



As a stand-alone analyzer or as a component of a modular IC system, the 817 Bioscan analyzes:

- Carbohydrates
- Alcohols
- Sugar alcohols
- Oxidizable substances

The novel 817 Bioscan

extends Metrohm's modular ion chromatography system. With this instrument, carbohydrate analysis is now included in the range of IC applications. The heart of the 817 Bioscan is a pulsed amperometric detector that is located in an insulated column oven. Control and data acquisition are carried out automatically via the Metrodata IC-Net 2.1 software.

Carbohydrate analyzer or flexible ion chromatography system?

This is, of course, no problem. Thanks to the modularity of the Metrohm IC system, the individual components can be combined at will to create the perfect IC System. This means that it is possible to operate a stand-alone system with the pulsed amperometric detector or the detector can be integrated into an existing standard IC system to expand the capability.

The stand-alone system only requires the additional use of a 709 IC Pump and the new **812 Valve Unit**. The valve unit is available in two versions, with either one or two metal-free injectors. It can be used for any applications that require additional valves.

New separation column for carbohydrates

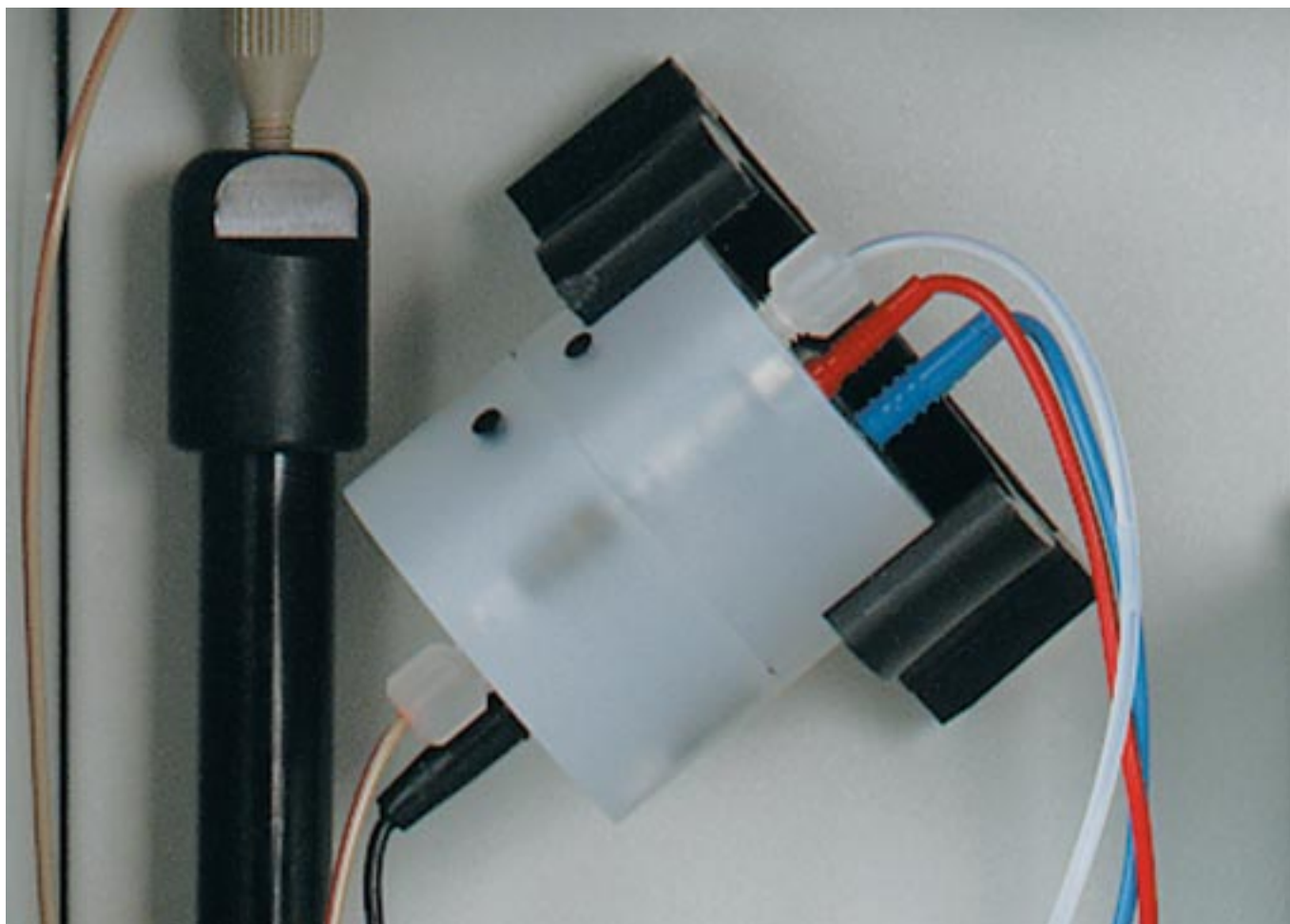
Strictly speaking the term «carbohydrate analyzer» is too narrow as, apart from carbohydrates, the 817 Bioscan can also be used to determine alcohols and sugar alcohols as well as other oxidizable substances. An important role in these analyses is played by the new separation column for carbohydrates, the **Metrosep Carb 1**, which is particularly suitable for the determination of carbohydrates using alkaline eluents and pulsed amperometric detection. It is very stable under alkaline conditions and separates monosaccharides and disaccharides in an excellent way.

Highly suitable for the determination of carbohydrates, alcohols and sugar alcohols: the new Metrosep Carb 1 separation column.



The 817 Bioscan opens up numerous applications – be it as a stand-alone carbohydrate analyzer or as a component of a modular IC system!





Close-up of the three-electrode measuring cell, which is located within the 817 Bioscan's insulated column oven

Detector and column oven form a unit

The measuring cell of the 817 Bioscan is integrated into the insulated column oven and is thus optimally protected against interferences. The three-electrode technique is applied, the standard working electrode is the gold electrode.

Operating modes

The detector can be operated in different operating modes: DC mode, Scan mode or Pulsed Amperometric mode.

DC mode

In the DC mode a constant potential is applied to the working electrode. The analytes are oxidized or reduced according to their electrochemical properties.

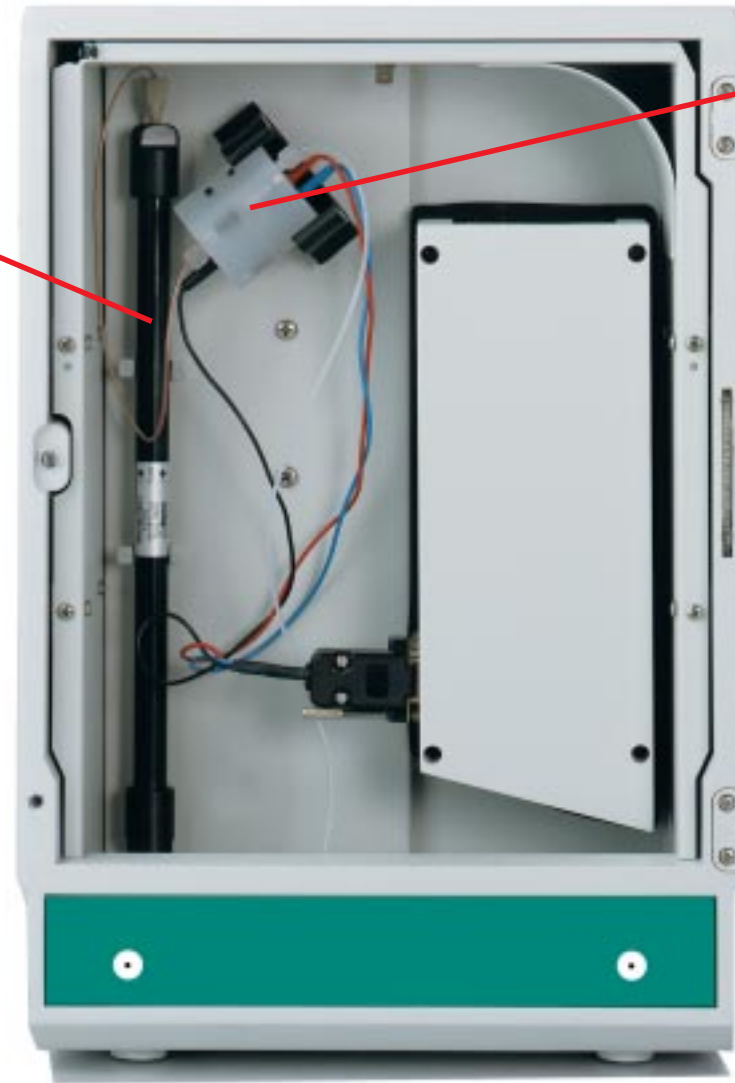
Scan Mode

The scan mode allows current-potential curves to be recorded. This is particularly helpful for determining the optimal settings for the pulsed amperometric operation.

Pulse mode for determining carbohydrates

The pulse mode utilizes three different working potentials that are applied in a cyclic fashion. In this way the electrode surface is freed from any adherent reaction products after each measuring point and a new, activated surface is produced for the next measurement. This is essential for carbohydrate analyses. The respective working potentials and times are freely programmable within a wide range and are stored in the corresponding system file. As electrochemical detection has a very large linear working range, the 817 Bioscan offers nine different measuring ranges from 10 nA to 5 μ A. Via the time program the measuring range can be adapted flexibly to the actual requirements. For example, when analyzing samples with extreme differences in concentration, it is possible to automatically switch to a different range within the chromatogram.

Novel separation column Metrosep Carb 1 for determining carbohydrates, alcohols and sugar alcohols using pulsed amperometric detection

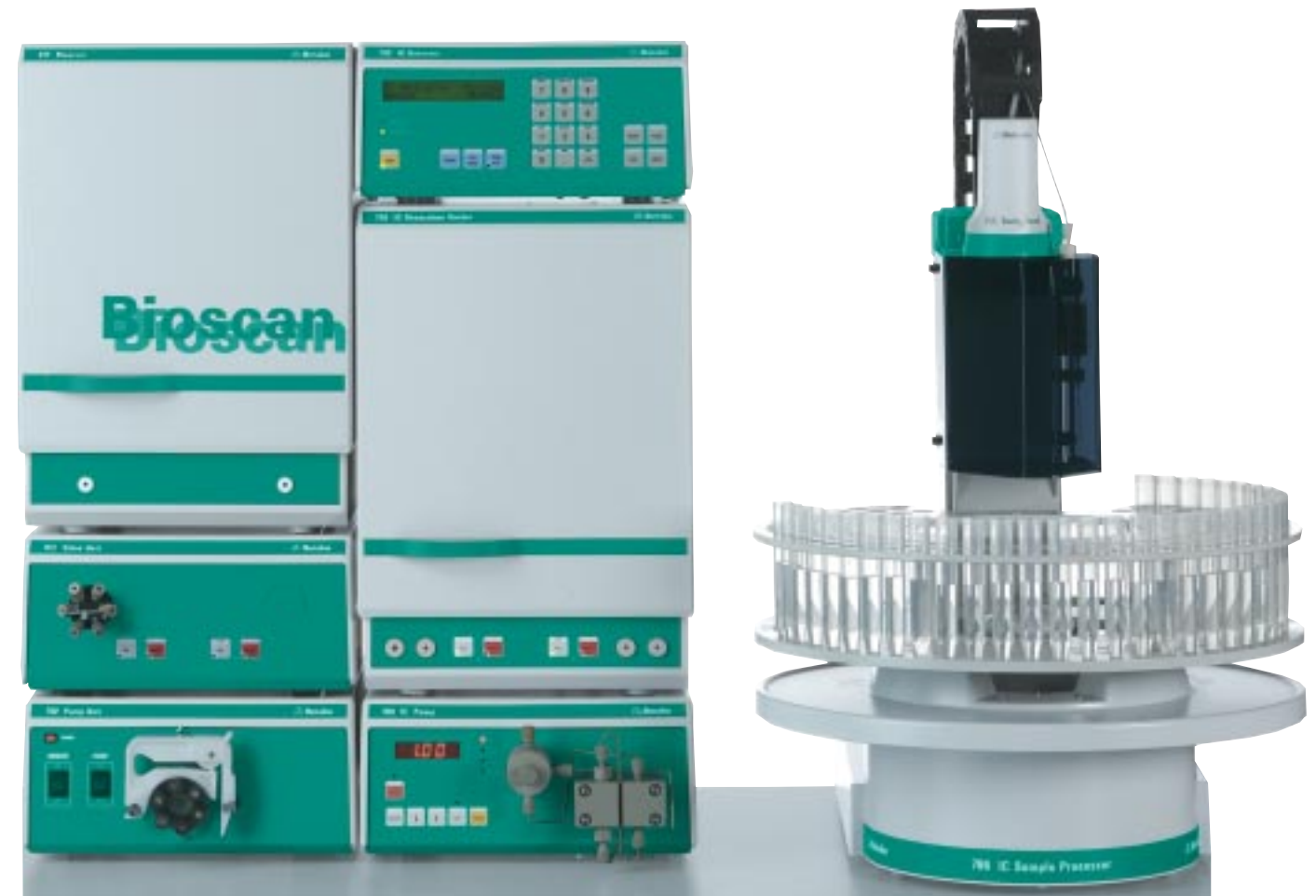


Electrochemical multifunction detector

- Integrated into the column oven
- Optimally protected against interferences
- Works according to the three-electrode technique
- Pulse mode: pulsed amperometric detection
- DC mode: amperometric detection with constant working potential
- Scan mode: recording of current-potential curves (cyclic voltammetry)



The 817 Bioscan as «carbohydrate analyzer» in combination with the 709 IC Pump and the 812 Valve Unit



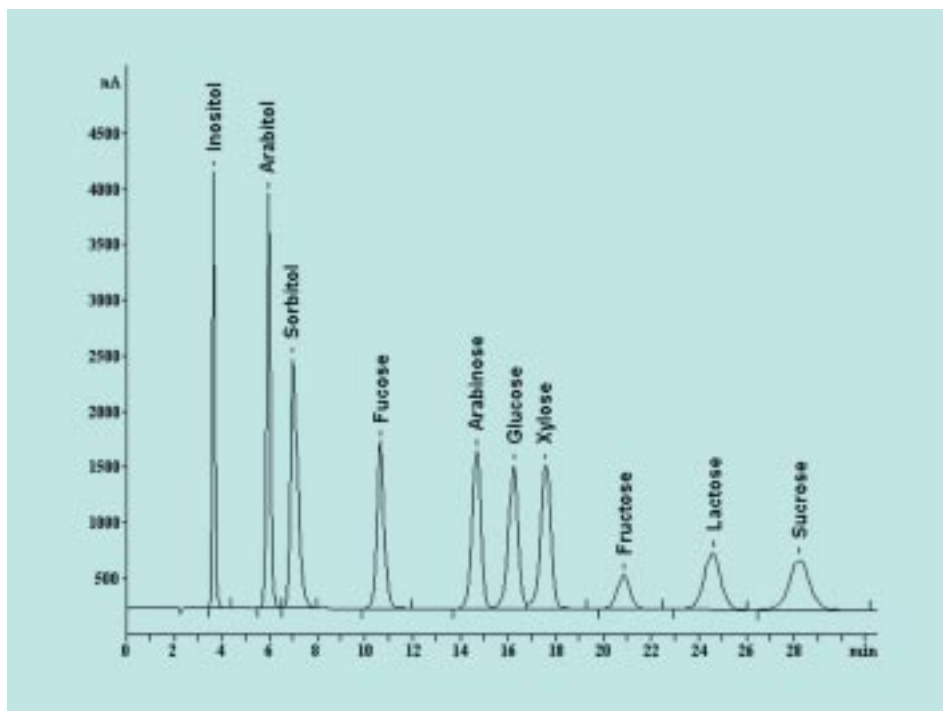
The 817 Bioscan as a component of a flexible automated ion chromatography system using conductivity and pulsed amperometric detection

The images shown here do not correspond to the scope of delivery of the 817 Bioscan, which can be found below under Ordering information.

Multiple applications

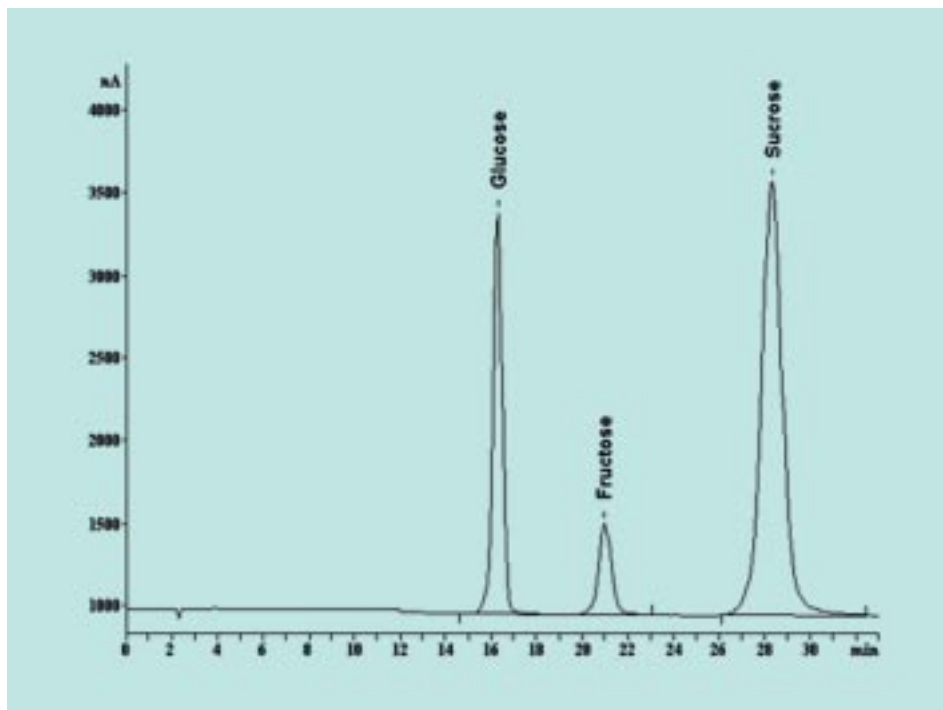
The 817 Bioscan allows the determination of carbohydrates, alcohols and sugar alcohols in the most diverse matrices, for example in soft drinks, fruit juices, dairy products, sweeteners, chocolate, sweets, chewing gum – to name but a few. The separation column used is the new Metrosep Carb 1. Under standard conditions, detection limits ranging from 20...100 ppb, corresponding to 2...10 pmol, can be achieved (signal-to-noise ratio S/N = 3).

The chromatograms shown were recorded in the pulse mode at a temperature of 32 °C. The eluent used was $c(\text{NaOH}) = 0.1 \text{ mol/L}$ at a flow rate of 1.0 mL/min.



Standard chromatogram of the Metrosep Carb 1 IC column

Standard: 5 mg/L Inositol
10 mg/L Arabitol, sorbitol, fucose, arabinose, glucose, xylose, fructose, lactose and sucrose



Determination of glucose, fructose and sucrose in a Cola drink. Sample preparation: diluted 1 : 1000 with ultrapure water, degassed and filtered through a 0.45 µm filter.

Results:

Glucose	19.5 g/L
Fructose	19.8 g/L
Sucrose	66.9 g/L

Ordering information

- 2.817.0010** Metrohm 817 Bioscan for pulsed amperometric detection
- Amperometric measuring cell with gold working electrode
 - Insulated column oven
 - Metrodata IC-Net 2.1 control and integration software

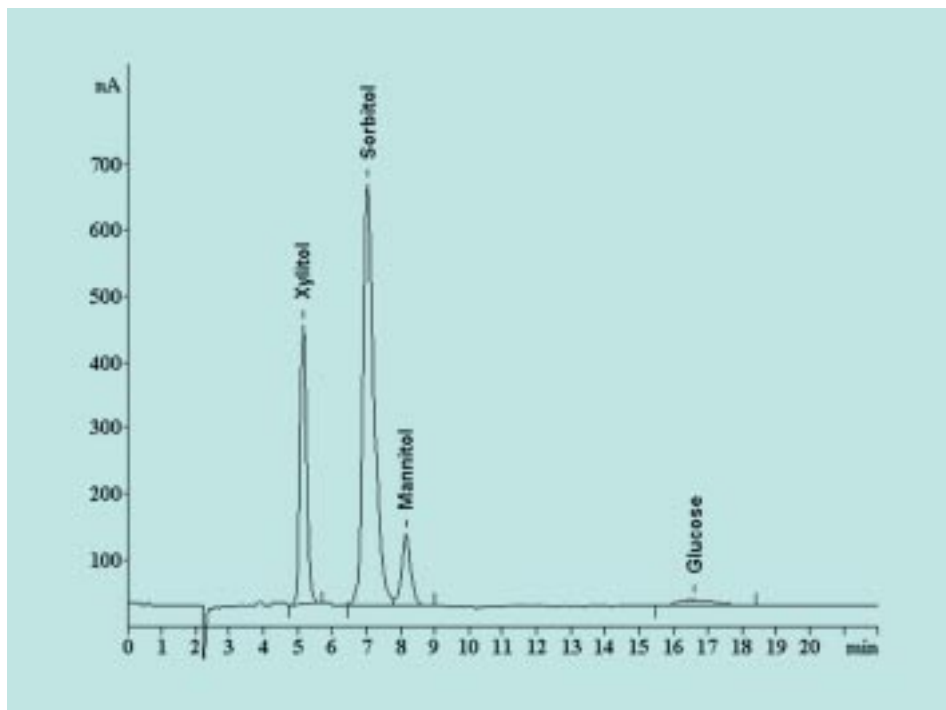
Options

- 2.812.00X0** 812 Valve Unit with one (version 2.812.0010) or two (version 2.812.0020) metal-free six-port injection valves
- 6.1013.000** Metrosep Carb 1 separation column

Technical specifications

Compact chromatography and detector module for amperometric detection

- Three-electrode measuring cell with working electrode made of gold
- Pulsed amperometric detection (pulse mode)
- Amperometric detection with constant working potential (DC mode)
- Cyclic voltammetry (scan mode)
- Potential range: -2.00...+2.00 V
- Integrated AD converter
- Temperature range of column oven: 5 °C above room temperature to 60 °C; temperature stability ±0.1 °C
- Dimensions
 - Width 255 mm
 - Height 385 mm
 - Depth 343 mm



Chromatogram obtained by analyzing a chewing gum. Sample preparation: 0.1 g sample / 100 mL ultrapure water, sample cut into pieces and extracted in an ultrasonic bath, sample solution diluted 1 : 100 with ultrapure water and filtered through a 0.45 µm filter.

Results:	Sorbitol	313.3 mg/g
	Mannitol	42.8 mg/g
	Glucose	15.5 mg/g
	Xylitol	not quantified



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