



Application Notes

Aracus



membraPure GmbH
Wolfgang Küntscher Str. 14
16761 Hennigsdorf / Berlin

Mail: info@membraPure.de
Tel.: 03302 / 201 20 0
Fax: 03302 / 201 20 21





Index

- Physiological Extended 54 amino acid 1 – 2

Clinical Applications

- Physiological (125x3/iVD) 42 amino acid 5 – 6
- Physiological (150x4) 7 – 8
- Diagnostic short (MSUD) 9 – 10

Food and Feedstuff Applications

- Hydrolysate (125x3) 13 – 14
- Hydrolysate (125x4) 15 – 16
- Hydrolysate PLUS (TRP) 17 – 18
- Feedstuff 19 – 20
- 24 Amino Acids Feedstuff-short 21 – 22

Biogene amine and others

- Biogenic Amine 25 – 26
- Glyphosate and AMPA 27 – 28
- Stress factors plants 29 – 30

Definitions of abbreviations 31 – 32

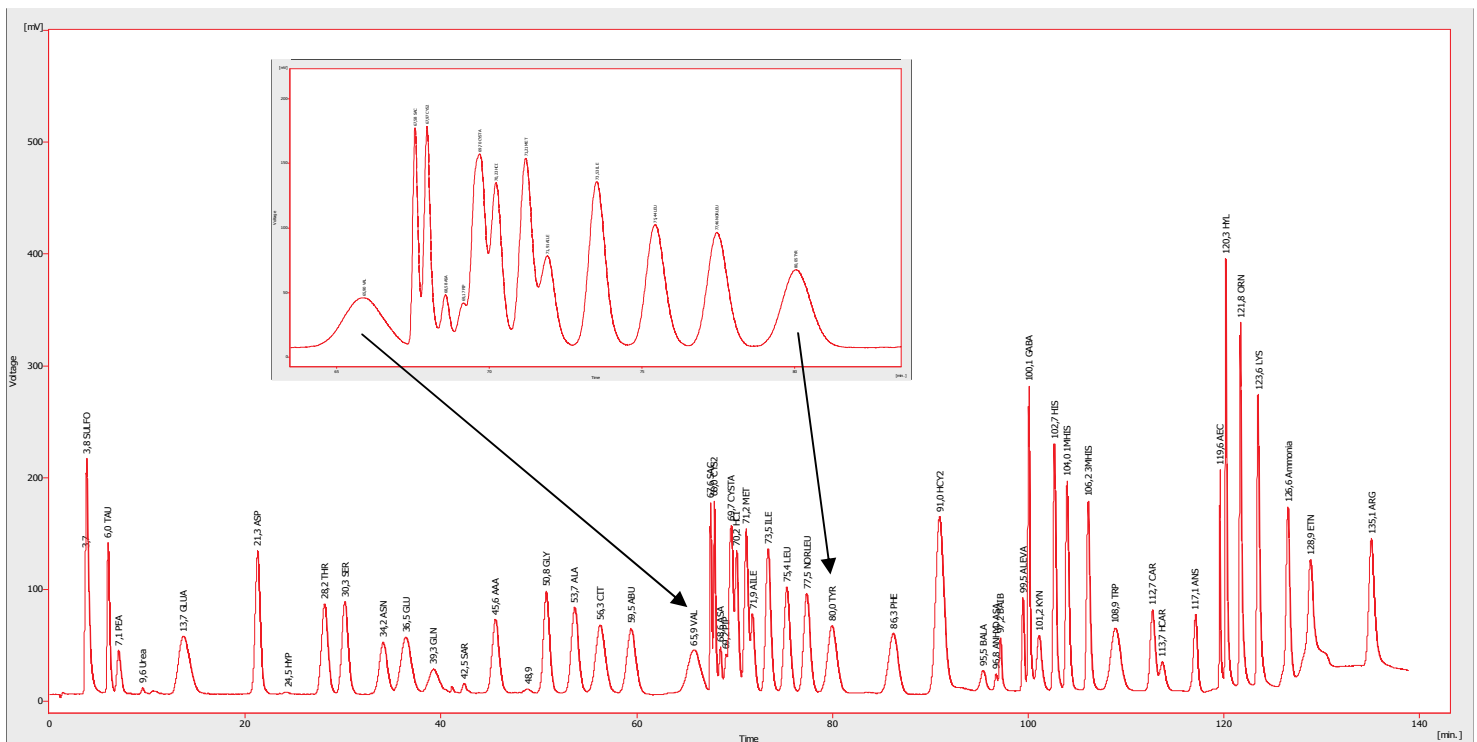
APPLICATION NOTE

Physiological Extended



Equipment ARACUS
Column Lithium system, 150 mm BL x 4.0 mm ID
 Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents Lithium system - Eluent A to Eluent F
Runtime 128 min
Gradient Program in Steps
Eluent Flow 240 µl/min
Column Temperature ... 35 °C to 74 °C
Injection Volume 20 µl
Reagent Ninhydrin (Post-Column Derivatization)
Reagent Flow 120 µl/min
Reactor Temperature ... 125 °C
Detection Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample Physiological standard Solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Physiological Extended +



number	retention time	code
	[min]	
1	3,8	SULFO
2	6	TAU
3	7,1	PEA
4	9,6	Urea
5	13,7	GLUA
6	21,3	ASP
7	24,5	HYP
8	28,2	THR
9	30,3	SER
10	34,2	ASN
11	36,5	GLU
12	39,3	GLN
13	39,3	SAR
14	45,6	AAA
15	48,9	PRO
16	50,8	GLY
17	53,7	ALA
18	56,3	CIT
19	59,5	ABU
20	65,9	VAL
21	67,6	SAC
22	68	CYS2
23	68,6	ASA
24	69,2	PIP
25	69,7	CYSTA
26	70,2	MET

number	retention time	code
	[min]	
27	71,2	AILE
28	73,5	ILE
29	75,4	LEU
30	77,5	NORLE
31	80	TYR
32	86,3	PHE
34	91	HCY2
35	95,8	BALA
36	96,8	ANHYD ASA
37	97,2	BAIB
38	99,5	ALEVA
39	100,1	GABA
40	101,2	KYN
41	102,7	HIS
42	104	1MHIS
43	106,2	3MHIS
44	108,9	TRP
45	112,7	CAR
46	113,7	HCAR
47	117,1	ANS
48	119,6	AEC
49	120,3	HYL
50	121,8	ORN
51	123,6	LYS
52	126,6	Ammonia
53	128,9	ETH
54	135,1	ARG

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)



Clinical Applications

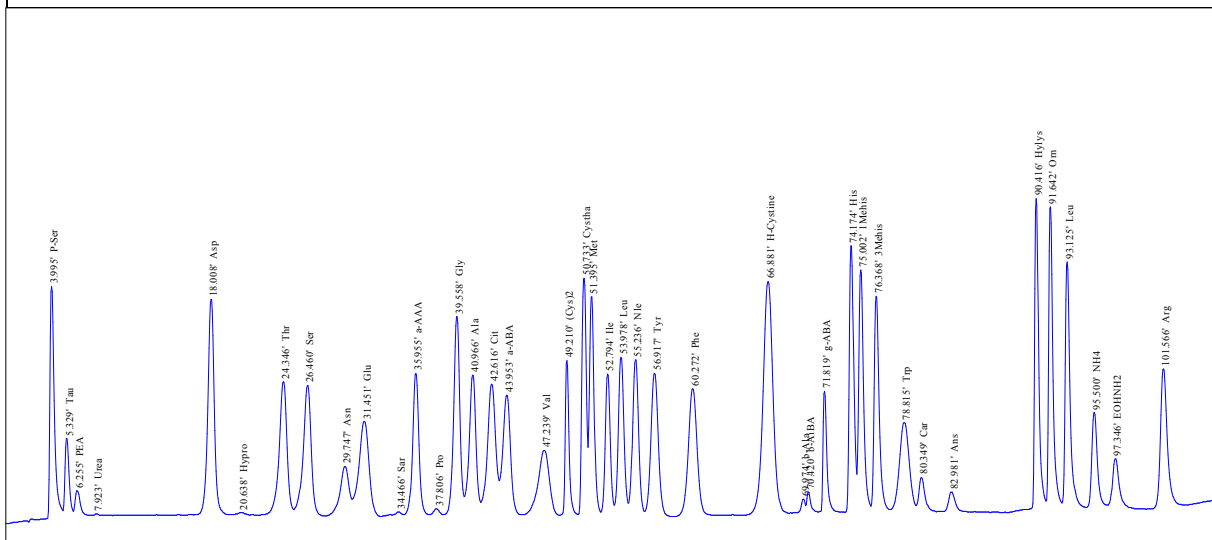
APPLICATION NOTE



Physiological (125x3/iVD)

Equipment	ARACUS
Column	Lithium system, 125mm BL x 3.0 mm ID Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents	Lithium system - Eluent A to Eluent F
Runtime	103 min
Gradient	Program in Steps
Eluent Flow	180 µl/min
Column Temperature ...	35 °C to 70 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	90 µl/min
Reactor Temperature ...	115 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Physiological standard Solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Physiological (125x3/iVD)



number	retention time	code
	[min]	
1	42616	P-Ser
2	42434	Tau
3	42406	PEA
4	42620	Urea
5	18.0	Asp
6	42541	Hypro
7	42453	Thr
8	42516	Ser
9	42580	Asn
10	42521	Glu
11	34.5	Sar
12	35.9	a-AAA
13	37.8	Pro
14	39.6	Gly
15	40.9	Ala
16	42.6	Cit
17	43.9	a-ABA
18	47.2	Val
19	49.2	(Cys) ₂
20	50.7	Cystha
21	51.4	Met

number	retention time	code
	[min]	
22	52.8	Ile
23	53.9	Leu
24	55.2	Nle
25	56.9	Tyr
26	60.2	Phe
27	66.9	H-Cystin
28	69.9	b-Ala
29	70.4	b-Aiba
30	71.8	g-ABA
31	74.1	His
32	75.0	1Mehis
33	76.4	3Mehis
34	78.8	Trp
35	80.3	Car
36	82.9	Ans
37	90.4	Hylys
38	91.6	Orn
39	93.1	Lys
40	95.5	NH ₄
41	97.3	EOHNH ₂
42	101.6	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

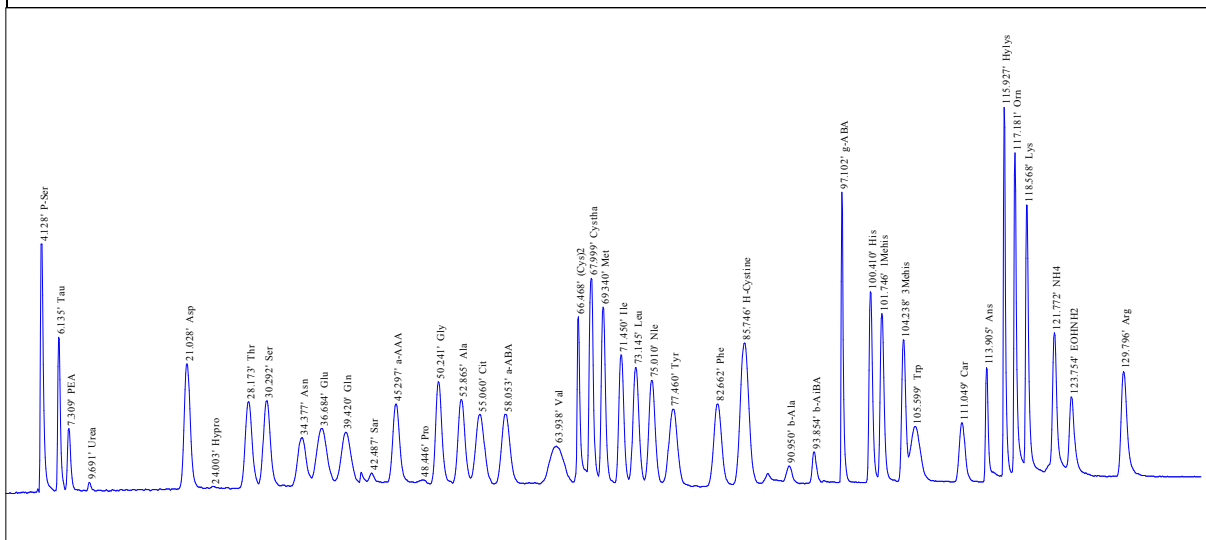
APPLICATION NOTE

Physiological (150x4)



Equipment	ARACUS
Column	Lithium system, 150 mm BL x 4.0 mm ID Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents	Lithium system - Eluent A to Eluent F
Runtime	128 min
Gradient	Program in Steps
Eluent Flow	240 µl/min
Column Temperature ...	35 °C to 74 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	120 µl/min
Reactor Temperature ...	125 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Physiological standard Solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Physiological (150x4)



number	retention time	code
	[min]	
1	4.1	P-Ser
2	6.1	Tau
3	7.3	PEA
4	9.7	Urea
5	21.0	Asp
6	24.0	Hypro
7	28.2	Thr
8	30.3	Ser
9	34.4	Asn
10	36.7	Glu
11	39.4	Gln
12	42.5	Sar
13	45.3	α -AAA
14	48.4	Pro
15	50.2	Gly
16	52.9	Ala
17	55.1	Cit
18	58.1	α -ABA
19	63.9	Val
20	66.5	(Cys) ₂
21	67.9	Cystha
22	69.3	Met

number	retention time	code
	[min]	
23	71.5	Ile
24	73.1	Leu
25	73.1	Nle
26	75.0	Tyr
27	77.5	Phe
28	82.7	H-Cystin
29	85.7	b-Ala
30	90.9	b-Aiba
31	93.9	g-ABA
32	97.1	His
34	100.4	1Mehis
35	101.7	3Mehis
36	104.2	Trp
37	105.6	Car
38	111.0	Ans
39	113.9	Hylys
40	115.9	Orn
41	117.2	Lys
42	121.8	NH ₄
43	123.8	EOH ₂ NH ₂
44	129.8	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

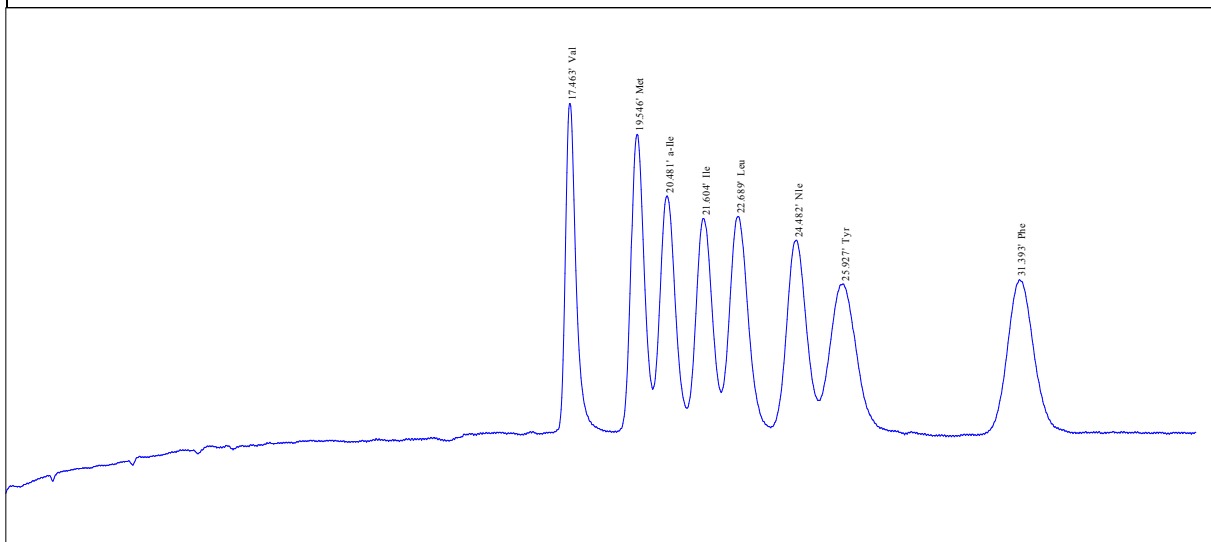
APPLICATION NOTE




Diagnostic short (MSUD)

Equipment	ARACUS
Column	Lithium system, 150 mm BL x 4.0 mm ID Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents	Lithium system - Eluent B, C and Eluent F
Runtime	34 min
Gradient	Program in Steps
Eluent Flow	240 µl/min
Column Temperature ...	57 °C to 70 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	120 µl/min
Reactor Temperature ...	125 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Diagnostic standard solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE	
Diagnostic short (MSUD)	

number	retention time [min]	code
1	17.5	Val
2	19.5	Met
3	20.5	a-Ile
4	21.6	Ile
5	22.7	Leu
6	24.5	Nle
7	25.9	Tyr
8	31.4	Phe

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)



Food and Feedstuff Applications

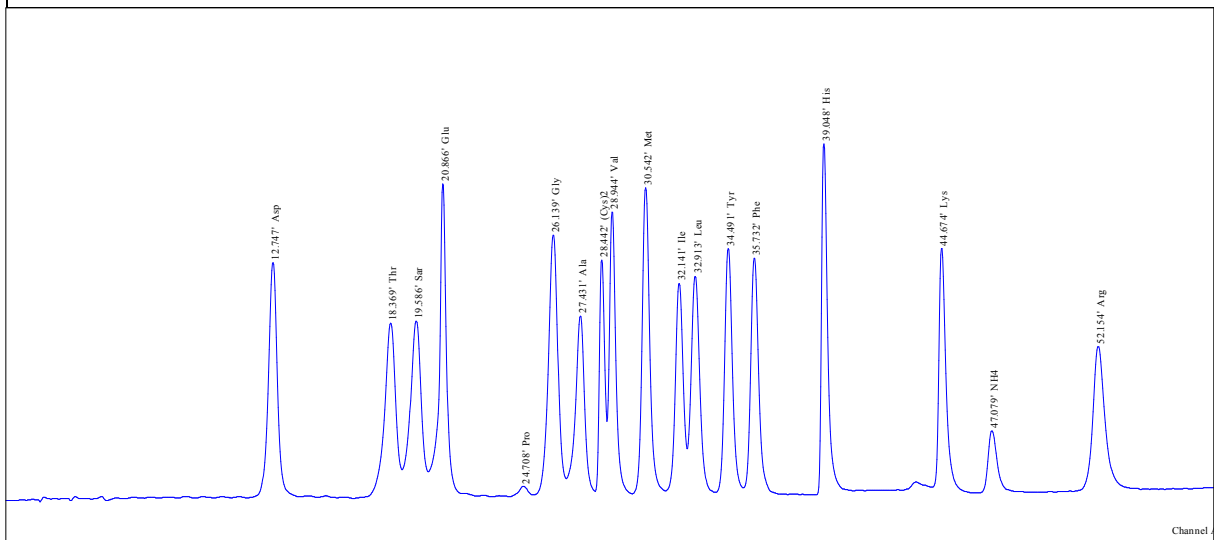
APPLICATION NOTE



Hydrolysate (125x3)

Equipment	ARACUS
Column	Lithium system, 125 mm BL x 3.0 mm ID Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents	Lithium system - Eluent A to Eluent F
Runtime	60 min
Gradient	Program in Steps
Eluent Flow	220 µl/min
Column Temperature ...	49 °C to 70 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	110 µl/min
Reactor Temperature ...	115 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Hydrolysate standard solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Hydrolysate (125x3)

number	retention time [min]	code
1	12.7	Asp
2	18.3	Thr
3	19.6	Ser
4	20.9	Glu
5	24.7	Pro
6	26.1	Gly
7	27.4	Ala
8	28.4	(Cys) ₂
9	28.9	Val
10	30.5	Met
11	32.1	Ile
12	32.9	Leu
13	34.5	Tyr
14	35.7	Phe
15	39.0	His
16	44.7	Lys
17	47.1	NH ₄
18	52.2	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

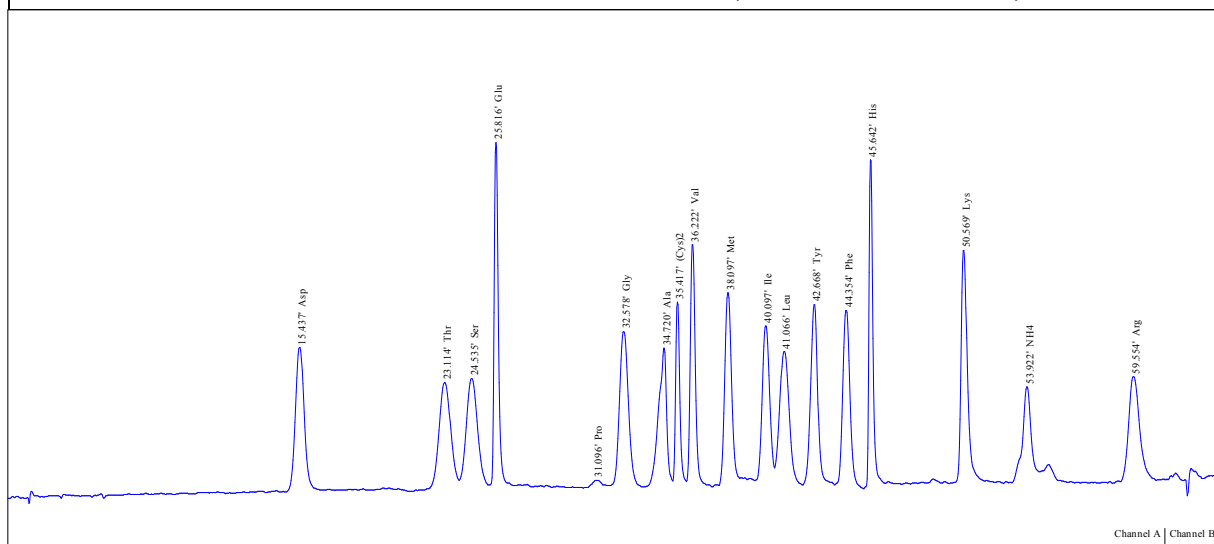
APPLICATION NOTE



Hydrolysate (125x4)

Equipment: ARACUS
 Column: Lithium system, 125 mm BL x 4.0 mm ID
 Ammonium Absorber, 40 mm x 2.0 mm ID
 Eluents: Lithium system - Eluent A to Eluent F
 Runtime: 60 min
 Gradient: Program in Steps
 Eluent Flow: 280 µl/min
 Column Temperature ...: 49 °C to 70 °C
 Injection Volume: 20 µl
 Reagent: Ninhydrin (Post-Column Derivatization)
 Reagent Flow: 140 µl/min
 Reactor Temperature ...: 125 °C
 Detection: Visible – 570 nm (Channel A) / 440 nm (Channel B)
 Sample: Hydrolysate standard solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Hydrolysate (125x4)

number	retention time [min]	code
1	15.4	Asp
2	23.1	Thr
3	24.5	Ser
4	25.8	Glu
5	31.1	Pro
6	32.6	Gly
7	34.7	Ala
8	35.4	(Cys) ₂
9	36.2	Val
10	38.1	Met
11	40.1	Ile
12	41.1	Leu
13	42.7	Tyr
14	44.4	Phe
15	45.6	His
16	50.6	Lys
17	53.9	NH ₄
18	59.6	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

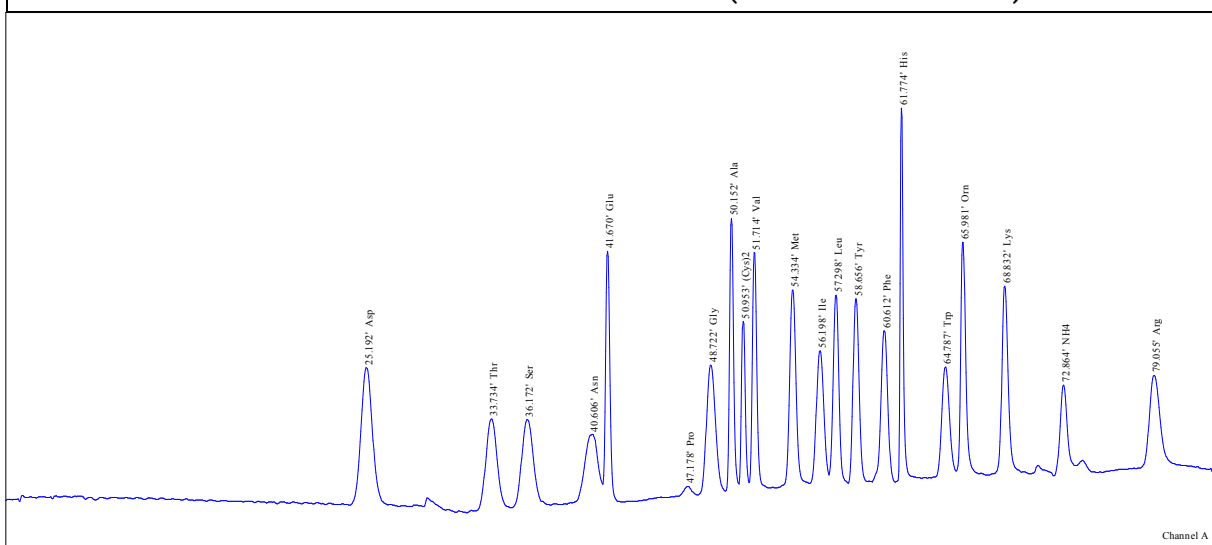
APPLICATION NOTE



Hydrolysate PLUS (TRP)

Equipment	ARACUS
Column	Lithium system, 125 mm BL x 4.0 mm ID Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents	Lithium system - Eluent A to Eluent F
Runtime	80 min
Gradient	Program in Steps
Eluent Flow	220 µl/min and 280µl/min
Column Temperature ...	33 °C to 70 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	120µl/min and 140 µl/min
Reactor Temperature ...	125 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Hydrolysate standard solution with additional: L-Asparagine L-Tryptophan L-Ornithine

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Hydrolysate PLUS (TRP)



number	retention time [min]	code
1	25.2	Asp
2	33.7	Thr
3	36.2	Ser
4	40.6	Asn
5	41.6	Glu
6	47.2	Pro
7	48.7	Gly
8	50.2	Ala
9	50.9	(Cys) ₂
10	51.7	Val
11	54.3	Met
12	56.2	Ile
13	57.3	Leu
14	58.7	Tyr
15	60.6	Phe
16	61.8	His
17	64.8	Trp
18	65.9	Orn
19	68.8	Lys
20	72.9	NH ₄
21	79.1	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

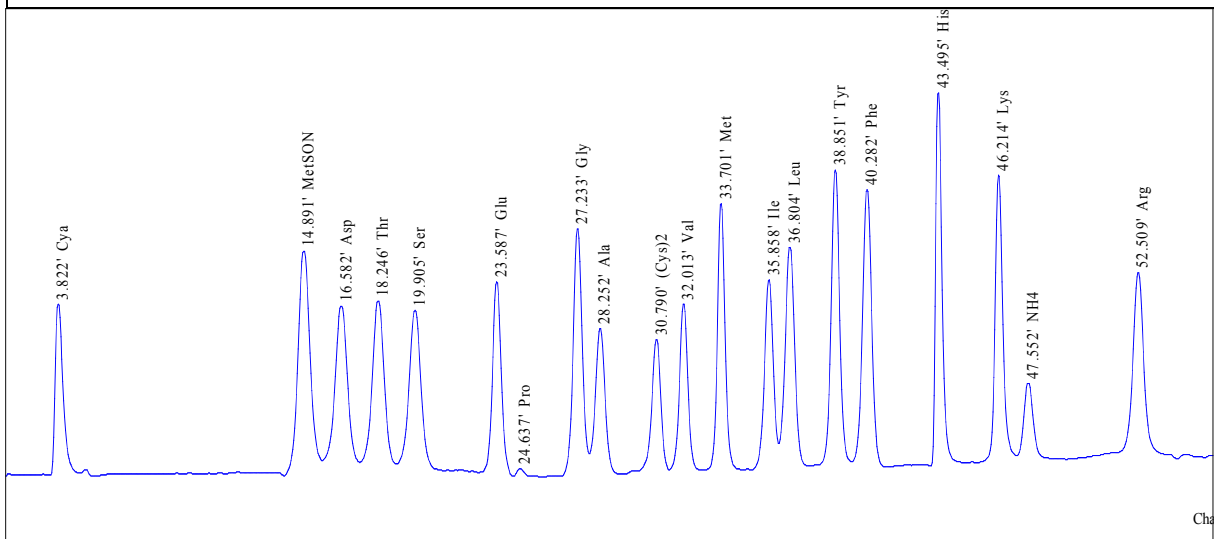
APPLICATION NOTE



Feedstuff

Equipment: ARACUS
 Column: Natrium system, 125 mm BL x 4.0 mm ID
 Ammonium Absorber, 40 mm x 2.0 mm ID
 Eluents: Natrium system - Eluent A to Eluent F
 Runtime: 52 min
 Gradient: Program in Steps
 Eluent Flow: 250 µl/min
 Column Temperature ...: 58 °C to 75 °C
 Injection Volume: 20 µl
 Reagent: Ninhydrin (Post-Column Derivatization)
 Reagent Flow: 125 µl/min
 Reactor Temperature ...: 115 °C
 Detection: Visible – 570 nm (Channel A) / 440 nm (Channel B)
 Sample: Feedstuff standard

Standard Solution with 100 nmol/ml (Channel A / 570nm)





number	retention time [min]	code
1	3.8	Cya
2	14.9	MetSON
3	16.6	Asp
4	18.2	Thr
5	19.9	Ser
6	23.6	Glu
7	24.6	Pro
8	27.2	Gly
9	28.3	Ala
10	30.8	(Cys) ₂
11	32.0	Val
12	33.7	Met
13	35.9	Ile
14	36.8	Leu
15	38.9	Tyr
16	40.3	Phe
17	43.5	His
18	46.2	Lys
19	47.6	NH ₄
20	52.5	Arg

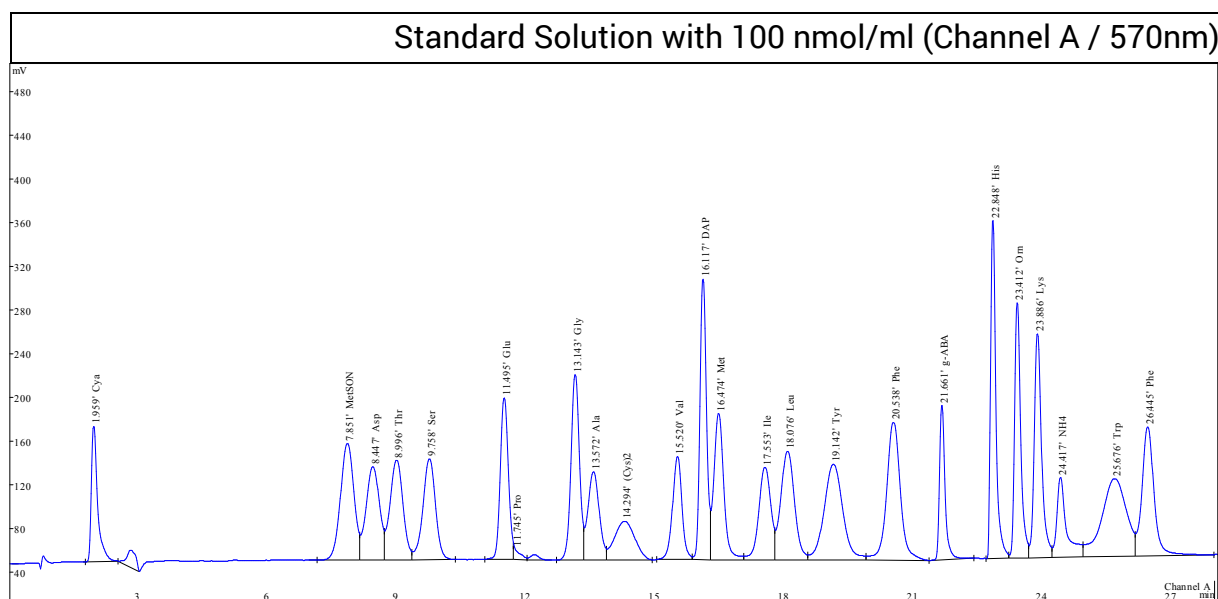
Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)

APPLICATION NOTE



24 Amino Acids Feedstuff-short

Equipment: ARACUS
Column: Natrium system, 125 mm BL x 4.0 mm ID
 Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents.....: Natrium system - Eluent A to Eluent F
Runtime: 26.5 min
Gradient.....: Program in Steps
Eluent Flow.....: 450 µl/min
Column Temperature ...: 50 °C and 75 °C
Injection Volume: 20 µl
Reagent: Ninhydrin (Post-Column Derivatization)
Reagent Flow: 215 µl/min
Reactor Temperature...: 130 °C
Detection: Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample.....: Feedstuff standard solution with additional:
 Diaminopimelic acid
 γ-Amino-n-butyric Acid
 L-Ornithine and
 L-Tryptophan



APPLICATION NOTE**24 Amino Acids Feedstuff-short**

number	retention time [min]	code
1	1.6	Cya
2	7.9	MetSON
3	8.4	Asp
4	9.0	Thr
5	9.8	Ser
6	11.5	Glu
7	12.2	Pro
8	13.1	Gly
9	13.6	Ala
10	14.3	(Cys) ₂
11	15.5	Val
12	16.1	DAP
13	16.5	Met
14	17.6	Ile
15	18.1	Leu
16	19.1	Tyr
17	20.5	Phe
18	21.7	g-ABA
19	22.8	His
20	23.4	Orn
21	23.9	Lys
22	24.4	NH ₄
23	25.7	Trp
24	26.4	Arg

Concentration: 100 nmol amino acid / ml ((Cys)₂: 50 nmol / ml)



Biogene amine and others

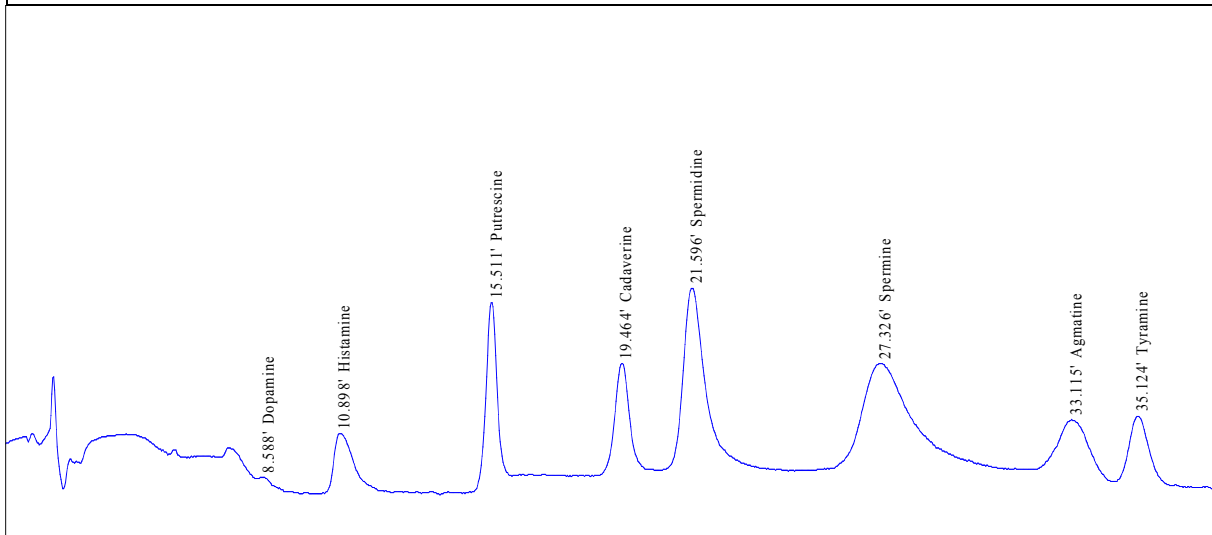
APPLICATION NOTE



Biogenic Amine

Equipment	ARACUS
Column	Potassium system, 118 mm BL x 2.0 mm ID Inline Filter, 40 mm x 2.0 mm ID
Eluents.....	Potassium system - Eluent A to Eluent D & Eluent F
Runtime	40 min
Gradient.....	Program in Steps
Eluent Flow.....	220 µl/min
Column Temperature ...:	75 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	110 µl/min
Reactor Temperature...:	130 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample.....	Biogenic Amine Standard solution

Standard Solution with 100 nmol/ml (Channel A / 570nm)



APPLICATION NOTE

Biogenic Amine

number	retention time [min]	code
1	8.6	Dopamine
2	10.9	Histamine
3	15.5	Putrescine
4	19.5	Cadaverine
5	21.6	Spermidine
6	27.3	Spermine
7	33.1	Agmatine
8	35.1	Tyramine

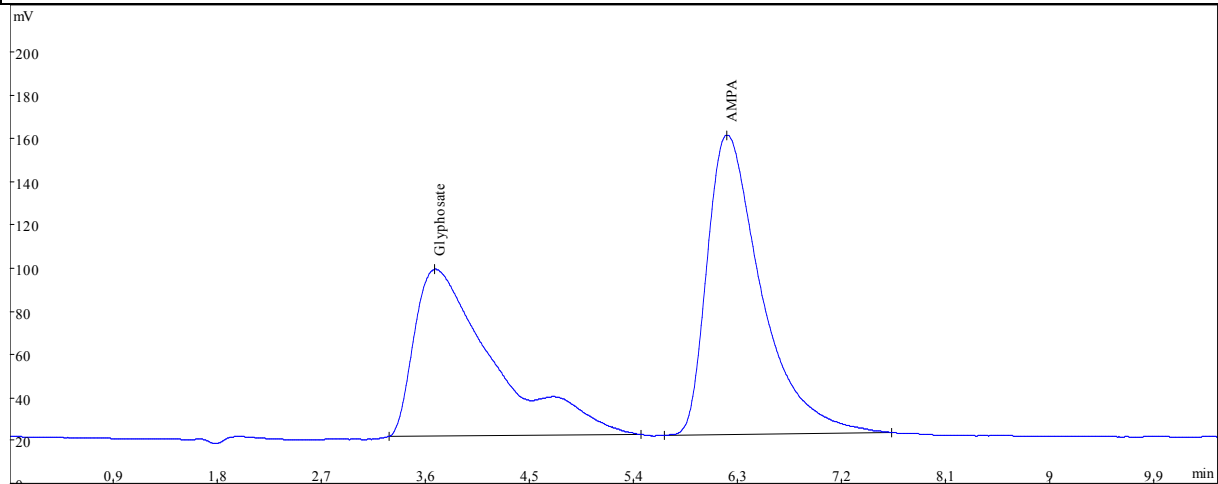
APPLICATION NOTE



Glyphosate and AMPA

Equipment: ARACUS
Column: Lithium system, 118 mm x 3.0 mm ID and
Ammonium Absorber, 40 mm x 2.0 mm ID
Eluents: Lithium system - Eluent A and Eluent F
Gradient: Program in Steps
Eluent Flow: 180 µl/min
Column Temperature ...: 60 °C
Injection Volume: 20 µl
Reagent: Ninhydrin (Post-Column Derivatization)
Reagent Flow: 90 µl/min
Reactor Temperature ...: 130 °C
Detection: Visible – 570 nm
Sample: Glyphosate
AMPA (Aminomethylphosphonic acid)

Standard Solution with 100 nmol/ml

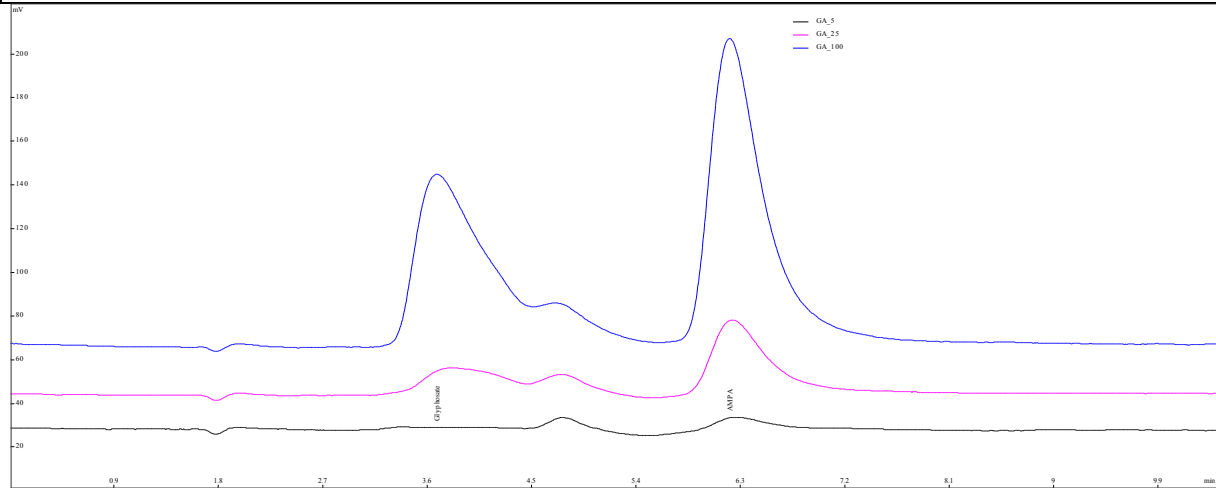


APPLICATION NOTE

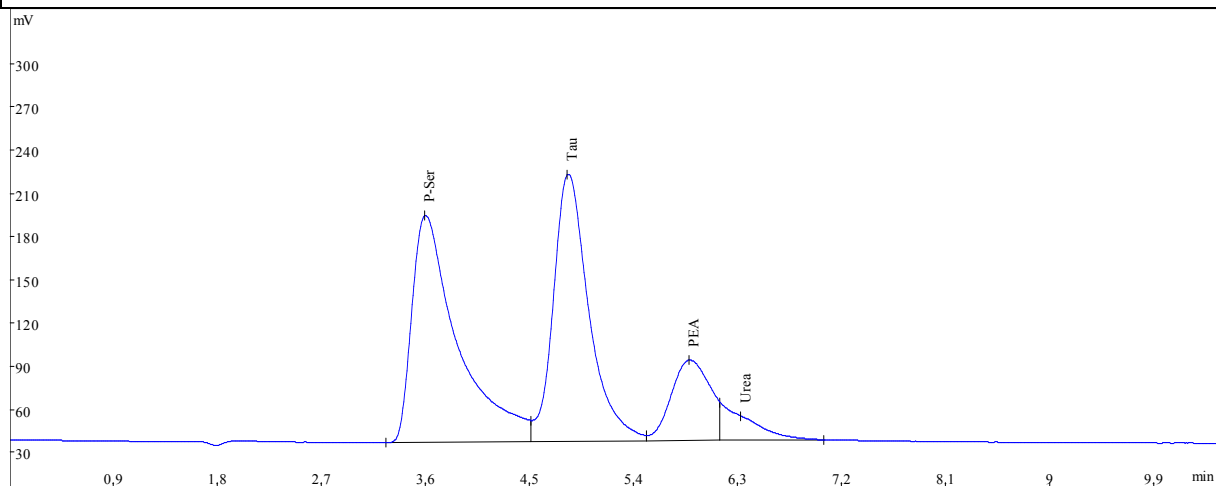
Glyphosate and AMPA



Standard Solutions with 100 nmol/ml, 25 nmol/ml and 5 nmol/ml



Standard Solution of Amino Acids with 100 nmol/ml



APPLICATION NOTE**Stress factors plants**

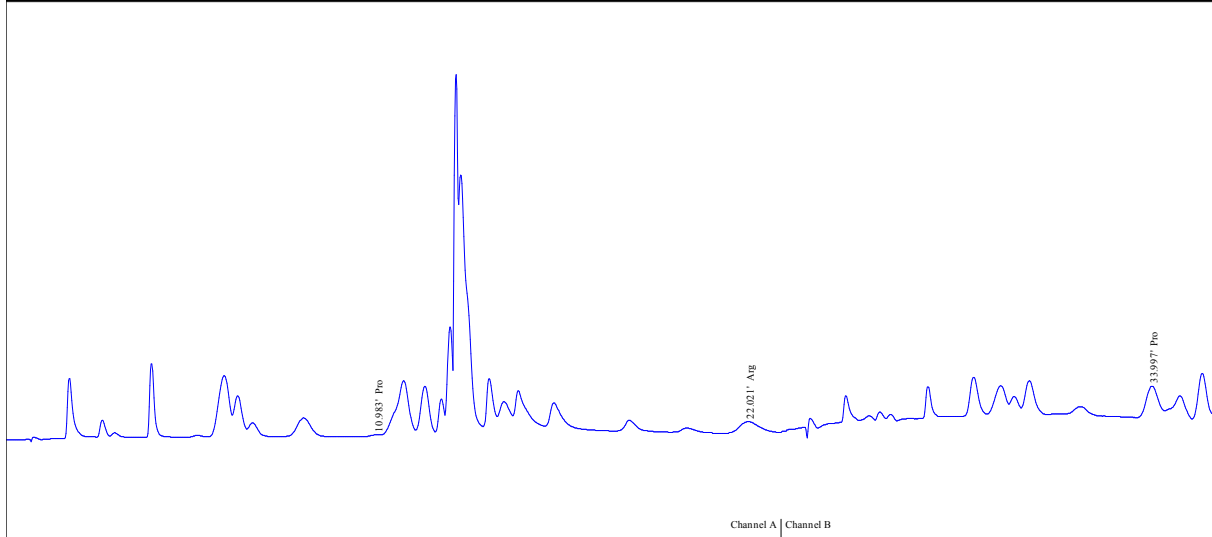
Equipment	ARACUS
Column	Lithium system, 125 mm BL x 4.0 mm ID Ammonium Absorber, 40 mm BL x 2.0 mm ID
Eluents	Lithium system - Eluent B to Eluent F
Runtime	23 min
Gradient	Program in Steps
Eluent Flow	450 µL/min
Column Temperature ...	50 °C and 70 °C
Injection Volume	20 µl
Reagent	Ninhydrin (Post-Column Derivatization)
Reagent Flow	225 µL/min
Reactor Temperature ...	125 °C
Detection	Visible – 570 nm (Channel A) / 440 nm (Channel B)
Sample	Physiological Standard
Equipment	ARACUS
Column	Lithium system, 125 mm BL x 4.0 mm ID Ammonium Absorber, 40 mm BL x 2.0 mm ID

APPLICATION NOTE

Stress factors plants



Standard Solution with 100 nmol/ml (Channel A / 570nm an Channel B /440nm)



number	retention time [min]	amino acid	code
1	11.0	L- Proline	Pro
2	22.0	L-Arginine	Arg

Definitions of abbreviations

amino acid	code
S-Sulfocysteine	SULFO
Taurine	TAU
o-Phosphoethanolamine	PEA
Urea	Urea
D-Glucosaminic Acid	GLUA
L-Aspartic Acid	ASP
Hydroxy-L-Proline	HYP
L- Threonine	THR
L-Serine	SER
L- Asparagine	ASN
L-Glutamic Acid	GLU
L-Glutamine	GLN
L- Sarcosine	SAR
L- α -Aminoadipic Acid	AAA
L- Proline	PRO
Glycine	GLY
L-Alanine	ALA
L-Citrulline	CIT
L- α -Amino-n-butyric Acid	ABU
L- Valine	VAL
L-Saccharopine	SAC
L-Cystine	CYS2
Argininosuccinic acid	ASA
L-Pipecolic Acid	PIP
Cystathionine	CYSTA
L-Methionine	MET
L-Allo-Isoleucine	AILE
L-Isoleucine	ILE
L-Leucine	LEU
Norleucine(internal standard)	NORLE
L-Tyrosine	TYR
L-Phenylalanine	PHE
H-Cystine	HCY2
β -Alanine	BALA

Succinic anhydride	ANHYD ASA
β -Aminoisobutyric Acid	BAIB
Amino-Levulinic Acid	ALEVA
γ -Amino-n-butyric Acid	GABA
Kynurenine	KYN
L-Histidine	HIS
1-Methyl-L-Histidine	1MHIS
3-Methyl-L-Histidine	3MHIS
L-Tryptophan	TRP
L-Carnosine	CAR
Homocarnosine	HCAR
L-Anserine	ANS
S-Aminoethyl-L-cysteine	AEC
Hydroxylysine	HYL
L-Ornithine	ORN
L-Lysine	LYS
Ammonium Chloride	Ammonia
Ethanolamine	ETH
L-Arginine	ARG