

THE BIOCHROM 30+ AMINO ACID ANALYSIS SYSTEM

The gold standard dedicated Amino Acid Analyzer
for *in vitro* diagnostic use and research



biochrom

"Our Biochrom amino acid analyzer was installed in 2004, and we have been using analyzers from Biochrom for at least 10 years for patient and animal samples. We are a relatively busy laboratory and typically run approximately 1000 samples per year. We have been pleased with the performance since installation and would recommend it for the clinical environment"

Eamonn O'Driscoll, Biochemical Genetics Unit
CAMBRIDGE UNIVERSITY HOSPITALS NHS FOUNDATION TRUST

AMINO ACID ANALYSIS IN CLINICAL AND PHYSIOLOGICAL SAMPLES

Investigating metabolic disorders is a crucial and complex task. With over 42 clinically significant amino acids and their derivatives implicated in the clinical diagnosis and monitoring of Inborn Errors of Metabolism¹, clinical laboratories need an accurate and reliable analysis system that delivers unequivocal results quickly.

The Biochrom 30+ is the latest gold standard dedicated amino acid analyzer used by reference laboratories, hospitals, pharmaceutical and industrial labs worldwide. It allows users to accurately detect and quantify amino acids and their derivatives in complex physiological samples for both *in vitro* diagnostic use and research.

QUALITY ANALYSIS

The Biochrom 30+ is capable of separating up to 56 detectable physiological amino acids, derivatives and other compounds present in biological fluids including rare amino acids such as alloisoleucine, sulfoxysteine, and argininosuccinic acid. It gives clear separations with precision (cv. <0.5%) and not only identifies peaks, but also quantifies them too. This gives important information to differentiate between metabolic disorders and does not need confirmatory identification on other systems.

FIVE GOOD REASONS TO BUY A BIOCHROM 30+ FOR CLINICAL ANALYSIS

- 1 SUPERB ANALYSIS QUALITY WITH LOW MATRIX INTERFERENCE. PRECISE, UNEQUIVOCAL PEAK IDENTIFICATION AND QUANTIFICATION-EVEN FOR RARE AND UNUSUAL MARKERS.
- 2 THE GOLD STANDARD DEDICATED AMINO ACID ANALYSIS SYSTEM TRUSTED BY HOSPITALS AND REFERENCE LABORATORIES WORLDWIDE.
- 3 A COST EFFECTIVE SERVICE COMBINED WITH LOW COST MAINTENANCE
- 4 EASY TO USE AND MAINTAIN.
- 5 A TOTAL SYSTEM- INSTRUMENT, COLUMNS, SOFTWARE, READY-TO USE REAGENTS PLUS EXPERT SUPPORT FROM BIOCHROM- A COMPANY WITH 40 YEARS OF EXPERTISE IN AMINO ACID ANALYSIS





A DEDICATED SYSTEM

The Biochrom 30+ 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.

COST EFFECTIVE

The Biochrom 30+ is a cost effective solution for amino acid analysis because it has a long column life—designed to last the life of the instrument. With our unique column cleaning and re-packing service you can reduce costs further. There is a full range of competitively priced ready to use reagents that saves preparation time and minimizes variation. All reagents are stable at room temperature simplifying storage.

EASY TO USE

Analysis times can be tailored to the laboratory's requirement, with ready to use short methods. The Biochrom 30+ has pre-defined analytical, processing and reporting methods in the software as well as dedicated technical support, training and installation to get your lab up and running quickly.



PEACE OF MIND

The Biochrom 30+ 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:

- Two maintenance visits per year performed by trained and certified Biochrom field service engineers.
- Biochrom quality parts used for all maintenance and repairs.
- Rapid service from our engineering team.

For more than 40 years, Biochrom has been supporting consultants, pediatricians and clinical experts throughout the world by providing a complete package for amino acid analysis, from instrumentation and chemical kits, to customer training courses and user group meetings.

THE BIOCHROM 30+ CLINICAL AND PHYSIOLOGICAL SYSTEM

A CHROMATOGRAPHIC SYSTEM SPECIFICALLY FOR AMINO ACIDS

The Biochrom 30+ Amino Acid Analyzer is a cation exchange chromatography system coupled with a highly specific detection system using post column derivatization 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 maximizes 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 clinical use 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 deproteinization-filtration step. The continuous flow of reagent ensures a reproducible derivatization giving high precision in the peak area.



THE BIOCHROM 30+ AMINO ACID ANALYSIS SYSTEM

- Biochrom 30+ Analyzer 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, HP printer, Windows® operating system and all cables
- Biosys software and Ezchrom Elite data handling software
- Manuals and qualification & performance verification logbook
- On-site customer training

ROBUST AND STABLE CHEMISTRY

The chemical kit contains everything you need for routine analysis of up to 260 runs (Accelerated method). Chemicals are available either as complete kits or as individual buffers and consumables 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.

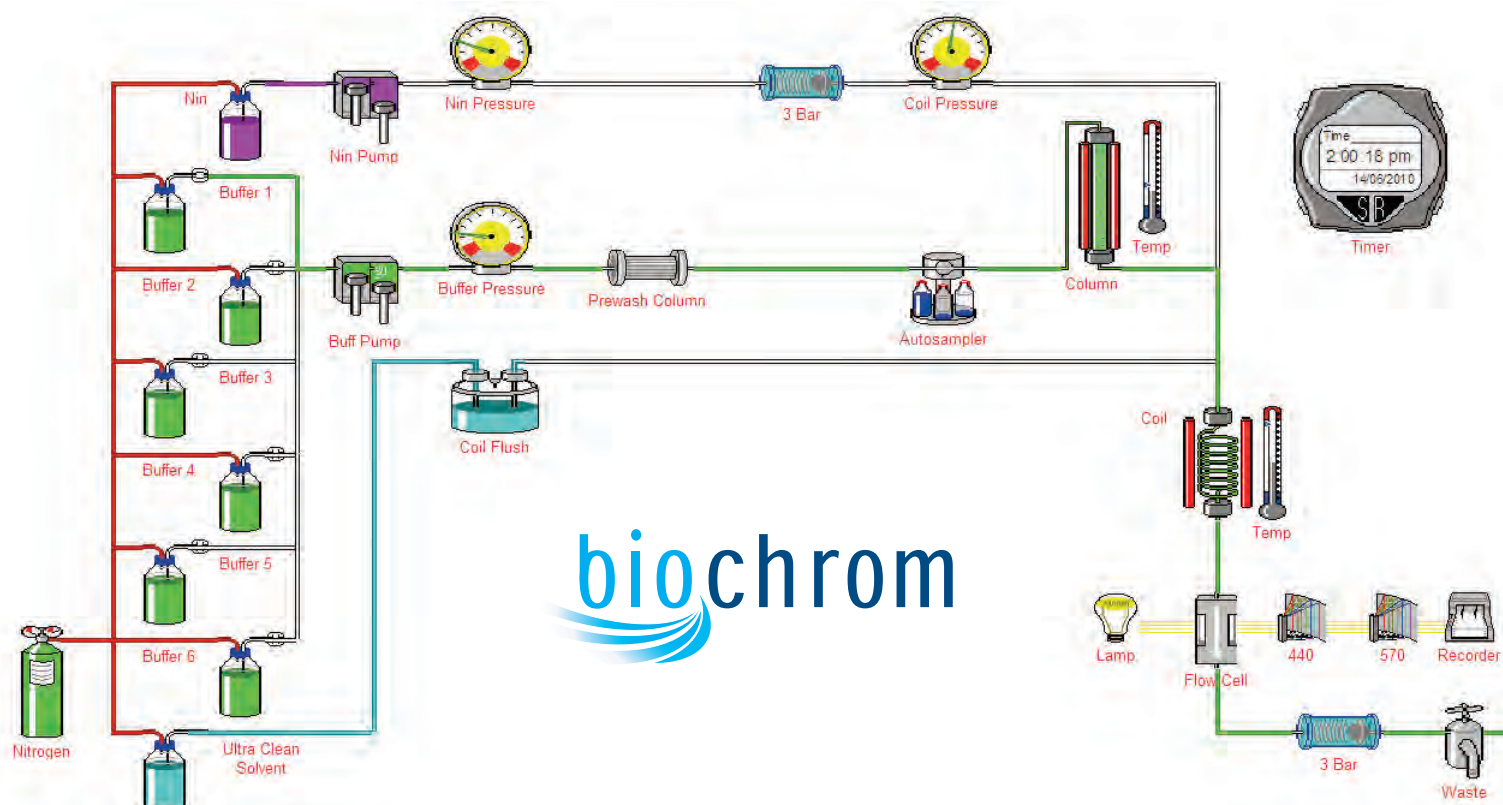


CHOICE OF RE-USABLE COLUMNS

- High Speed 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.

amino acid analyzers



biochrom

SOFTWARE

Biochrom BioSys V. 3.0 software controls the system via an advanced graphical user interface showing real time operational information and is fully integrated with the data-handling software EZChrom Elite™ from Agilent. This powerful, advanced software is easily networked for secure data storage and includes special tools for compliance with regulatory demands, e.g. FDA 21CFR11 part 11. It offers a wide variety of functions to set up methods and sequences, process and visualize data and compile custom reports. Data can be exported easily to other programs or other Windows® applications. Other chromatography systems use this software so its

familiarity may increase efficiency and help to reduce user-training costs.

QUALITY

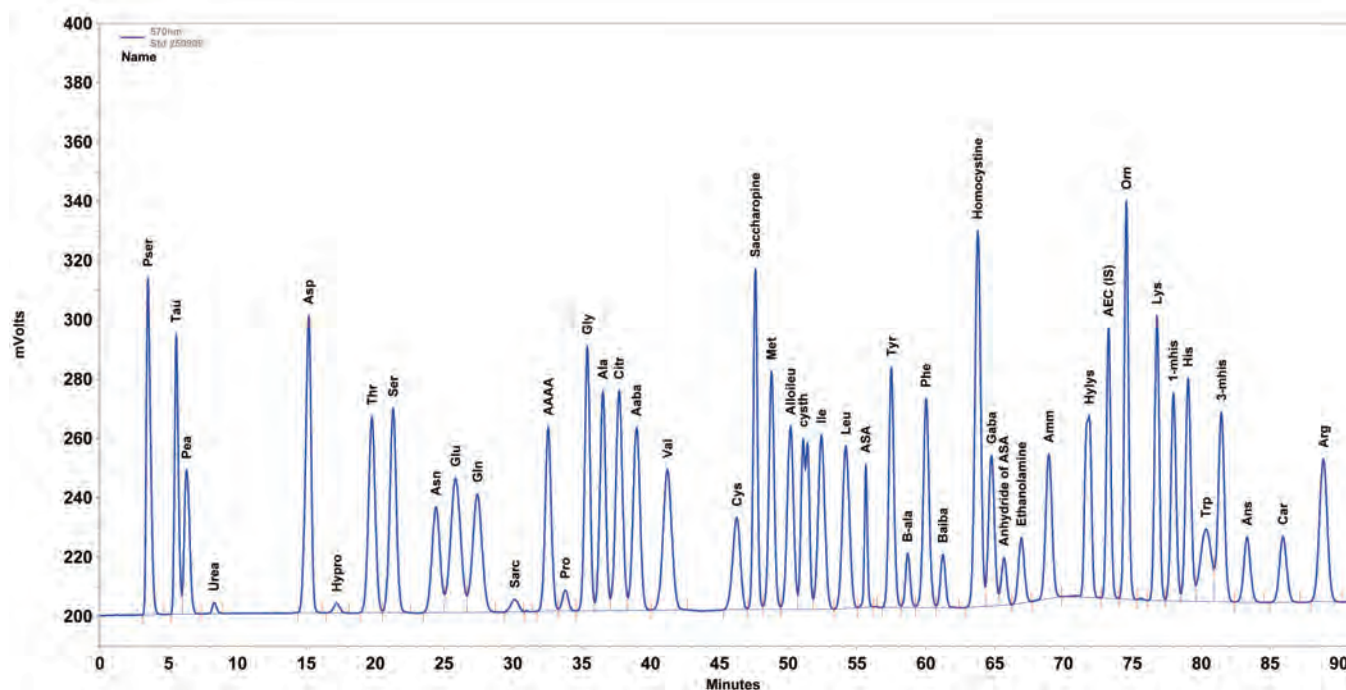
The Biochrom 30+ System is certified for *in vitro* diagnostic use for the diagnosis of PKU. Biochrom reagents are manufactured from high quality materials under the ISO 9001:2008 Quality System and subjected to rigorous control procedures. In accordance with the IVD Medical Devices directive 98/79/EC and the UK Medical Devices Regulations 2002 No. 618. FDA exempt contact Biochrom for information.

" Our Biochemical Genetics laboratory had the privilege of purchasing the first Biochrom Amino Acid Analyzer in the United States. We have been a Biochrom customer for 10 years and have since purchased a second system. We have been very impressed with the outstanding service Biochrom has continually provided. The analyzers are reliable, rugged, and consistently produce high quality data that enables us to report accurate results for inborn metabolic diseases."

Erin T. Strovel, Ph.D., F.A.C.M.G.
Director Pediatric Biochemical Genetics Laboratory
Assistant Professor of Pediatrics
UNIVERSITY OF MARYLAND

CLINICAL ANALYSIS

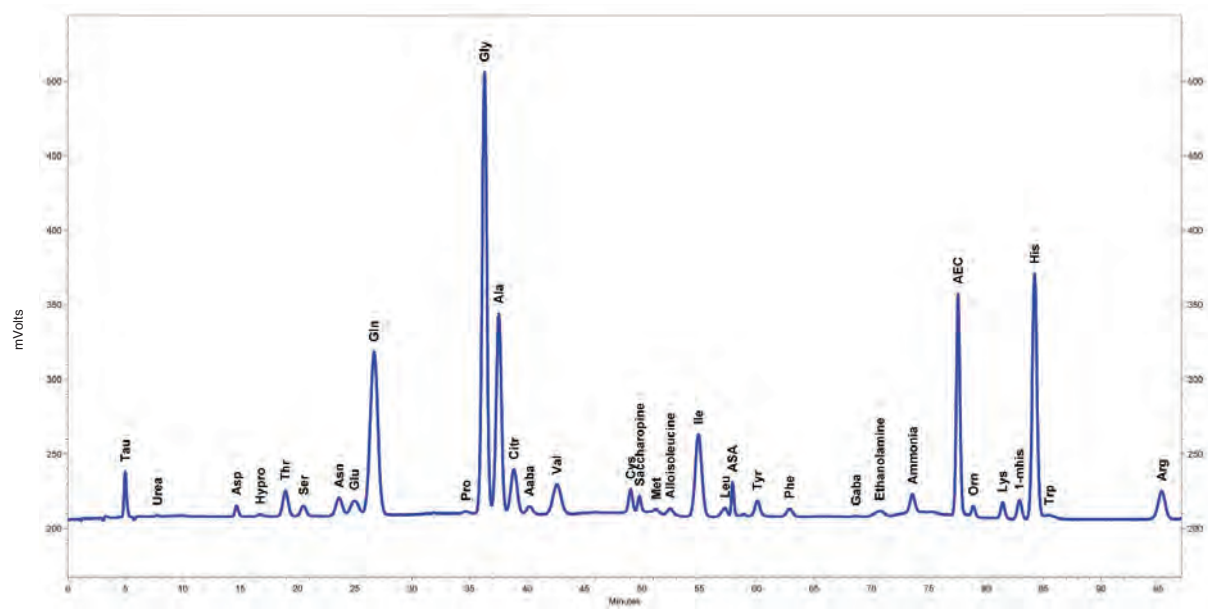
The Biochrom 30+ enables you to recognize a characteristic amino acid chromatographic profile to aid diagnosis. The quantification of the amino acids may indicate the severity of the abnormality detected. For reference purposes, chromatograms of normal plasma and urine samples are shown.



Amino acid standard analyzed on the Biochrom 30+ accelerated method.

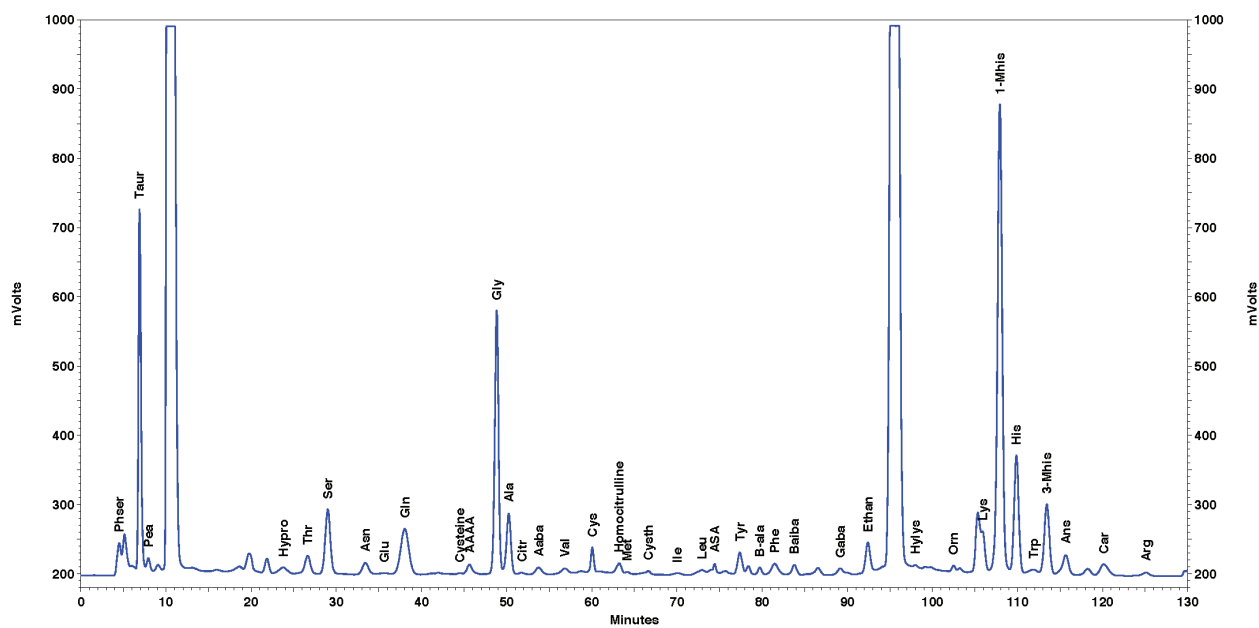
PLASMA ANALYSIS

A full screening is achievable in less than 2 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 spiked with saccharopine, allosioleucine and argininosuccinic acid.

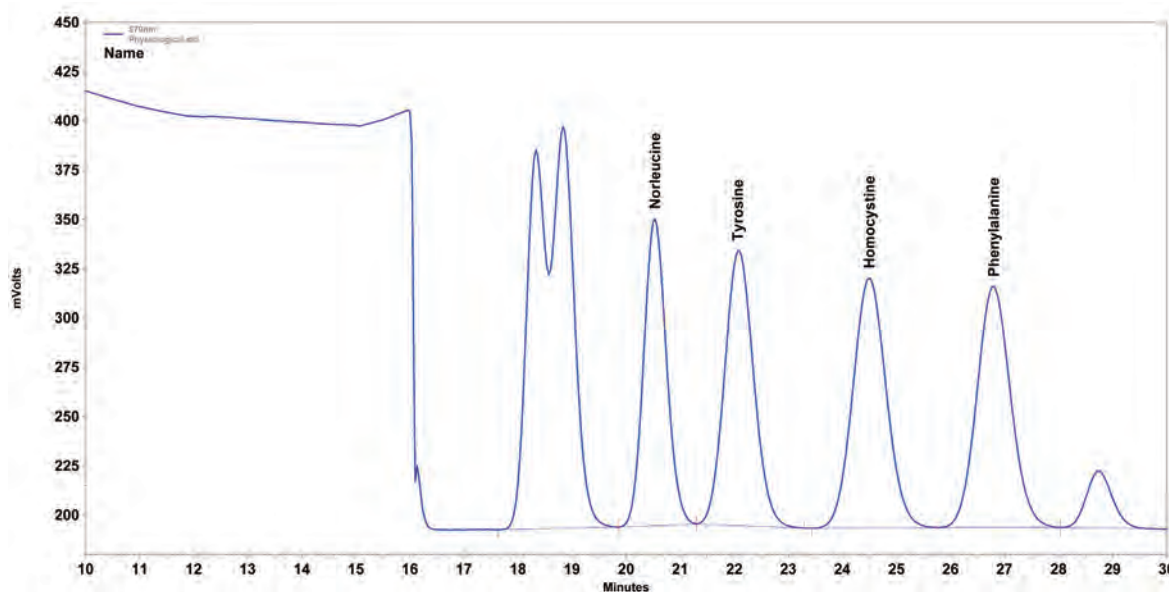
URINE ANALYSIS



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

PHENYLKETONURIA (PKU)

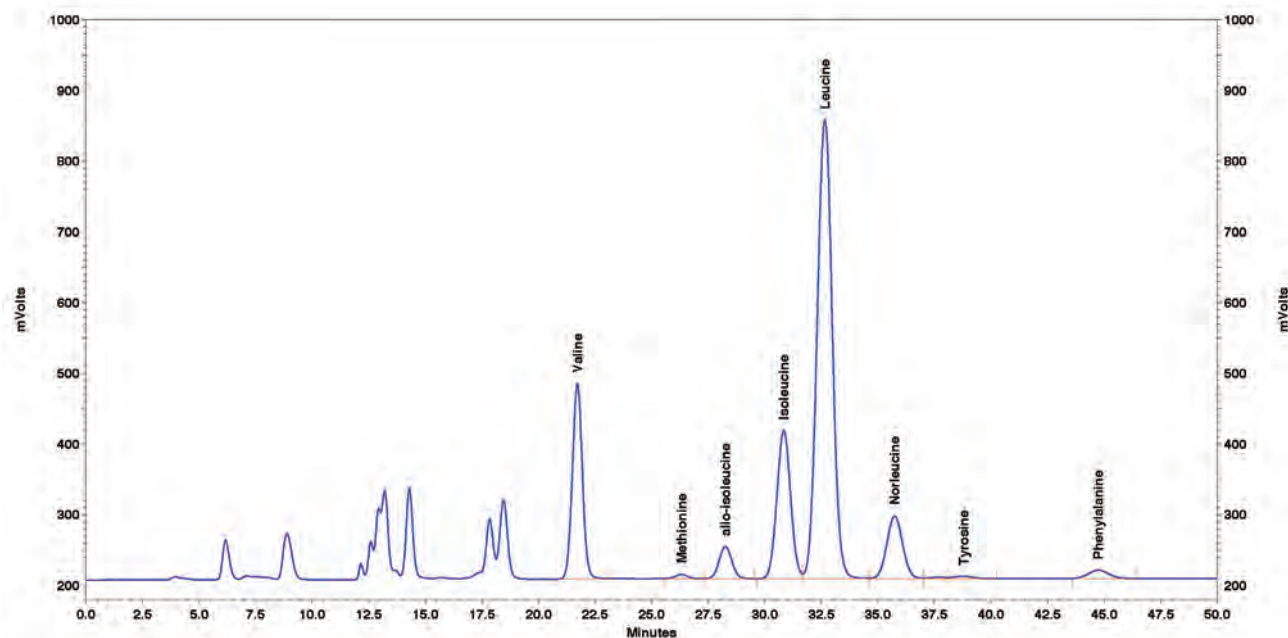
The PKU method is designed specifically for PKU newborn screening and to monitor patients' phenylalanine levels in plasma. Samples can be analyzed within 30 minutes with an injection-to-injection repeat time of 50 min. The method is compatible with dried blood spot samples and gives cost effective PKU screening service.



Normal plasma sample analyzed on a Biochrom 30+ equipped with the PKU column. Norleucine used as the internal standard.

MAPLE SYRUP URINE DISEASE (MSUD)

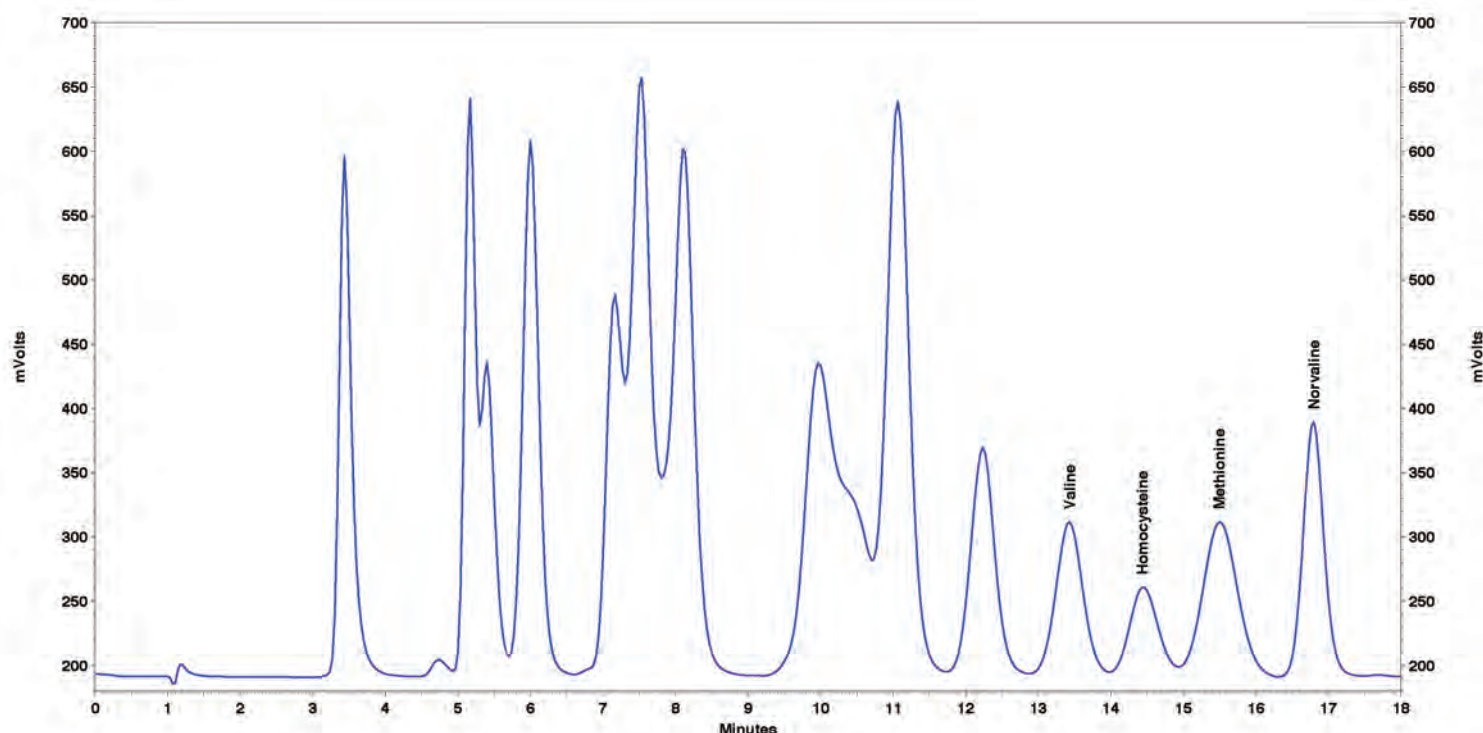
Maple Syrup Urine Disease (MSUD) can be diagnosed by the presence of alloisoleucine combined with high amounts of leucine, isoleucine and valine². The Biochrom 30+ separates fully isoleucine, leucine and alloisoleucine enabling a clear diagnosis.



MSUD patient sample analyzed with the MSUD short method. Data kindly provided by Tanyalcin Laboratory, Turkey.

TOTAL HOMOCYSTEINE ASSAY

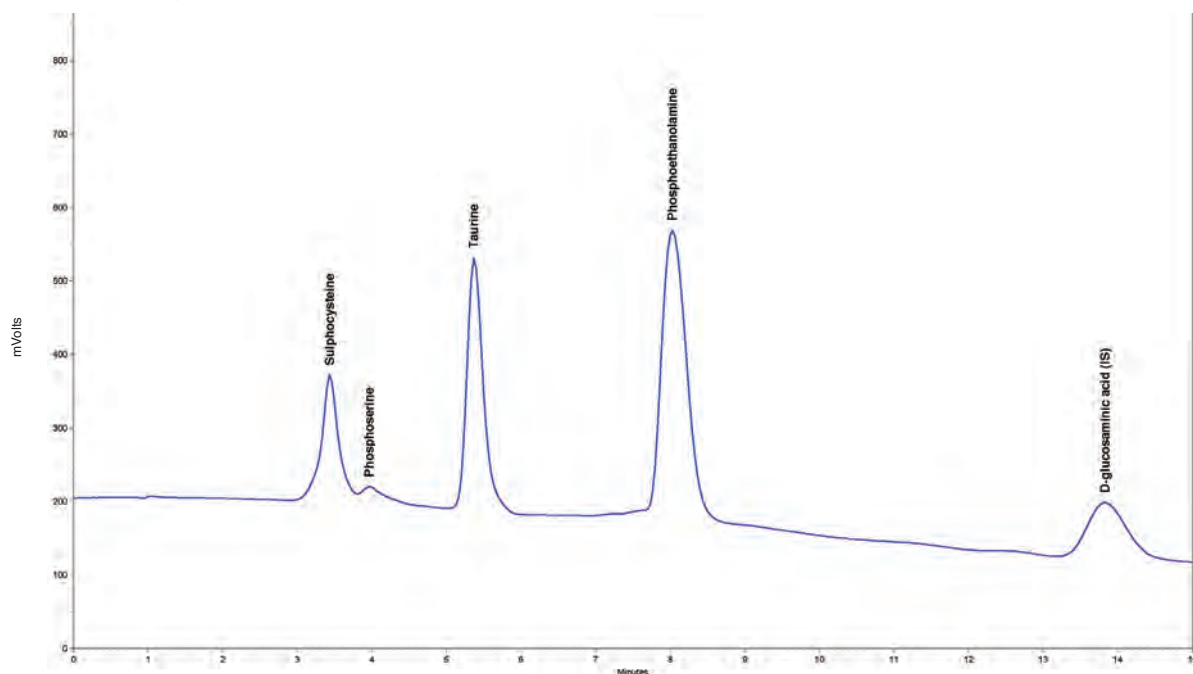
Elevated plasma total homocysteine has emerged as an important risk factor in the development of vascular disease³. Using the Biochrom 30+ Amino Acid Analyzer reduces analysis time to 24 min injection to injection for evaluation of patients at risk.



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

SULFOCYSTEINE

Sulfite oxidase deficiency is a rare inborn error of metabolism, characterized by elevated urinary and plasma s-sulphocysteine². Using the Biochrom 30+ Amino Acid Analyzer, a short programme for the analysis of s-sulphocysteine has been developed that allow its separation from phosphoserine.



Patient sample urine sulfocysteine. Data kindly provided by St James Hospital, Leeds UK.

Biochrom 30+ TECHNICAL SPECIFICATIONS

Reproducibility	Area: Better than 0.5% RSD at 10 nanomoles. Retention time: Better than 0.1%RSD	
Limit of detection	9 - 15 pmoles Ninhydrin	
Time of analysis (based on the separation of 45 physiological amino acids):	Accelerated analysis:	115 min injection to injection
	High Performance analysis:	170 min injection to injection
Analytical column:	High pressure PEEK column packed with Ultropac 8 cation exchange resin. Peltier heating/cooling system.	
Eluent system:	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.	
Temperature	Column temperature variable between 20°C and 99°C. Reaction Coil temperature adjustable between 40°C and 145°C (135°C is optimum).	
Photometric detection:	Single flow cell with optical beam splitter. Dual channel detection at 440nm and 570nm.	
Sample injection	3 injection modes (full loop, partial loop and micro), 84 position autosampler. Sample volumes from 1µL to 5000µL. 200µL loop supplied as standard.	
Software:	BioSys v3.0 control software Biochrom Alias Manager autosampler control software Latest version of EZChrom Elite Data Handling 21 CFR part 11 compliant	
Dimensions and weights:	Bench top Fluidics Cabinet:	48x59x57 cm, 19x23x22 inches (wxdxh)
	Weight:	50kg, 110lbs
	Autosampler:	30x57.5x36 cm, 12x23x14 inches (wxdxh)
	Weight:	21kg, 46lbs
Operating Conditions:	Operating temperature:	15 °C to 25 °C
	Maximum humidity:	80% at 25 °C
Required services:	Oxygen free nitrogen gas (99.99%) or Argon regulated to 73.5psi (5bar). Drainage facility. 240V/100V, 50Hz/60Hz, 300VA mains supply.	
Safety System	Automatic shut-down and reaction coil flushing in the event of: <ul style="list-style-type: none"> ■ photometer lamp failure ■ incorrect ninhydrin / buffer / coil / nitrogen pressures ■ incorrect coil and column temperatures ■ power failure 	
Order Code	Biochrom 30+ Physiological System 80 - 6000 - 50	

ELUTION ORDER OF CLINICALLY SIGNIFICANT AMINO ACIDS AND DERIVATIVES ANALYZED BY THE Biochrom 30+

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

ABOUT BIOCHROM

Biochrom is a world leader in amino acid analysis. The Biochrom 30+ is recognized as the gold standard dedicated amino acid analyzer used by hospitals, pharmaceutical and industrial labs worldwide. Applications are available both for clinical analysis and screening of metabolic disorders, for drug synthesis, infusion fluids and for industrial applications in food, beverage and feedstuffs.

Biochrom is a leading manufacturer of scientific instruments with over 40 year's experience. The Biochrom Group consists of five well-known instrument brands covering amino acid analysis, UV/Vis spectroscopy, and microplate instrumentation. Hospitals and laboratories worldwide trust our products and we are a valued OEM partner of many of the world's finest scientific instrumentation companies. The Biochrom spectroscopy range includes the Novaspec, Ultrospec®, and GeneQuant®, plus the Biochrom Libra and Biochrom WPA brands. Biochrom also manufactures two major brand names in the microplate instrumentation market - Biochrom Asys and Biochrom Anthos.

All our instruments are available through a growing global network of independent distributors, backed by our commitment to customer support. Biochrom is a Harvard Bioscience Company.

EZChrom Elite is a trademark of Agilent Technologies

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¹ Differential diagnosis of (inherited) amino acid metabolism or transport disorders. W. Blom & J.G.M. Huijman, 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, Biochrom Application note B30.5.



Biochrom Ltd

22 Cambridge Science Park,
Milton Rd, Cambridge CB4 0FJ UK
Tel: +44 (0)1223 423723
Fax: +44 (0)1223 420164
Email: enquiries@biochrom.co.uk
www.biochrom.co.uk

Biochrom US

84 October Hill Road,
Holliston, MA 01746-1388 USA
Tel: (Toll free): 877- BIO-CHROM (877-246-2476)
Fax: 508-429-5732
email: sales@biochrom-us.com
www.biochrom-US.com

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