

# Bio 30+ Amino Acid Analyzer System

The gold standard dedicated Amino Acid Analyzer for physiological fluids



## Amino acid analysis in physiological fluids



“A relatively busy laboratory, we typically run approximately 1,000+ physiological samples. We have been very pleased with the performance of our Bio 30+ since installation over a decade ago and highly recommend it for the any analytical laboratory environment.”

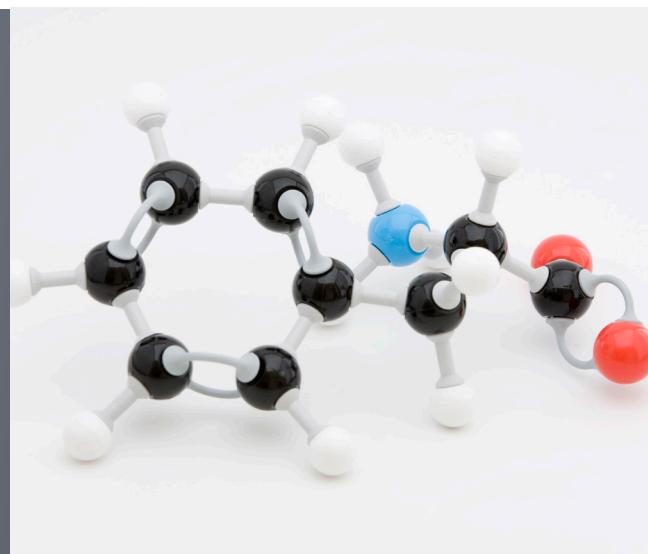
- Laboratory Manager

Investigating metabolic disorders is a crucial and complex task. With over 42 significant amino acids and their derivatives implicated in the accurate analysis of Inborn Errors of Metabolism<sup>1</sup>, including Phenylketonuria (PKU), laboratories need an accurate and reliable analysis system that delivers unequivocal results quickly.

This compact instrument allows users to accurately detect and quantify amino acids and their derivatives in complex physiological samples.

### A powerful tool...

- Accurate... Exceptional analysis quality with low-matrix interference
- Precise... Unequivocal peak identification and quantification even for rare and unusual markers
- Reliable... Trusted by hospitals and reference laboratories worldwide, and backed by expert scientific support
- Efficient... Complete system which includes the instrument, columns, software and ready-to-use reagents
- Easy to use and maintain



## Accurate Analysis of Inborn Errors of Metabolism (IEM)

A proven instrument for the precise quantification and qualification of free amino acids in physiological fluids, the Bio 30+ System can aid in the quantitative analysis of amino acids for inborn errors of metabolism.

# Bio 30+ System

The gold standard  
in amino acid analysis



Bio 30+ Amino Acid Analysis System

## A dedicated system

The Bio 30+ System is fully automated with an 84-position air cooled autosampler. It is designed to operate 24/7 and ideal for busy clinical and research labs. This compact instrument can handle plasma, serum, urine, dried blood spots and CSF with low matrix interference and without costly and time-consuming re-equilibration.

## Highly flexible meeting research needs— Now and in the future

The Bio 30+ System offer a high-level of flexibility. Systems can be configured based on particular amino acids of interest today, and then easily modified as a lab's research focus changes.

## Peace-of-mind

The Bio 30+ System is backed by a dedicated technical and engineering support team. Our applications team can help with full screening methods or specific short methods from our application database built over many years. Our service contract package\*\* gives complete peace of mind and includes:

- Biochrom quality parts used for all maintenance and repairs
- Rapid service from our engineering team

The system has pre-defined analytical, processing and reporting methods in the software. Analysis times can be tailored to meet specific requirements, with ready-to-use short methods.





## Key Features

- Bio 30+ Analyzer System with air-cooled autosampler
- Choice of column (with top-up resin)
- Starter pack of ready-to-use reagents
- Spare parts and consumables kit
- HP computer and monitor
- Biosys software and OpenLab EZChrom Edition data handling software
- On-site customer training

## A chromatographic system specifically for amino acids

The Bio 30+ System is a cation exchange chromatography system coupled with a highly specific detection system using post column derivatisation with ninhydrin reagent. Amino acids are separated according to their net charge determined by the pKa of their ionized groups. The mobile phase is a finely tuned set of 5 lithium citrate buffers used in a stepwise elution profile of increasing pH and molarity. A temperature gradient on the column maximises resolution. Lithium hydroxide solution regenerates the resin bed online after each run cycle.

## Highly specific detection system

The ninhydrin method is highly specific because it reacts only with amino groups giving a compound absorbing at 570nm wavelength (440nm for amino acids like proline). This response is a linear relationship between the absorbance and the amount of amino acid in the sample. The sensitivity of the ninhydrin reaction is optimized for physiological sample and the response is 100% linear within the expected amino acids concentration range encountered in clinical samples. The only sample preparation needed is a simple deproteinisation-filtration step. The continuous flow of reagent ensures a reproducible derivatisation giving high precision in the peak area.

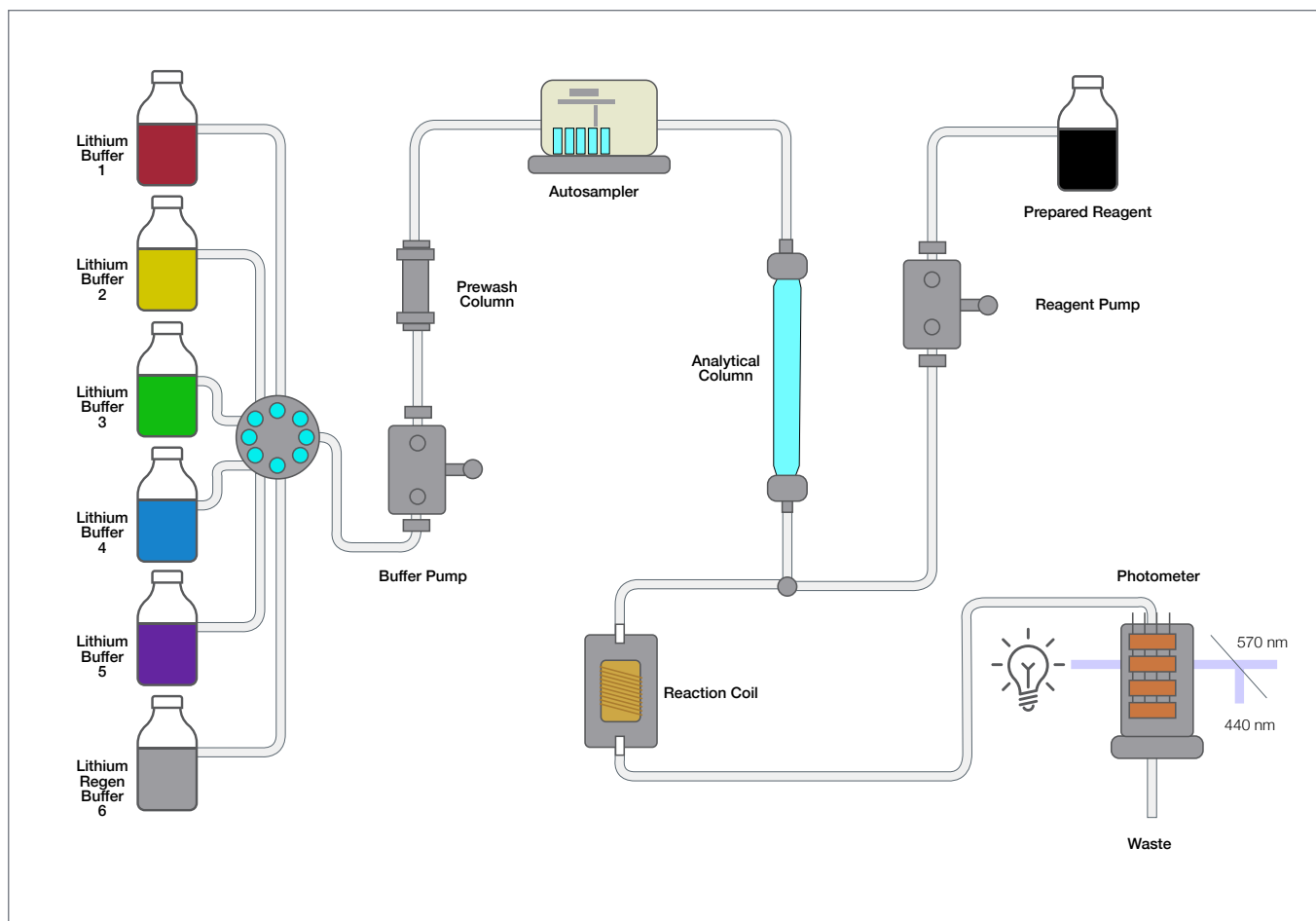
## Robust and stable chemistry

Biochrom's patented EZ Nin solution is a unique form of Ninhydrin which needs no preparation or special conditions to remain stable long term, meaning less time to set up, and no more wasting the last few mL in the bottle. Chemicals and consumables are available either as complete kits or as individual buffers to enable continuity of analysis. All reagents are stable at room temperature and guaranteed to give accurate and reproducible results with a 3-year shelf life. On the instrument, buffers and reagents are stored under an inert gas to ensure stability.

## Choice of reusable columns

- **Accelerated Column** – for rapid full screening
- **High-Performance Column** – the standard reference
- **High-Resolution Column** – for maximum separation

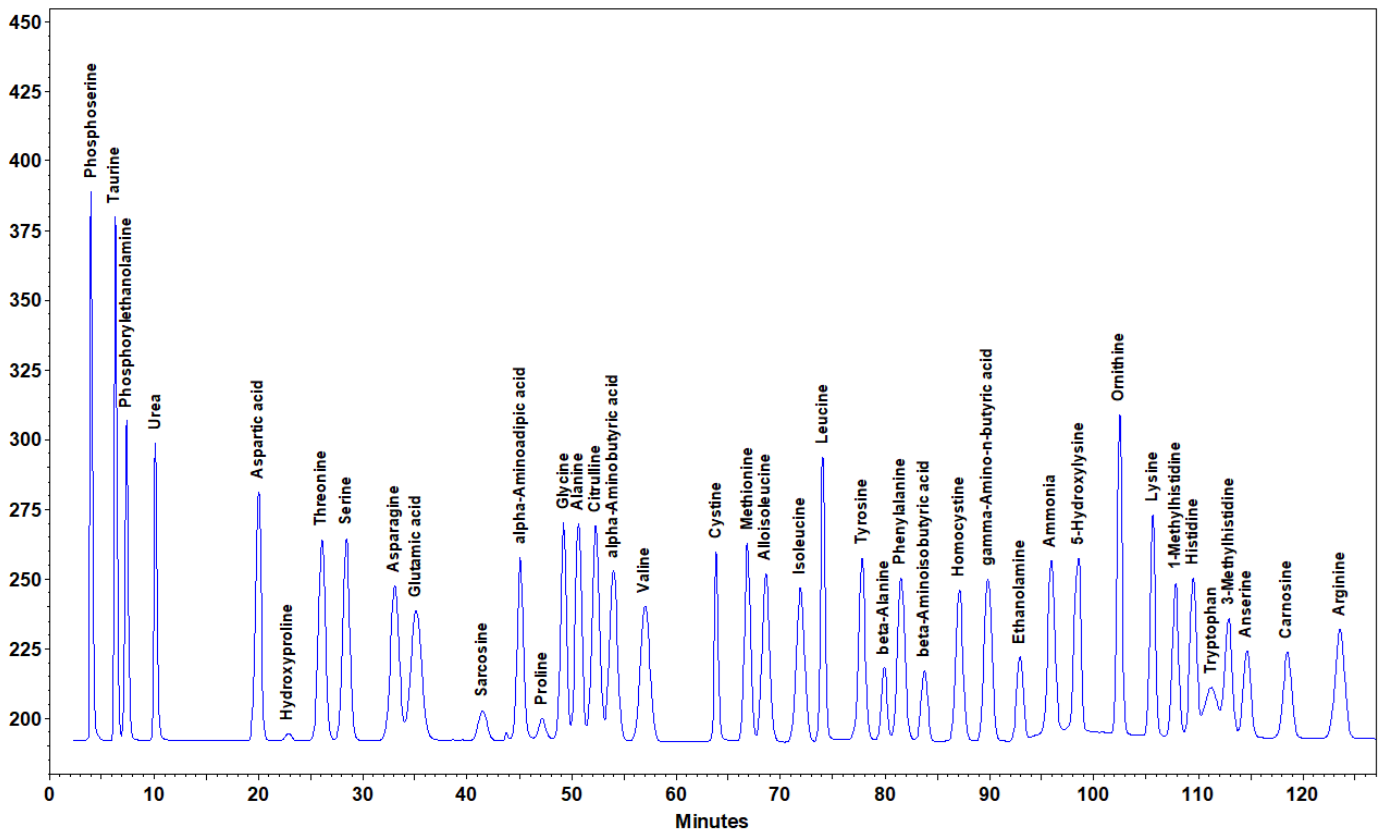
Manufactured from PEEK material, the columns are free from corrosion and metal contamination and are packed with optimally sized cation exchange resin. The columns are attached with finger-tight fittings so no special spanners are required to ensure a leak-free seal. All our columns are fully tested and optimized under strict QC criteria. To minimize waste and reduce costs, our columns are fully recyclable at the end of their life thanks to our unique repacking and cleaning service.



Fluidic Schematic of Bio 30+ Lithium System for Physiological Samples

# Free Amino Acid Analysis in Physiological Samples

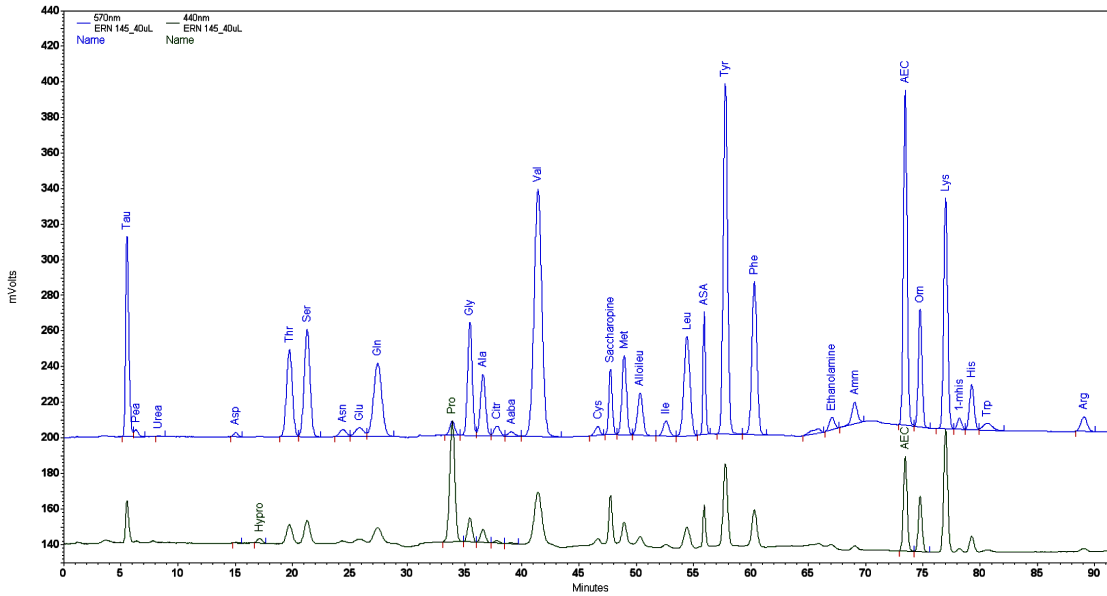
The Bio 30+ System enables you to recognize a characteristic amino acid chromatographic profile to aid in free amino acid analysis. The quantification of the amino acids may can assist in investigating metabolic abnormalities. For reference purposes, chromatograms of reference material, normal plasma and urine samples are shown.



Physiological Standard (Part Number 80-6002-80) analyzed on the Bio 30+ High Performance method

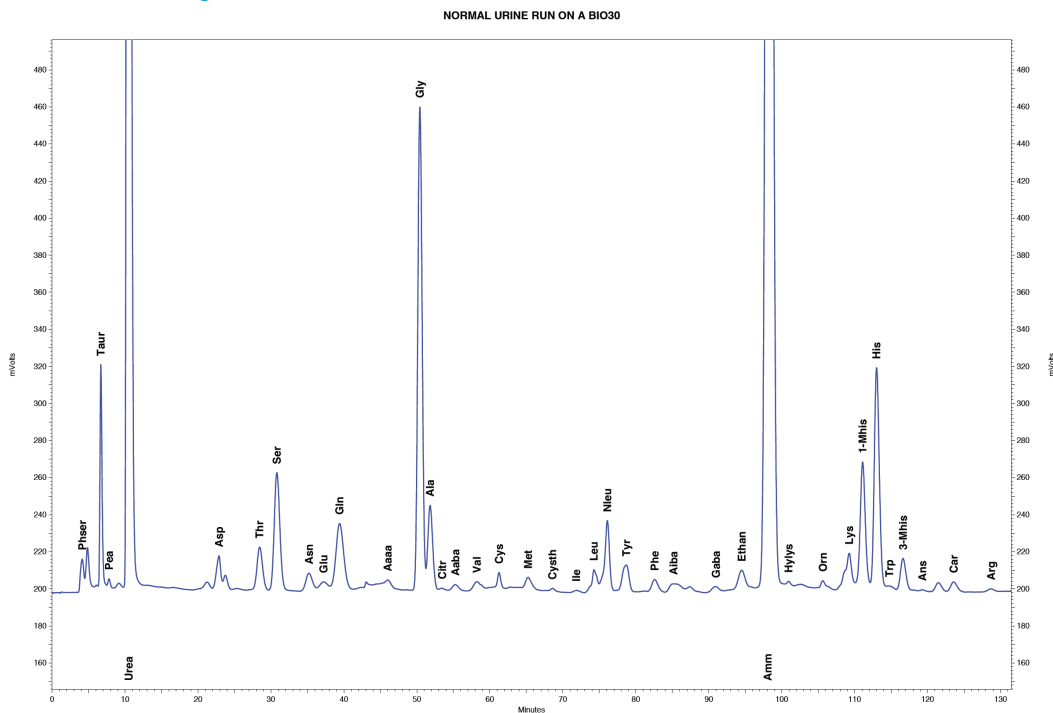
## Plasma Analysis

A full screening is achievable in less than two hours (injection to injection) in physiological samples with the Accelerated System. Rare key markers are clearly separated as shown in the plasma sample below.



Plasma sample containing unusual amino acids. 570nm and 440nm channel.

## Urine Analysis

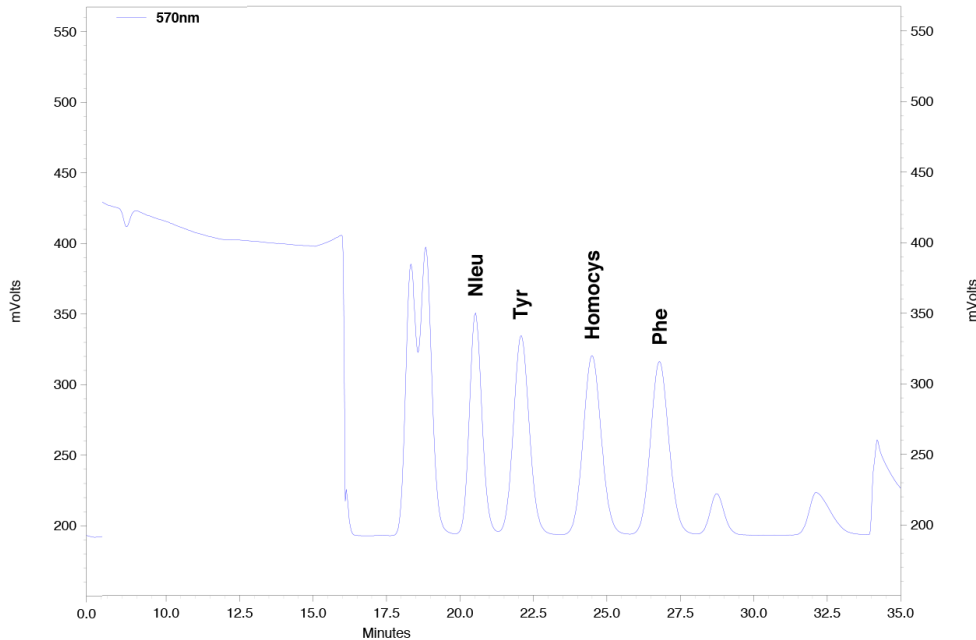


Urine sample analyzed on the Bio 30+ High Performance System.



## Analysis of Tyrosine and Phenylalanine:

The phenylalanine short method allows a fast and accurate separation of tyrosine, phenylalanine and homocystine within a short single run. Samples can be analyzed within 30 minutes, with an injection to injection repeat time of 50 minutes.

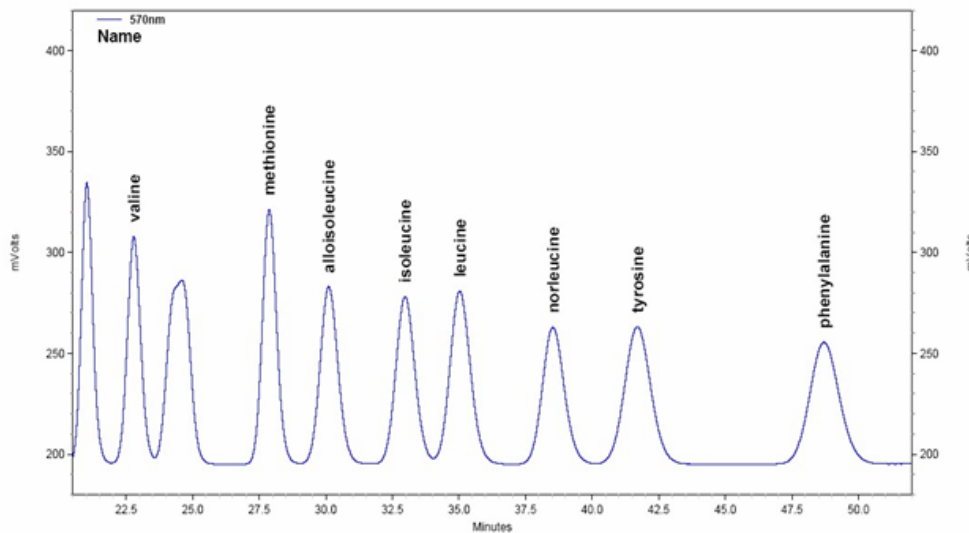


Amino acid reference material analyzed on a Bio 30+ equipped with the High Performance column. Norleucine used as the internal standard.

## Branched Chain Amino Acids Analysis:

Using the Bio 30+ System, the levels of the branched chain amino acids leucine, isoleucine, and valine, can be determined accurately, using norleucine as the internal standard. In addition, L-alloisoleucine and homocitrulline can be well resolved and quantified. A dedicated method for those amino acids allows their separation in 78 minutes injection to injection.

Physiological standard including L-alloisoleucine (10 nmol/20uL)

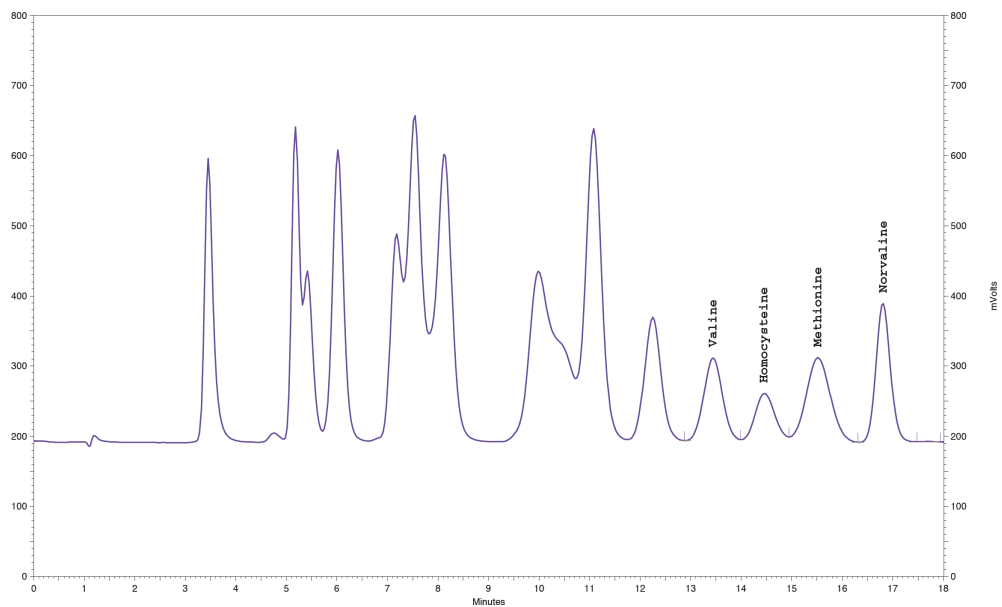


Physiological standard analyzed on the Bio 30+ System using the Branched Chain Amino Acids short method. Norleucine is used as the internal standard.

## Total Homocysteine Assay

Elevated plasma total homocysteine has emerged as an important risk factor in the development of vascular disease<sup>3</sup>.

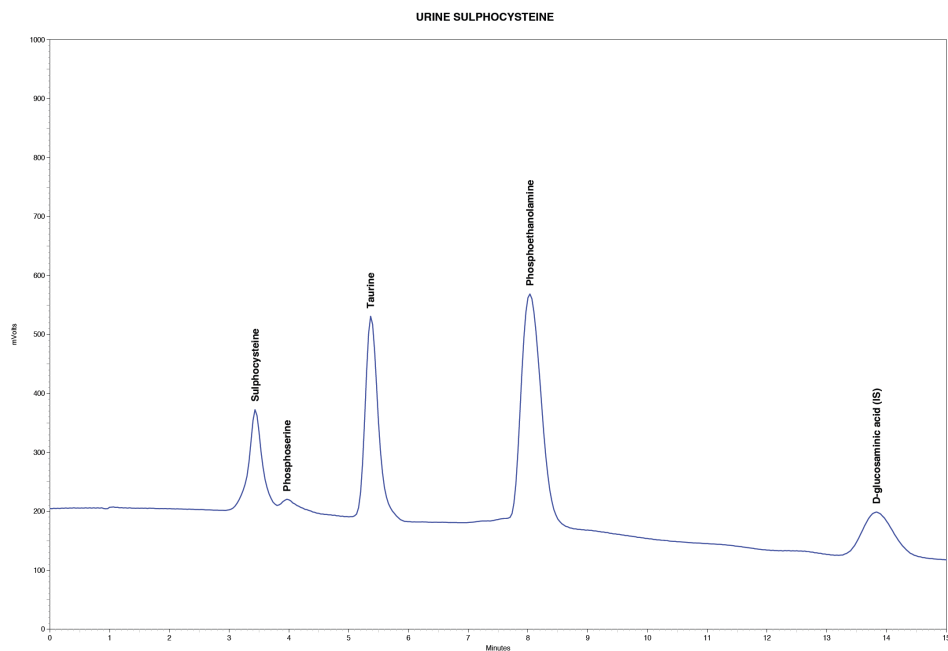
The Bio 30+ System allows a rapid analysis of homocysteine levels in plasma with an analysis time of 24min injection to injection.



Physiological standard spiked with homocysteine. Norvaline is used as the internal standard.

## Sulfocysteine

Using the Bio 30+ System, a short program for the analysis of s-sulfocysteine has been developed that allow its separation from phosphoserine.



Analysis of sulfocysteine in urine sample

# Bio 30+ System Technical Specifications

<b>Reproducibility</b>	Area: better than 1.5% RSD at 10 nanomoles. Retention time: better than 0.5% RSD.
<b>Limit of Detection</b>	9 - 15 pmoles (primary amino acids detection at 570nm)
<b>Time of analysis (based on the separation of 45 physiological amino acids):</b>	Accelerated analysis: 115 min injection to injection High Performance analysis: 170 min injection to injection
<b>Analytical Column</b>	High pressure PEEK column packed with Ultropac 8 cation exchange resin. Peltier heating/cooling system.
<b>Eluent System</b>	6 buffer system (5+1 regeneration solution) stored on the instrument at room temperature in graduated 1L glass bottles under nitrogen pressure. Ninhydrin reagent: Stored on the instrument at room temperature under nitrogen pressure in a 2L plastic coated glass bottle.
<b>Temperature</b>	Column temperature variable between 20°C and 99°C. Reaction Coil temperature adjustable between 40°C and 145°C (optimal temperatures: 135°C for UltraNin, 138°C for EZ Nin).
<b>Photometric Detection</b>	Single flow cell with optical beam splitter. Dual channel detection at 440nm and 570nm.
<b>Sample Injection</b>	3 injection modes (full loop, partial loop and micro), 84 position autosampler. Sample volumes from 1µL to 5000µL. 200µL loop supplied as standard.
<b>Software</b>	BioSys control software Biochrom Alias Manager autosampler control software OpenLAB CDS EZChrom Edition
<b>Dimensions and Weights</b>	Bench top fluidics cabinet: 48 x 59 x 57 cm, 19 x 23 x 22 inches (w x d x h) - Weight: 50 kg, 110 lbs - Autosampler: 30 x 57.5 x 36 cm, 12 x 23 x 14 inches (w x d x h) - Weight: 21 kg, 46 lbs
<b>Operating Conditions</b>	Operating temperature: 15 °C to 25 °C Maximum humidity: 80% at 25 °C
<b>Required Services</b>	Oxygen free nitrogen gas (99.99%) or Argon regulated to 73.5 psi (5bar). Drainage facility. 240V/100V, 50Hz/60Hz, 300 VA mains supply.
<b>Safety System</b>	Automatic shut-down and reaction coil flushing in the event of: <ul style="list-style-type: none"> <li>• photometer lamp failure</li> <li>• incorrect ninhydrin / buffer / coil / nitrogen pressures</li> <li>• incorrect coil and column temperatures</li> <li>• power failure</li> </ul>

For ordering information, please contact your local Biochrom representative or email: [enquiries@biochrom.co.uk](mailto:enquiries@biochrom.co.uk)

## Elution order of amino acids and derivatives analyzed by the Bio 30+ System

- |                        |                            |   |                          |
|------------------------|----------------------------|---|--------------------------|
| 1. Sulfocysteine       | 15. Cysteine               | 29. Cystathionine                         | 42. γ-Aminobutyric acid  |
| 2. Phosphoserine       | 16. α-Aminoadipic acid     | 30. Allolsoleucine                        | 43. Ethanolamine         |
| 3. Taurine             | 17. Proline                | 31. Isoleucine                            | 44. Ammonia              |
| 4. Phosphoethanolamine | 18. Glycine                | 32. Leucine                               | 45. Hydroxylysine        |
| 5. Urea                | 19. Alanine                | 33. Argininosuccinic acid                 | 46. Amino Ethyl Cysteine |
| 6. Aspartic acid       | 20. Citrulline             | 34. NorLeucine                            | 47. Ornithine            |
| 7. Hydroxyproline      | 21. 21 α-Aminobutyric acid | 35. Cysteine-homocysteine mixed disulfide | 48. Lysine               |
| 8. Methionine sulfone  | 22. Valine                 | 36. Tyrosine                              | 49. 1-Methyl histidine   |
| 9. Threonine           | 23. Homocysteine           | 37. β-alanine                             | 50. Histidine            |
| 10. Serine             | 24. Cystine                | 38. Phenylalanine                         | 51. Tryptophan           |
| 11. Asparagine         | 25. Saccharopine           | 39. δ-Aminolevulinic acid                 | 52. 3-Methyl histidine   |
| 12. Glutamic acid      | 26. Pípecolic acid         | 40. β-Aminoisobutyric acid                | 53. Anserine             |
| 13. Glutamine          | 27. Homocitrulline         | 41. Homocystine                           | 54. Carnosine            |
| 14. Sarcosine          | 28. Methionine             |   | 55. Arginine             |

**\*\*Please Note: Use of non-Biochrom approved columns, reagents, buffers, etc. may invalidate the warranty of the Biochrom Amino Acid Analyzer.**

1 Differential diagnosis of (inherited) amino acid metabolism or transport disorders. W. Blom & J.G.M.Huijmans, Amino Acids (1992) 2:25-67

2 Vademecum Metabolicum Manual of Paediatrics. J. Zschocke & G. Hoffmann, 2ed. Milupa GmbH 2004

3 Rapid Analysis of Homocysteine Levels. A.Lolia & S. Bee,

For more than 50 years, Harvard Bioscience's division Biochrom has been delivering the industry's leading Gold Standard Amino Acid Analysis (AAA) instruments to life scientists worldwide. Cited in thousands of scientific journal articles, Biochrom has been helping tens of thousands of researchers achieve their goals.

You can count on Biochrom for superior AAA quality—and unprecedented expert support so you can confidently trust your results and focus on making the world a healthier place.



[sales@biochrom-us.com](mailto:sales@biochrom-us.com) • [www.biochrom.co.uk](http://www.biochrom.co.uk) • [enquiries@biochrom.co.uk](mailto:enquiries@biochrom.co.uk)

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Americas (+1) 800-272-2775 • United Kingdom (+44) 0 1223 423 723

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