

State of the Art Sample Preparation
for High Resolution MALDI MSI

SunCollect Pneumatic Sprayer

Advanced Sample Preparation for MALDI Imaging

The SunCollect MALDI-Sprayer is a high performance tissue preparation system for Imaging MALDI Mass Spectrometry.

The sprayer can handle a large variety of tissue samples like fresh-frozen and FFPE tissue sections. Besides all common MALDI matrices, enzymes such as trypsin can be applied as well as derivatisation agents and external standard solutions.



Figure 1: SunCollect pneumatic sprayer

SunCollect sprayer offers the following key features:

- Automated delivery of matrix, enzyme or derivatisation solutions.
- New robust 9-port ceramic valve with low dead-volume to minimise liquid consumption.
- Automatic self-cleaning function at the end of each spray session.
- 100 % biocompatible.
- Compact unit 36 x 49 x 40 cm (w,d,h).
- Preprogrammed spray protocols.
- Up to 8 sample slides can be sprayed simultaneously.
- Economical consumption of solutions.

The SunCollect system uses an optimized spray generator to produce extremely small matrix droplet sizes. It 'atomizes' the matrix solution with its patented spray nozzle using compressed air or nitrogen gas.

SunCollect enables the user to produce by far the finest matrix crystals by a spray procedure in combination with a very high homogeneity. For α -Cyano-4-hydroxycinnamic acid (HCCA), crystal sizes around 100 nm can be achieved (Figure 2).

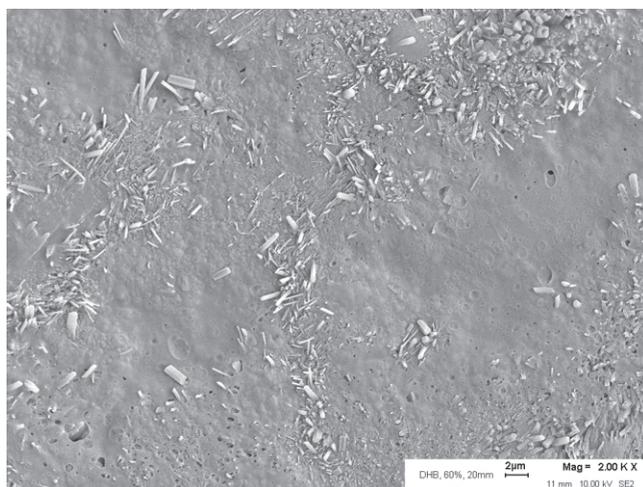
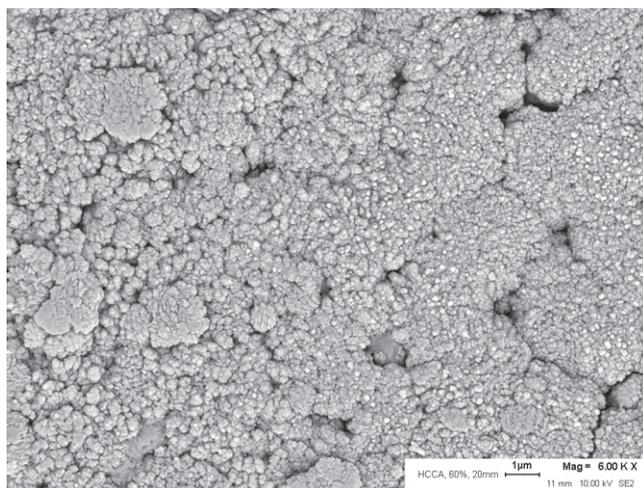


Figure 2: SEM pictures of mouse kidney samples covered with HCCA (top) and DHB (lower) using SunCollect.

Furthermore, the SunCollect system is very fast: To cover a standard ITO glass slide (75 x 25 mm) it takes about 1 minute per layer. The patented multi-layer-technique produces finest spray results in combination with an excellent analyte extraction while keeping the spatial resolution (Figure 3). The Ideal sample preparation for high resolution MALDI-MS Imaging.

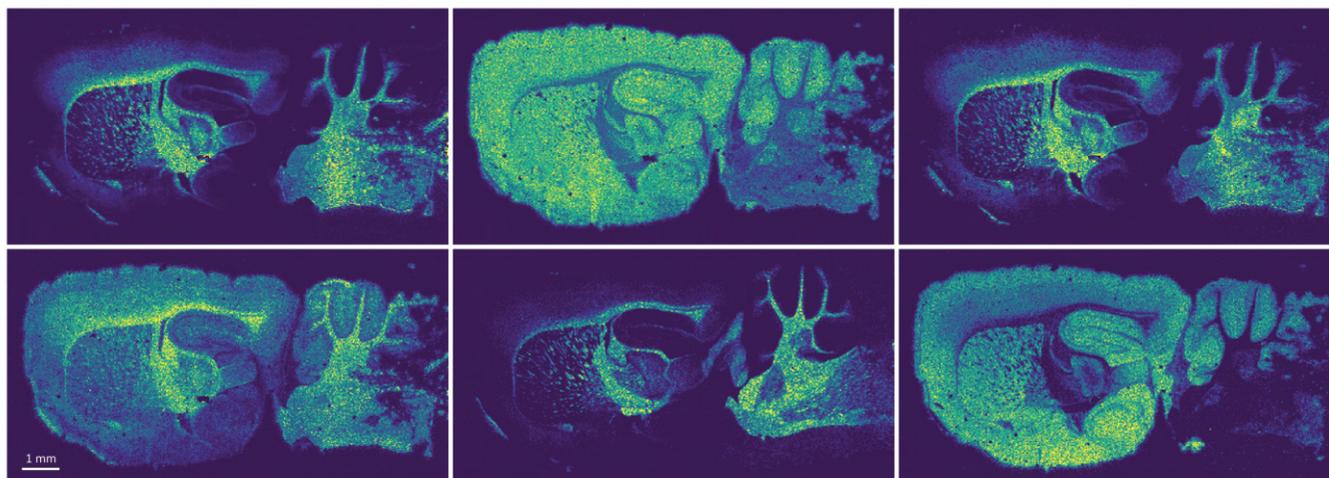


Figure 3: MALDI-MS imaging of various molecules in mouse brain using the MassTech AP-MALDI (ng) UHR ion source coupled to a Thermo Orbitrap Exploris 480 mass spectrometer (courtesy of Gille Frache, LIST Luxembourg). Pixel size: 25x25 μm . The tissue sections were covered with HCCA matrix using SunCollect.

High comfort dispenser system

SunCollect is equipped with a fully software controlled dispenser pump for high comfort spray applications (Figure 4). The dispenser system has a 9-port aluminium ceramic valve that exhibits highest chemical resistance in combination with a strong endurance. It enables the user to spray enzyme and matrix solutions directly one after another without any need for manual removal of solutions from the liquid pathways.

All spray preparation and postprocessing steps, like filling the fluid lines, washing, cleaning and rinsing of the fluid paths is performed fully automatically.

Additional cleaning and washing of the system can be performed by one-click direct control buttons.

The user software is self-explaining and intuitive and enables highest quality spray results. The spray direction can be rotated by 90° and the software controls the refill of the dispenser syringe during the coating process.

Automated compression between dispenser and spray nozzle guarantees a constant flow rate and leads to a highly homogeneous coating.

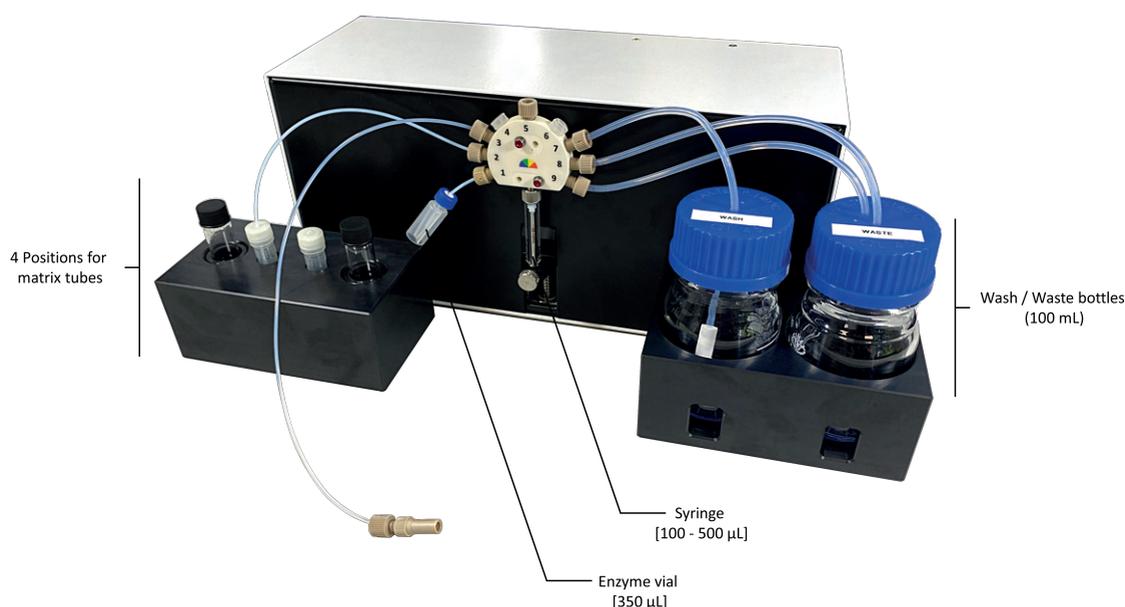


Figure 4: Overview of the new dispenser pump system of the SunCollect Sprayer

Technical Specifications

Dimensions	Closed lid: W 36 cm (14.2") x D 49 cm (19.3") x H 40 cm (15.7") Open lid: W 36 cm (14.2") x D 64 cm (25.2") x H 85 cm (33.5")
Weight	17 kg (37.5 lbs)
Power requirements	100-240 VAC 50/60 Hz (external power supply)
Number / dimension of sample slides	Max. 8 standard glass slides of 25 x 75 mm or two MALDI-tragets of max. 82 x 124 mm
Resolution of axis movement	X-Axis: 0.030 mm Y-Axis: 0.125 mm Z-Axis: 0.040 mm
Spray speed	Minimum: 1 mm/min. Maximum: 4000 mm/min.
Flow rates	Depending on syringe size: 10 µL/min. - 20 mL/min.
Adjustable distance from sprayhead to standard target holder	Fine adjustment possible in single millimeter steps: Minimum: 0 mm Maximum: 49 mm
Achievable crystal size by patented spray procedure	100 - 150 nm for HCCA 1 - 2 µm for DHB
Instrument control	Windows laptop or tablet PC
100% Biocompatibility	All wetted parts are made of quartz glass, PEEK, aluminium ceramic, ETFE or PTFE
Option to convert the instrument to a MALDI-Spotter and nano/micro-LC fraction collector for bottom up proteomics	Spot /fraction size down to 1 nL (nano liter) possible

For research use only. Not for use in diagnostic procedures.

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