functionality of the modifier pump enables automated mobile phase blending of up to 4 solvents, reducing the time and effort required for manually pre-mixing the appropriate eluent composition. This reduces lab workload as well as solvent waste from pre-mixed eluents.



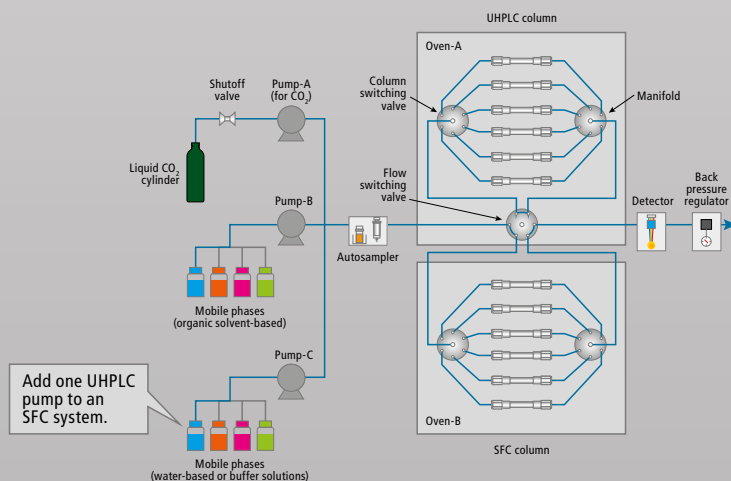
With the dedicated “Method Scouting Solution” software, various analytical conditions can be applied simply by selecting them from the graphical user interface (GUI). It supports an automated workflow by calculating analysis run time, modifier and sample amount required, automated method and batch creation as well as prevention of degradation through column rinsing.

This workflow automation significantly reduces time and effort required for method development, as well as the risk of human error during the process. Once the optimum separation parameters have been identified, scale-up to preparative scale flow rates can also be realized easily using the Shimadzu “Method Transfer” tool to maintain separation while increasing the mass load.

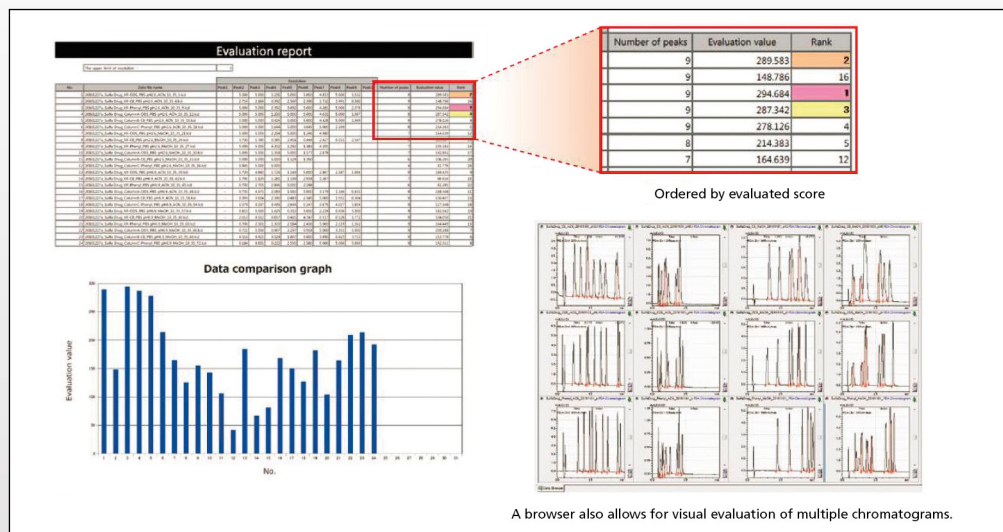
SFC / (U)HPLC switching system

Improved analytical efficiency with reduced cost of acquisition

When considering separation conditions, testing with more than just one technique can be beneficial. The Nexera UC SFC/UHPLC switching system allows measurements by either liquid chromatography (LC) or supercritical fluid chromatography (SFC) on a single system. LC and SFC offer very different selectivity for analytes of interest, so an increased range of compounds can be analyzed while components that co-elute using LC can be re-tested using SFC. A hybrid system allows for most efficient method screening using the two orthogonal techniques, resulting in improved analytical efficiency. Existing Shimadzu (U)HPLC systems can be upgraded to offer a full SFC/UHPLC set-up while saving acquisition cost as well as lab space.



SFC and UHPLC involve significantly different mobile phase and separation characteristics, but stable analysis can be performed in either mode, by purging the flow lines with the respective eluent used. This washing and equilibration step is accomplished by executing a pre-defined batch table generated automatically by the dedicated software. The streamlined process is easy-to-use, even for non-experts, for smooth switching between SFC and UHPLC analyses.



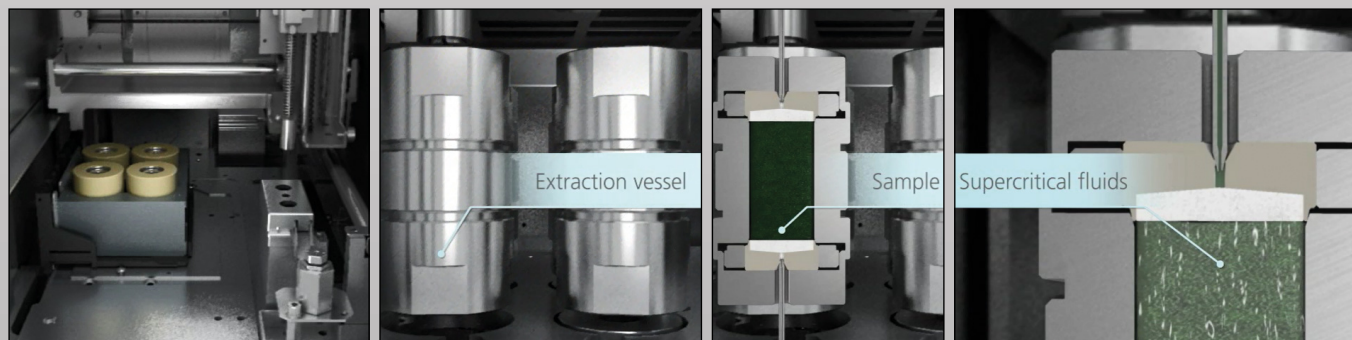
Seamless evaluation of results in a multi-data report

Data acquired by method scouting can be evaluated quantitatively with a multi-data report. By employing an evaluation method that uses resolution and number of peaks detected, it supports the user in quickly judging a large number of chromatograms in terms of the most promising separation conditions.

Online sample preparation

Nexera UC online SFE-SFC system

The Nexera UC SFE-SFC system improves the analytical workflow through an unprecedented combination of supercritical fluid extraction (SFE) sample preparation with SFC analysis. In an online SFE-SFC approach, the solid sample, whether dried blood spot, food sample or polymer is homogenized and placed in an extraction vessel in the SFE unit. Supercritical CO₂ is then introduced, and extraction selectivity can be controlled carefully by tuning the solvating power of the CO₂ through changes in pressure and temperature. This makes it faster, more efficient and more versatile than liquid extractions. Samples are extracted under light-shielding, anaerobic conditions so that decomposition even of labile compounds can be avoided.



The Nexera UC online SFE-SFC approach eliminates the need for tedious, manual sample pretreatment. Combined with MS, it offers quick and easy on-line sample extraction with state-of-the-art chromatographic separation and high sensitivity detection.

Sample collection made easy

Patented LotusStream GLS technology enables analytical fractionation system

New and unique gas-liquid separation (GLS) technology allows fractionation of low volumes in collection vessels as small as 1.5 mL vials or deep well plates without scattering of the solvent, enabling analytical scale fractionation. The elegant design of the new LotusStream GLS reduces the total size of the recovery system and provides easy cleaning and maintenance.



The Nexera UC supercritical fluid chromatography system was co-developed with Osaka University, Miyazaki Agricultural Research Institute and Kobe University in a project of the Japan Science and Technology Agency. Since its release in January 2015, it has been recognized as an innovative system worldwide. The Nexera UC is now widely used in government agencies, universities and environmental testing laboratories as well as in pharmaceutical and food industries.



Shimadzu Europa GmbH
Albert-Hahn-Str. 6-10 · D-47269 Duisburg
Tel.: +49 - (0)203 - 76 87-0
Fax: +49 - (0)203 - 76 66 25
shimadzu@shimadzu.eu
www.shimadzu.eu

Find out more:



www.shimadzu.eu
/next-era-SFC