

# Automated sample preparation with touch-optimized control software

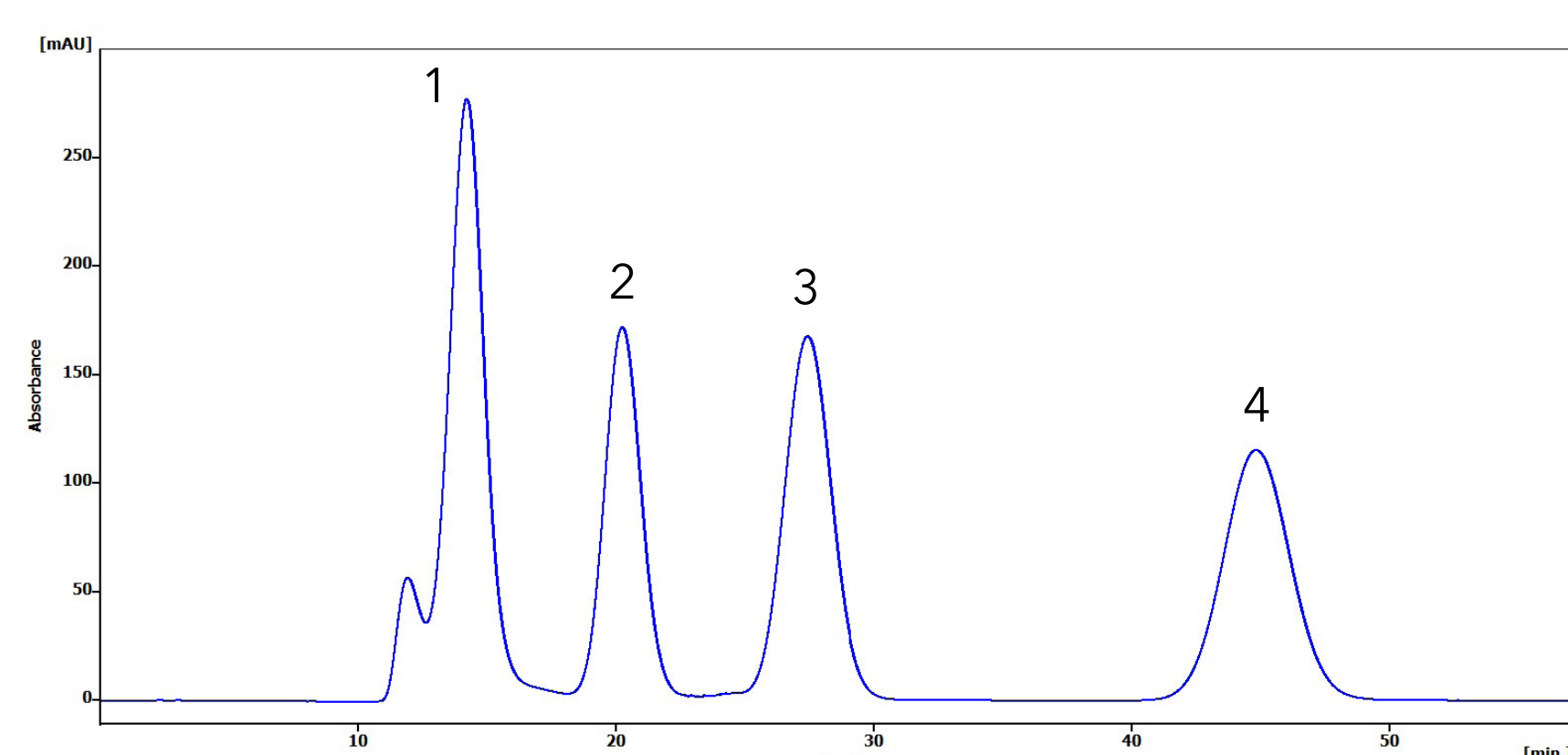
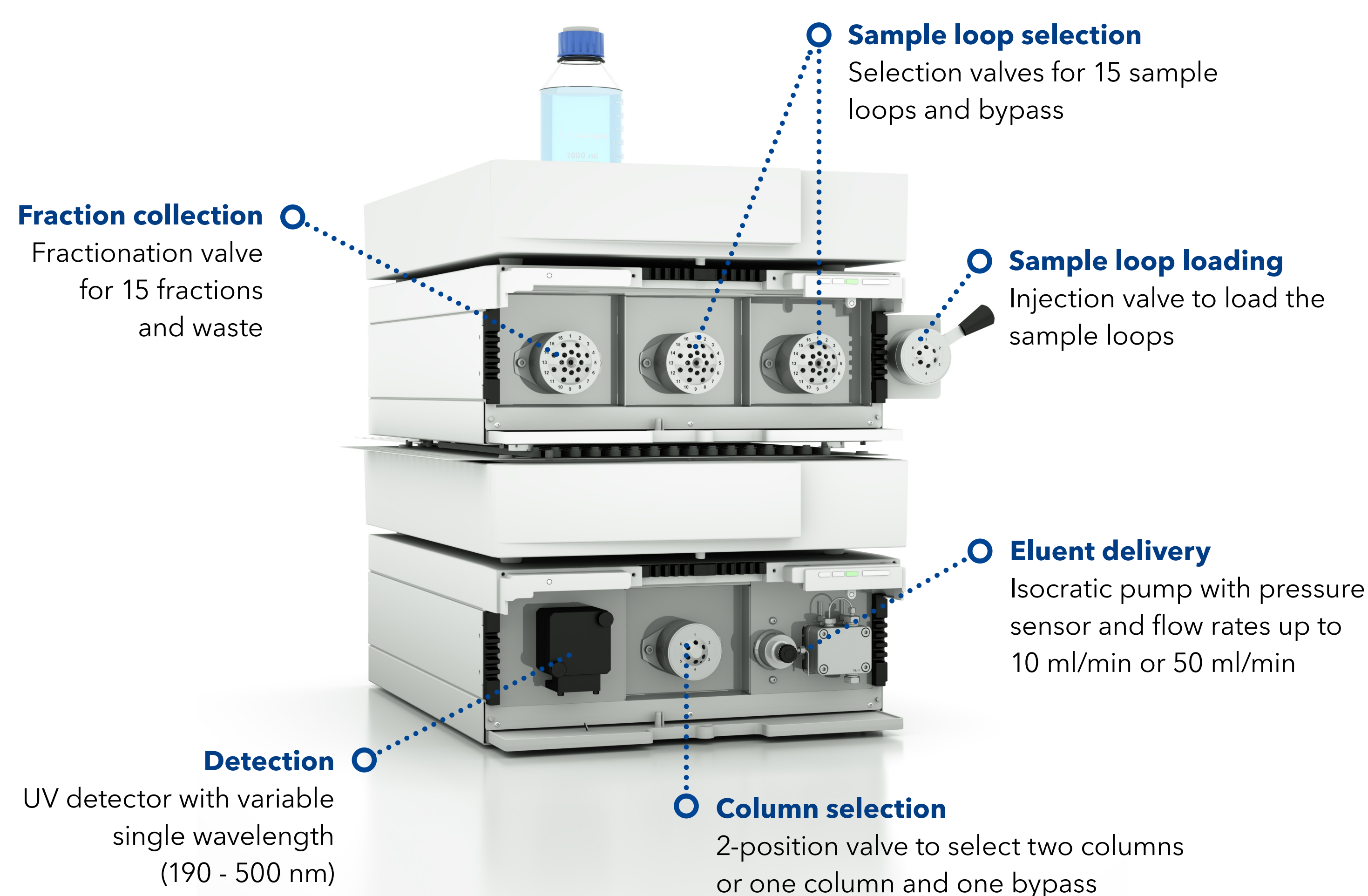
M. Schulze, M. von Delbrück, A. Bördgen; applications@knauer.net  
KNAUER Wissenschaftliche Geräte GmbH, Hegauer Weg 38, 14163 Berlin, Germany; www.knauer.net

## SUMMARY

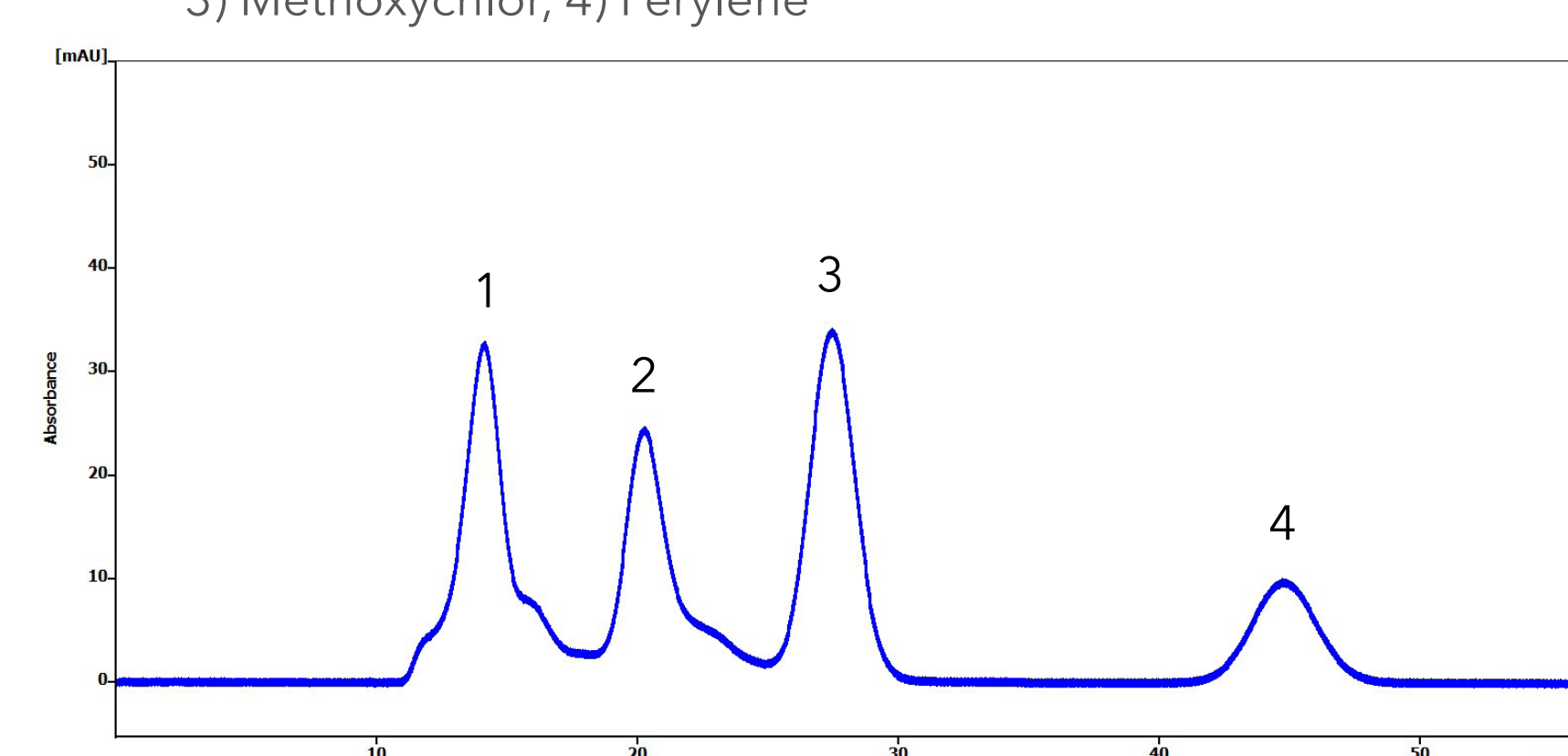
Prior to many analysis procedures interfering components in samples must be removed. Manual sample preparation based on Gel Permeation Chromatography (GPC) is work-intensive and time consuming. Human resources and time can be saved by automation of the GPC cleanup method. Further, reproducibility and quality of the cleanup are improved. After sample loading, the dedicated system fully automatically processes up to 15 samples. The cost-effective software Mobile Control provides a touch-optimized user interface for intuitive device control directly at the system.

## WHAT IS GPC CLEANUP?

GPC Cleanup (Gel Permeation Chromatography) is primarily employed for performing general cleanup tasks on a wide range of sample matrices such as foodstuffs, tissues, plants and environmental samples. The separation of components takes place according to their molecular size and shape due to the heterogeneous pore size of the solid phase. The column material acts as a molecular sieve. High-molecular substances such as lipids and proteins interfering with subsequent analysis e.g. of pesticides are efficiently removed.

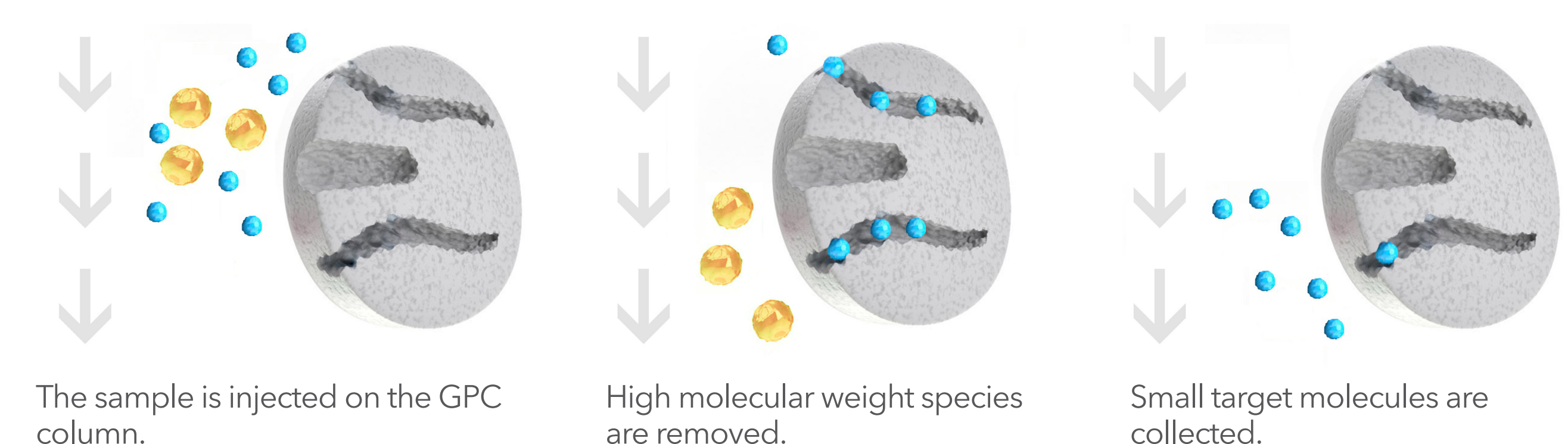


**Fig. 1** Chromatogram of US EPA method 3640A calibration standard containing 1) Corn oil matrix, 2) Bis-(2-ethylhexyl)phthalate, 3) Methoxychlor, 4) Perylene



**Fig. 2** Chromatogram of olive oil sample, spiked with pesticides: 1) Olive oil matrix, 2) Bis-(2-ethylhexyl)phthalate, 3) Methoxychlor, 4) Perylene

## Separation principle



## SYSTEM LAYOUT

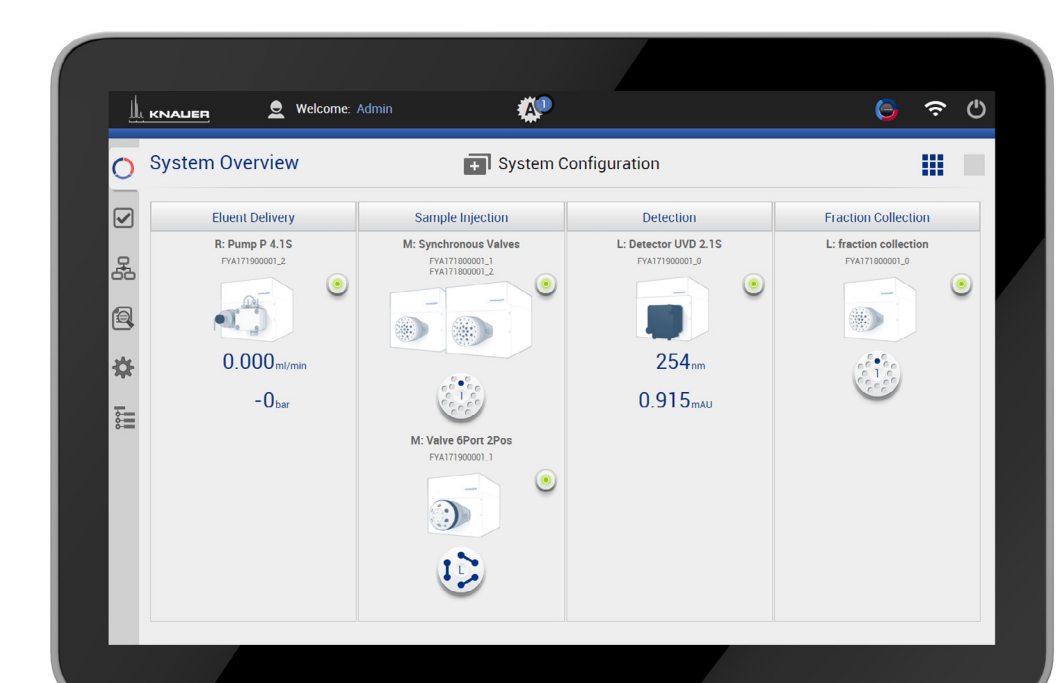
The system features 15 sample loops controlled by two 16 port multiposition valves. The GPC tubing guide sorts outlet tubings coming from the fraction collection valve. The wound-up sample loops are stored in a tray with drainage system and are easily accessible for inspection and replacement. With an additional multiposition valve, 15 fractions and waste can be collected. All multiposition valves and the manual injection valve are integrated into a compact AZURA® Assistant ASM 2.1L. Elution of separated substances/standard components is monitored by a variable single wavelength UV detector. A second assistant harbors the small detector, the system pump with a pressure sensor and a valve to bypass the GPC column or select between two columns.

## In accordance with established methods to determine pesticide residues

- Method 984.21 - AOAC international
- SW-846 Method 3640A - US Environmental Protection Agency
- AEN 12393 and EN 1528 - European Standard
- L 00.00-34 Method in accordance with §64 LFGB (formerly § 35 LMBG)

## SYSTEM CONTROL

The GPC Cleanup System is operated with the cost-effective software Mobile Control. The clearly arranged and touch-optimized user interface runs on a tablet directly mounted on the system. It automatically recognizes devices and the system is configured within a few finger swipes. Due to the arrangement in functional blocks like eluent delivery, sample injection, detection, fraction collection, programs are created fast with a minimal number of clicks.



Intuitive and touch-optimized control software Mobile Control Chrom

## GPC CLEANUP OF OLIVE OIL SAMPLES

Fig. 1 shows the chromatogram of the GPC calibration standard eluted with cyclohexane/ethyl acetate (1:1, v/v). The three detected pesticides were baseline separated and could be identified easily. Fig. 2 shows the elution profile of one olive oil sample containing different types of pesticides. It can be seen that all pesticides were detected with the US EPA method 3640A. Compared to the measurement of the standard solution, the spiked sample showed less matrix effects. This means that all interfering high molecular elements were removed during clean up. The recovery for all of these compound classes was higher than 70 %.

## CONCLUSION

GPC sample preparation is a useful tool for separating small amounts of target molecules from high molecular weight species. The AZURA® GPC Cleanup System automates sample preparation and relieves the burden of manual handling. Routine processing of a wide range of different sample matrices can be addressed. The arrangement of the 15 sample loops and one wash loop avoids cross contamination, hence allowing a robust sample preparation procedure.



Additional information