

**Table S1. Time Table of UPLC-MRM-MSMS**

<b>Time</b>	<b>A (H<sub>2</sub>O)</b>	<b>B (ACN)</b>	<b>Flow</b>
0.00 min	17.00%	83.00%	0.40 mL/min
1.50 min	17.00%	83.00%	0.40 mL/min
4.00 min	25.00%	75.00%	0.40 mL/min
6.00 min	50.00%	50.00%	0.40 mL/min
8.50 min	50.00%	50.00%	0.40 mL/min
9.00 min	17.00%	83.00%	0.40 mL/min
13.00 min	17.00%	83.00%	0.40 mL/min

**Table S2. MRM Parameters-UPLC-MRM-MS/MS**

<b>Compound Name</b>	<b>Prec Ion</b>	<b>Prod Ion</b>	<b>Frag (V)</b>	<b>CE (V)</b>	<b>Polarity</b>	<b>Quantifier/Qualifier</b>
Glycine	76.1	30.2	75	6	Positive	Quantifier/Qualifier
Beta-Alanine	90.1	72.1	50	3	Positive	Quantifier
Beta-Alanine	90.1	30.1	50	8	Positive	Qualifier
L-Alanine	90.1	44.1	50	7	Positive	Quantifier/Qualifier
4-Aminobutyric acid	104.1	87.1	50	7	Positive	Quantifier
4-Aminobutyric acid	104.1	69.1	50	15	Positive	Qualifier
L-Serine	106.1	88.1	50	5	Positive	Qualifier
L-Serine	106.1	60.1	50	9	Positive	Quantifier
L-Proline	116.1	70.2	90	15	Positive	Quantifier/Qualifier
L-Valine	118.1	72.1	80	9	Positive	Quantifier
L-Valine	118.1	55.1	80	17	Positive	Qualifier
L-Threonine	120.1	74.1	50	9	Positive	Quantifier
L-Threonine	120.1	56.1	50	17	Positive	Qualifier
4-Hydroxyproline	132.1	86.0	85	13	Positive	Quantifier
4-Hydroxyproline	132.1	68.1	85	19	Positive	Qualifier
L-Asparagine	133.1	116.0	80	5	Positive	Qualifier
L-Asparagine	133.1	87.0	80	5	Positive	Quantifier
L-Ornithine	133.1	116.0	75	5	Positive	Qualifier
L-Ornithine	133.1	70.0	75	18	Positive	Quantifier
L-Aspartic acid	134.1	116.0	40	4	Positive	Qualifier
L-Aspartic acid	134.1	88.1	40	6	Positive	Quantifier
L-Glutamine	147.1	130.0	45	5	Positive	Quantifier
L-Glutamine	147.1	84.1	45	20	Positive	Qualifier
L-Lysine	147.1	130.0	45	5	Positive	Qualifier
L-Lysine	147.1	84.1	45	17	Positive	Quantifier
L-Glutamic acid	148.1	130.0	55	8	Positive	Qualifier
L-Glutamic acid	148.1	84.1	55	15	Positive	Quantifier
L-Methionine	150.1	104.0	55	8	Positive	Quantifier
L-Methionine	150.1	56.1	55	17	Positive	Qualifier
L-Histidine	156.1	110.0	65	11	Positive	Quantifier
L-Histidine	156.1	93.0	65	24	Positive	Qualifier
5-Hydroxylysine	163.1	128.0	55	7	Positive	Quantifier
5-Hydroxylysine	163.1	82.0	55	16	Positive	Qualifier
L-Phenylalanine	166.1	120.0	70	10	Positive	Quantifier
L-Phenylalanine	166.1	77.1	70	40	Positive	Qualifier
1-Methyl-L-histidine	170.1	124.0	65	11	Positive	Quantifier
1-Methyl-L-histidine	170.1	83.0	65	25	Positive	Qualifier
3-Methyl-L-histidine	170.1	126.0	70	12	Positive	Qualifier
3-Methyl-L-histidine	170.1	96.0	70	20	Positive	Quantifier
L-Arginine	175.1	116.0	60	14	Positive	Qualifier
L-Arginine	175.1	70.0	60	16	Positive	Quantifier
L-Citrulline	176.1	159.0	55	5	Positive	Quantifier
L-Citrulline	176.1	113.0	55	15	Positive	Qualifier
L-Tyrosine	182.1	136.0	74	10	Positive	Quantifier
L-Tyrosine	182.1	91.0	74	30	Positive	Qualifier
L-Tryptophan	205.1	188.0	70	6	Positive	Quantifier

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L-Tryptophan	205.1	146.0	70	18	Positive	Qualifier
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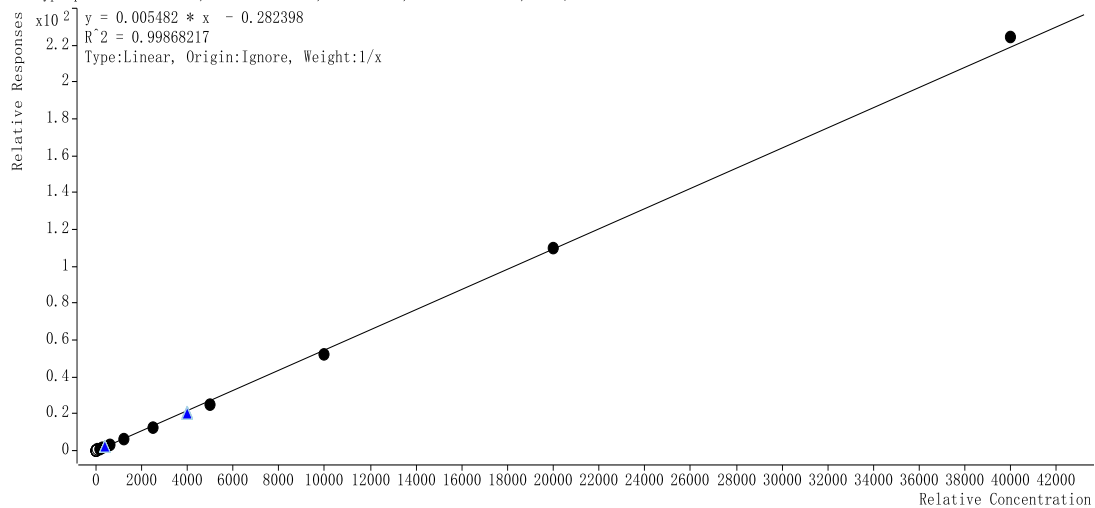
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Table S3. Calibration of UPLC-MRM-MSMS

Compound Name	LLOD (nmol/L)	LLOQ (nmol/L)	R <sup>2</sup>
L-Tryptophan	78.13	156.25	0.9987
L-Phenylalanine	2.44	4.88	0.9997
L-Valine	12.21	24.41	0.9996
L-Methionine	2.44	4.88	0.9993
4-Aminobutyric acid	4.88	9.77	0.9999
L-Tyrosine	19.53	39.06	0.9998
L-Proline	78.13	156.25	0.9992
Beta-Alanine	39.06	78.13	0.9995
Glycine	78.13	312.50	0.9984
4-Hydroxyproline	39.06	78.13	0.9967
L-Glutamic acid	78.13	156.25	0.9995
L-Threonine	87.89	703.13	0.9990
L-Aspartic acid	19.53	39.06	0.9999
L-Asparagine	78.13	312.50	0.9983
L-Citrulline	39.06	78.13	0.9997
1-Methyl-L-histidin	78.13	156.25	0.9995
L-Arginine	39.06	78.13	0.9991
3-Methyl-L-histidin	4.88	9.77	0.9999
L-Histidine	4.88	9.77	0.9998
L-Ornithine	39.06	78.13	0.9996
5-Hydroxylysine	4.88	9.77	0.9996
L-Alanine	61.04	488.28	0.9995
L-Glutamine	24.41	48.83	0.9988
L-Serine	21.97	43.95	0.9996
L-Lysine	97.66	1562.50	0.9988

**L-Tryptophan**

L-Tryptophan - 16 Levels, 9 Levels Used, 16 Points, 9 Points Used, 14 QCs



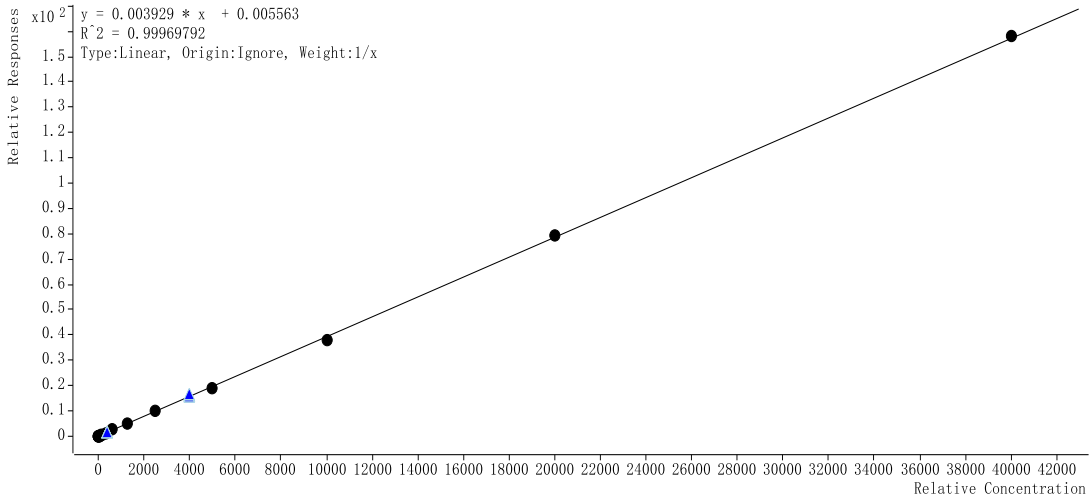
## L-Phenylalanine

L-Phenylalanine - 16 Levels, 14 Levels Used, 16 Points, 14 Points Used, 14 QCs

$$y = 0.003929 * x + 0.005563$$

$$R^2 = 0.99969792$$

Type:Linear, Origin:Ignore, Weight:1/x



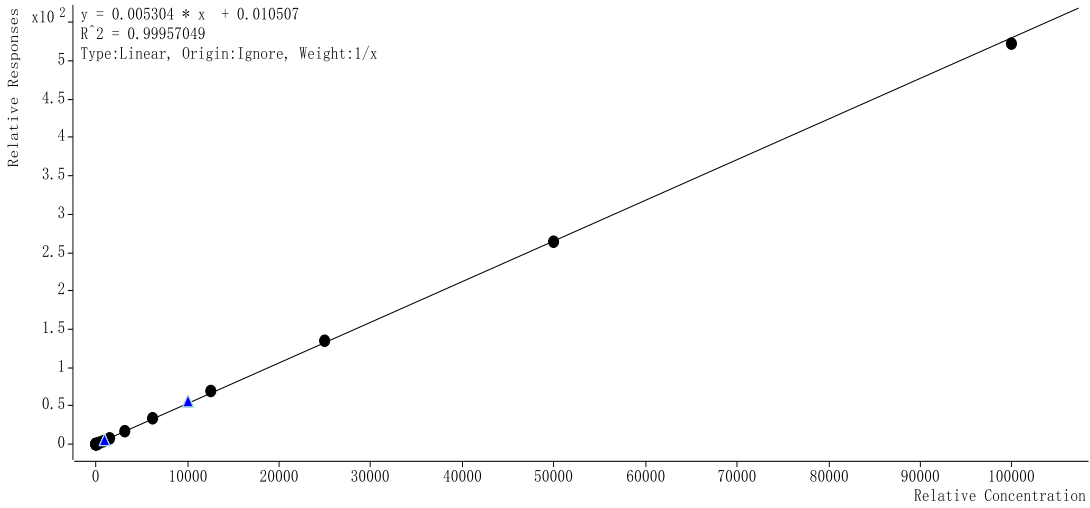
## L-Valine

L-Valine - 16 Levels, 13 Levels Used, 16 Points, 13 Points Used, 14 QCs

$$y = 0.005304 * x + 0.010507$$

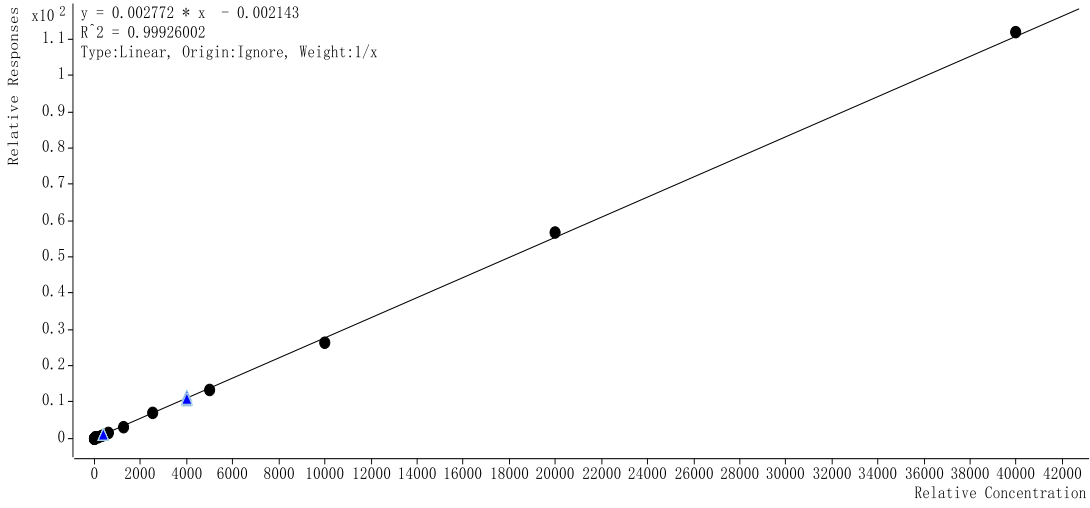
$$R^2 = 0.99957049$$

Type:Linear, Origin:Ignore, Weight:1/x



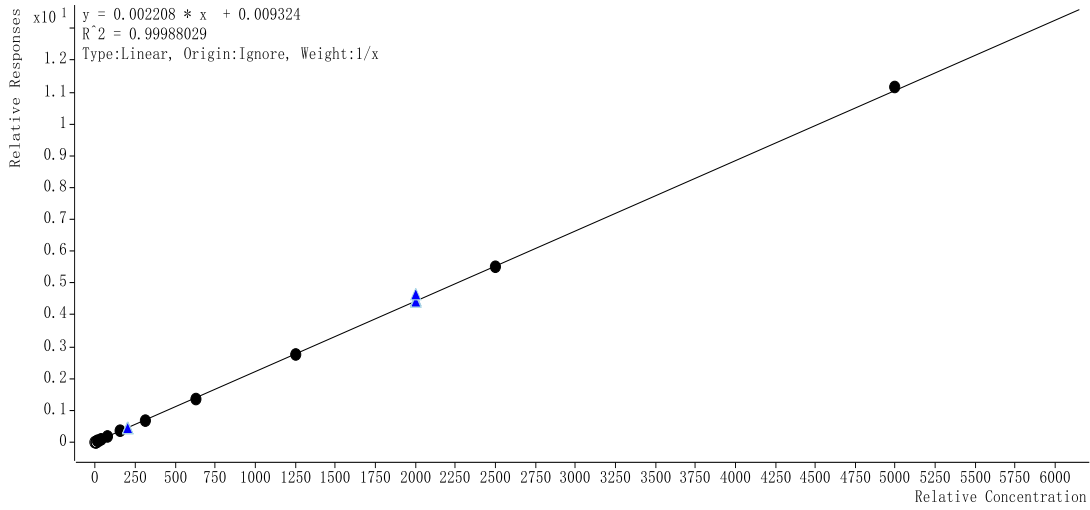
## L-Methionine

L-Methionine - 16 Levels, 14 Levels Used, 16 Points, 14 Points Used, 14 QCs



## 4-Aminobutyric acid

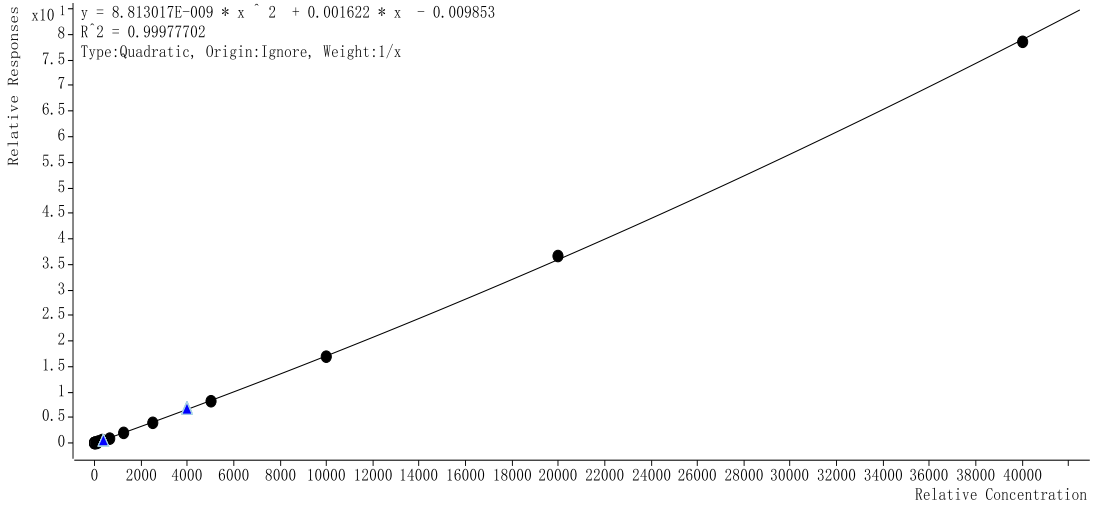
4-Aminobutyric acid - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



## L-Tyrosine

L-Tyrosine - 16 Levels, 11 Levels Used, 16 Points, 11 Points Used, 14 QCs

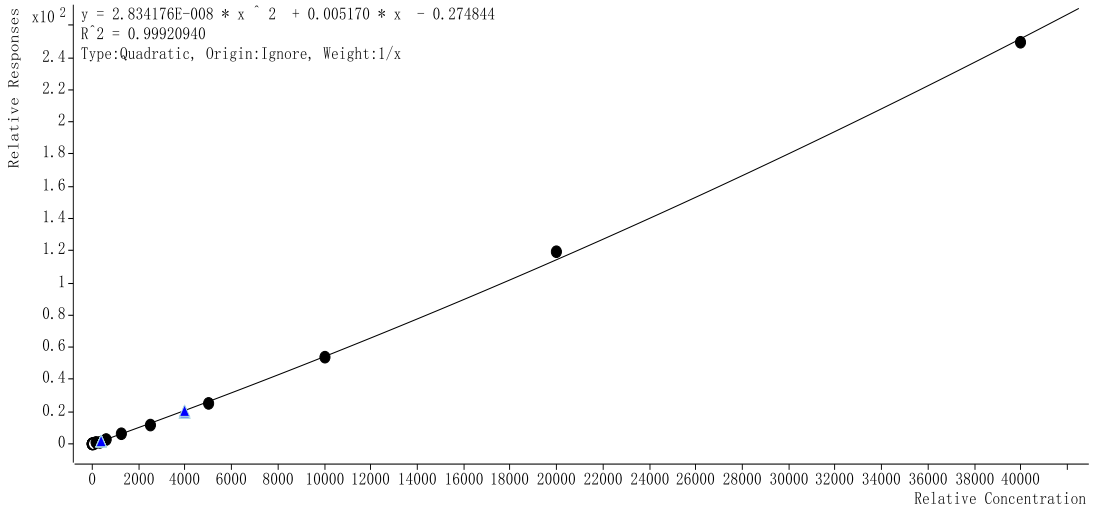
$y = 8.813017E-009 * x^2 + 0.001622 * x - 0.009853$   
 $R^2 = 0.99977702$   
Type:Quadratic, Origin:Ignore, Weight:1/x



## L-Proline

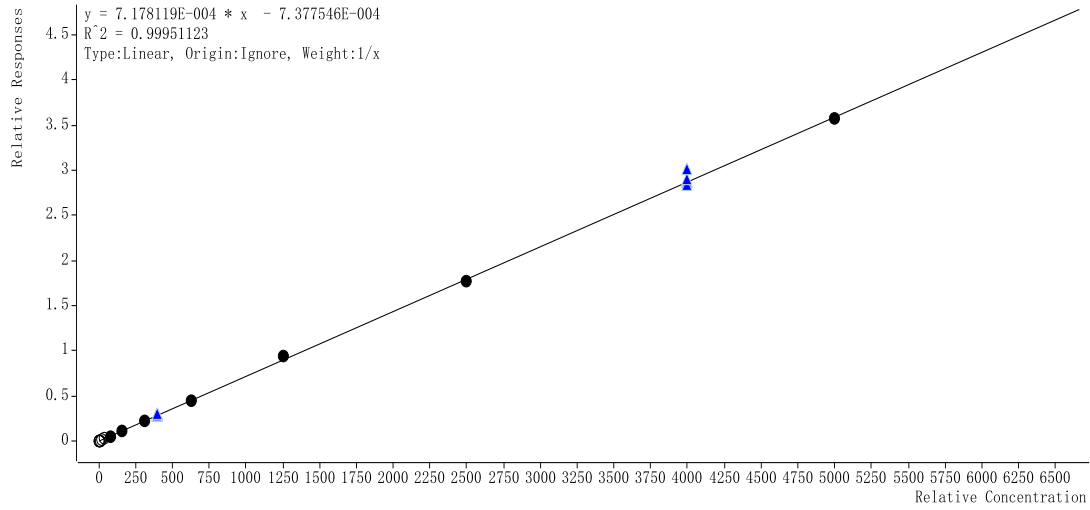
L-Proline - 16 Levels, 9 Levels Used, 16 Points, 9 Points Used, 14 QCs

$y = 2.834176E-008 * x^2 + 0.005170 * x - 0.274844$   
 $R^2 = 0.99920940$   
Type:Quadratic, Origin:Ignore, Weight:1/x



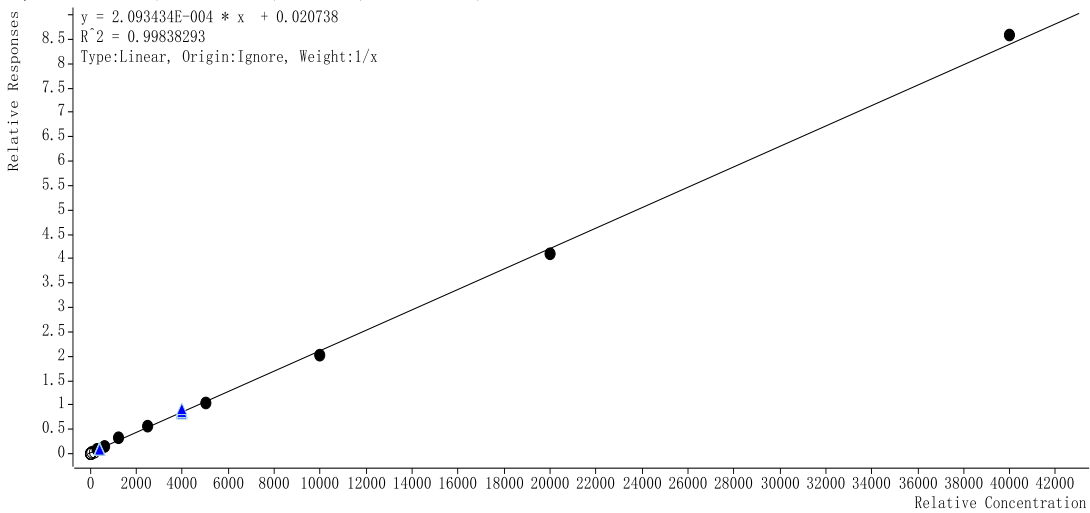
## Beta-Alanine

Beta-Alanine - 16 Levels, 7 Levels Used, 16 Points, 7 Points Used, 14 QCs



## Glycine

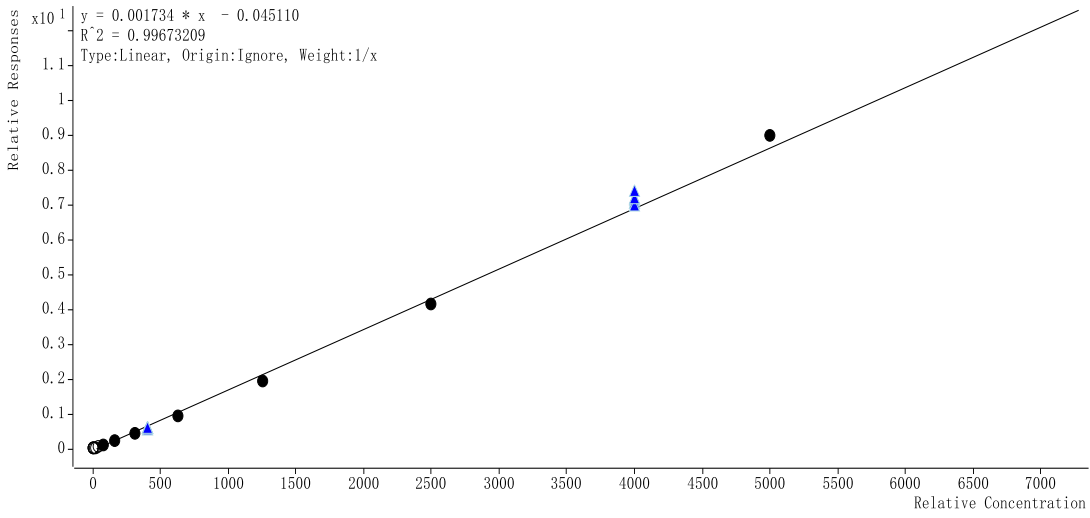
Glycine - 16 Levels, 8 Levels Used, 16 Points, 8 Points Used, 14 QCs





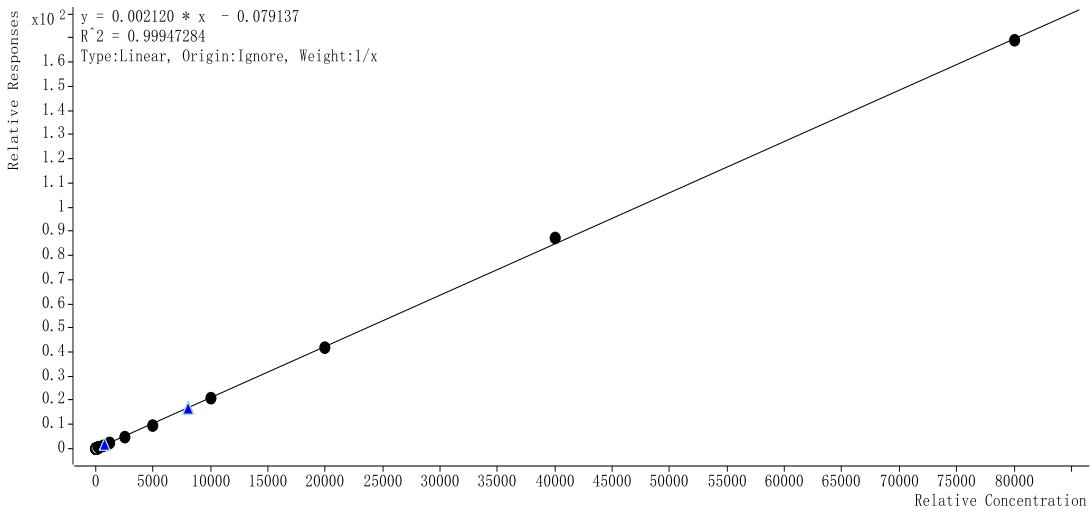
### 4-Hydroxyproline

4-Hydroxyproline - 16 Levels, 7 Levels Used, 16 Points, 7 Points Used, 14 QCs



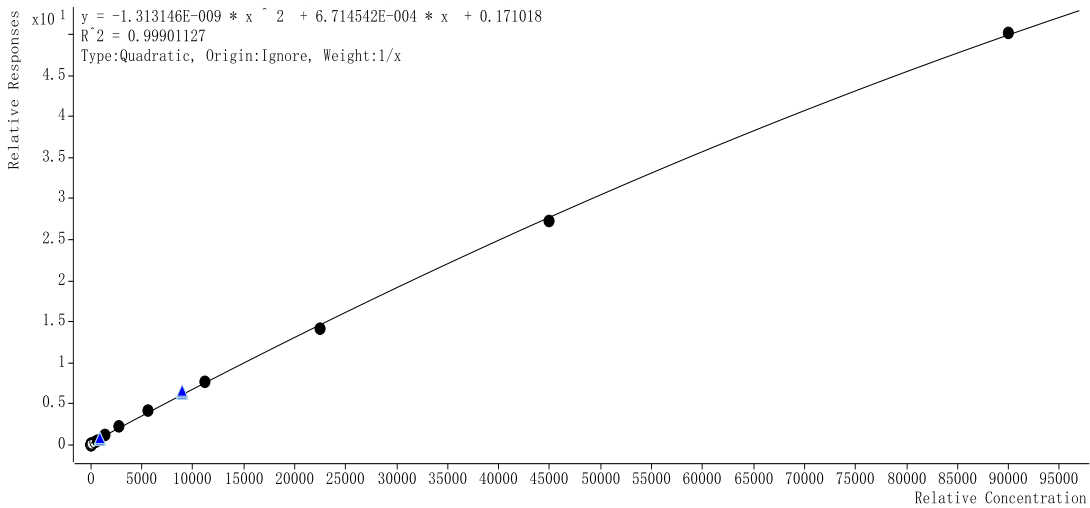
### L-Glutamic acid

L-Glutamic acid - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



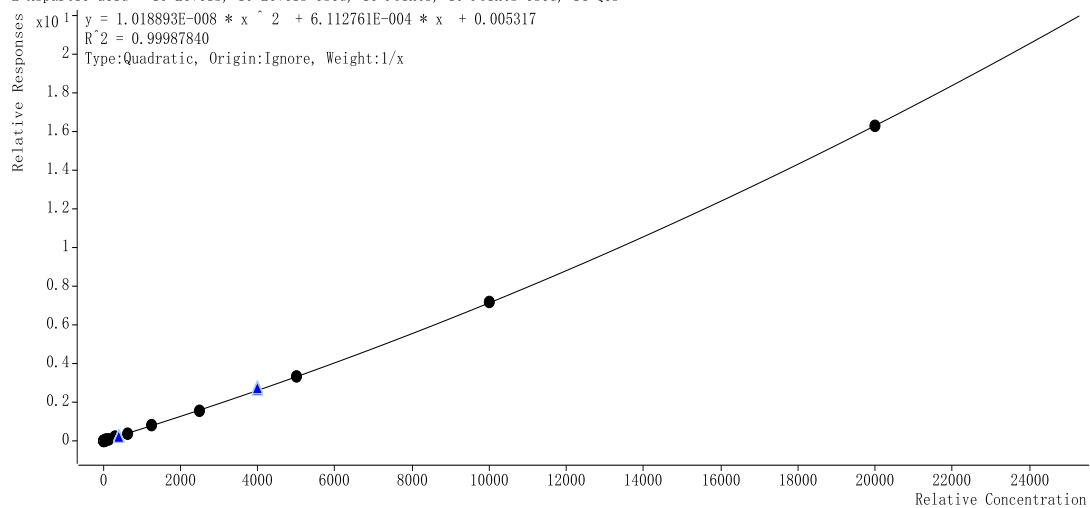
### L-Threonine

L-Threonine - 16 Levels, 8 Levels Used, 16 Points, 8 Points Used, 14 QCs



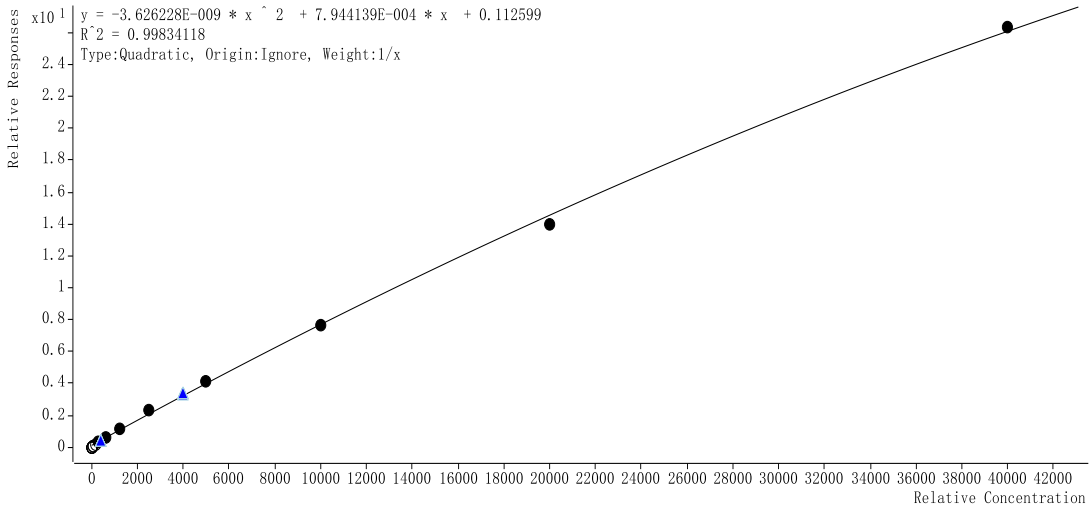
### L-Aspartic acid

L-Aspartic acid - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



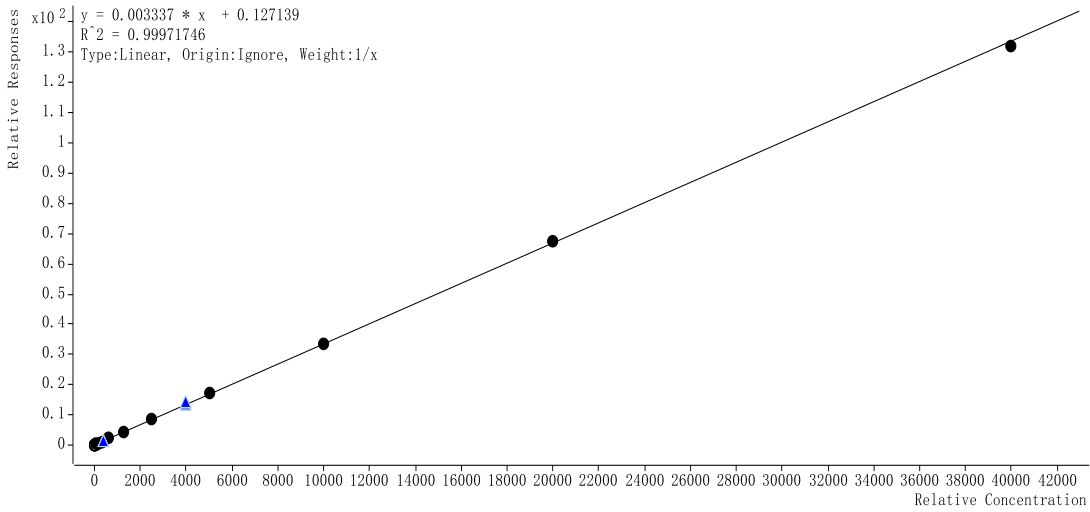
## L-Asparagine

L-Asparagine - 16 Levels, 8 Levels Used, 16 Points, 8 Points Used, 14 QCs



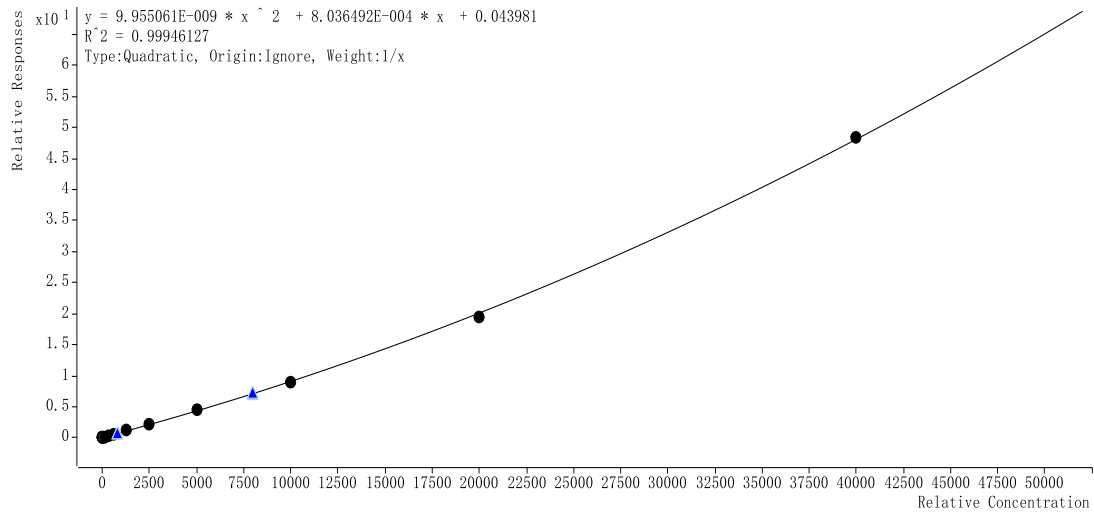
## L-Citrulline

L-Citrulline - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



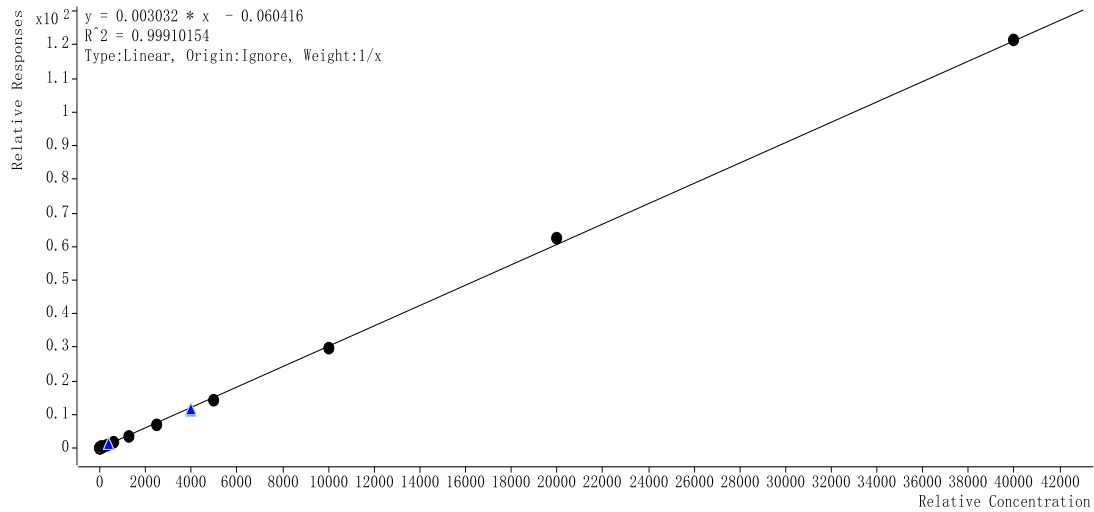
### 1-Methyl-L-histidine

1-Methyl-L-histidine - 16 Levels, 9 Levels Used, 16 Points, 9 Points Used, 14 QCs



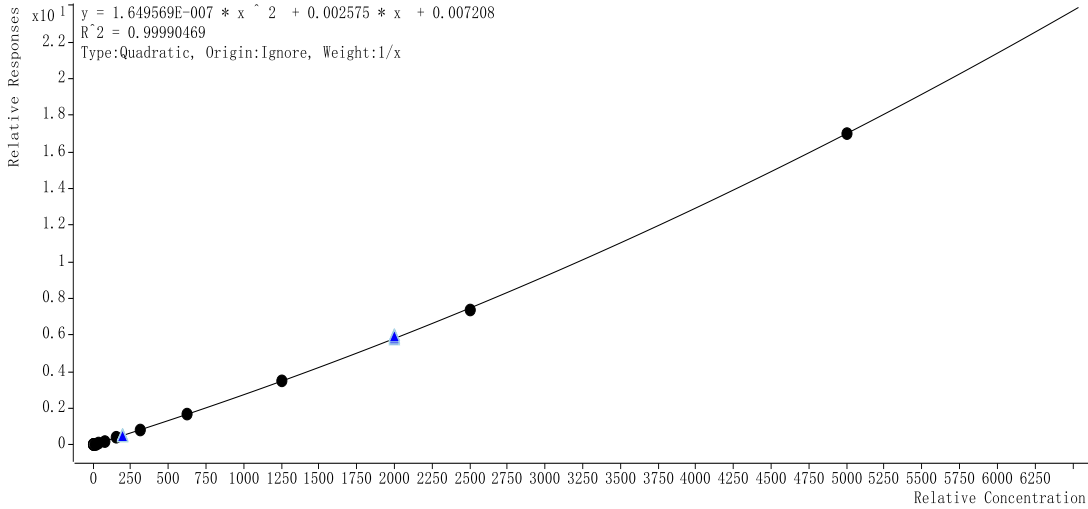
### L-Arginine

L-Arginine - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



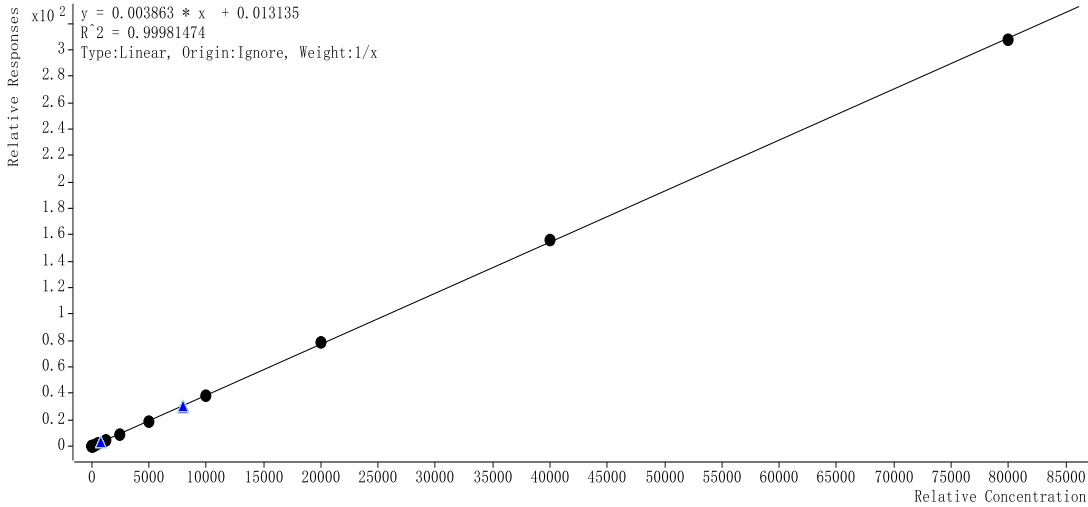
### 3-Methyl-L-histidine

3-Methyl-L-histidine - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



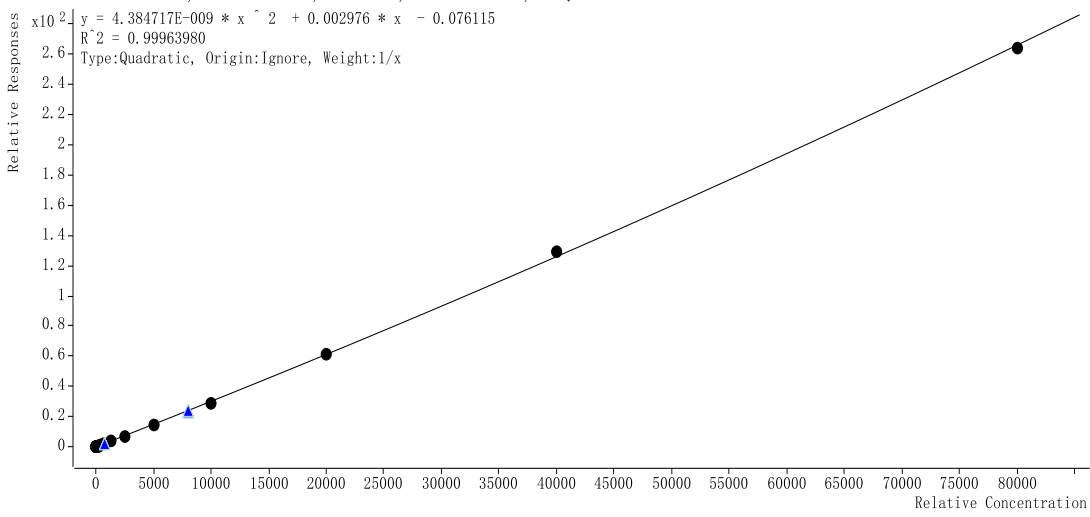
### L-Histidine

L-Histidine - 16 Levels, 14 Levels Used, 16 Points, 14 Points Used, 14 QCs



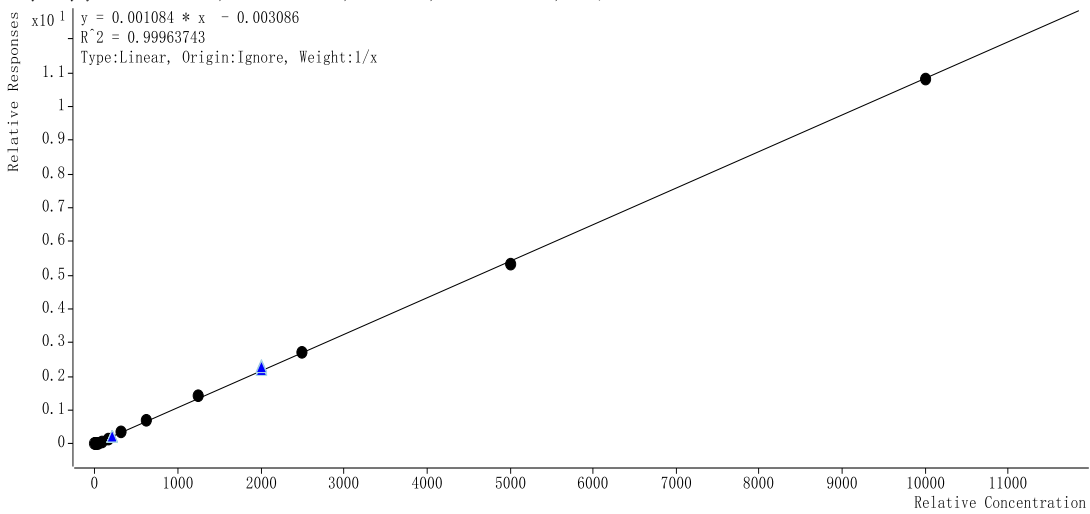
### L-Ornithine

L-Ornithine - 16 Levels, 11 Levels Used, 16 Points, 11 Points Used, 14 QCs



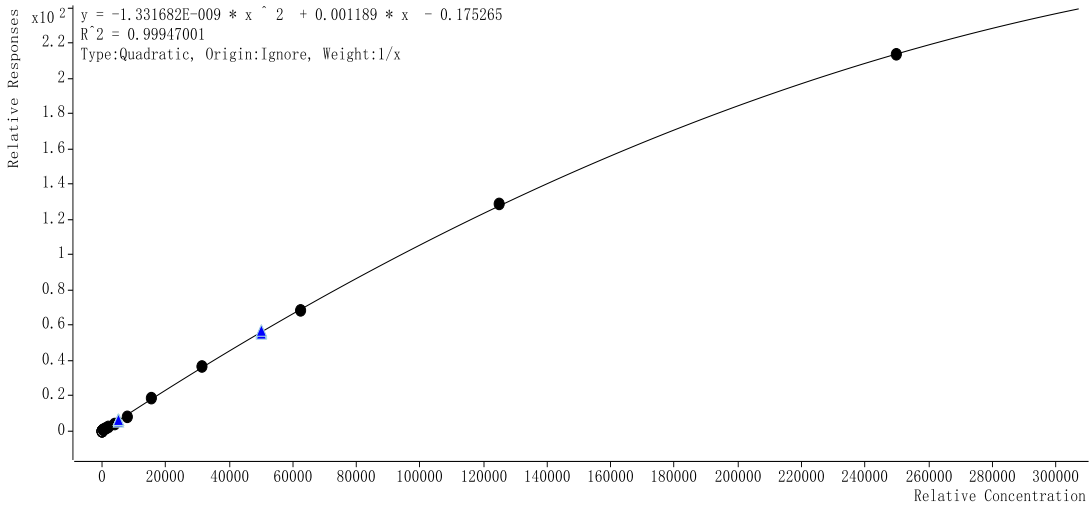
### 5-Hydroxylysine

5-Hydroxylysine - 16 Levels, 11 Levels Used, 16 Points, 11 Points Used, 14 QCs



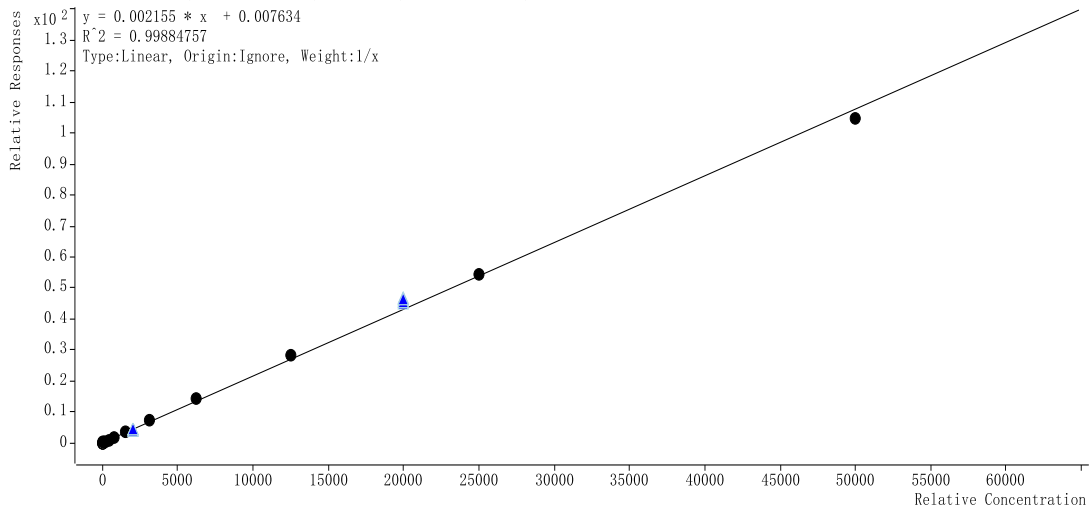
## L-Alanine

L-Alanine - 16 Levels, 10 Levels Used, 16 Points, 10 Points Used, 14 QCs



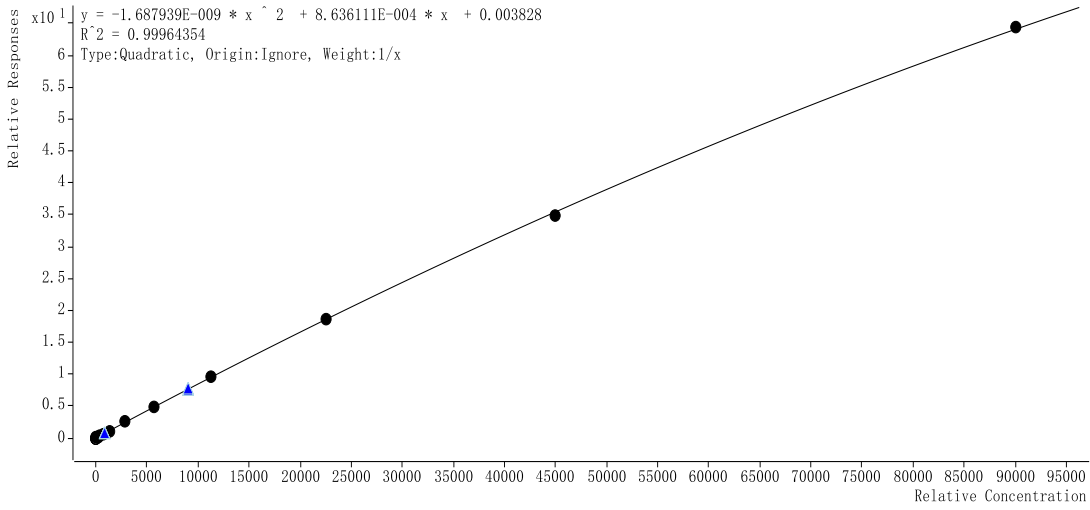
## L-Glutamine

L-Glutamine - 16 Levels, 11 Levels Used, 16 Points, 11 Points Used, 14 QCs



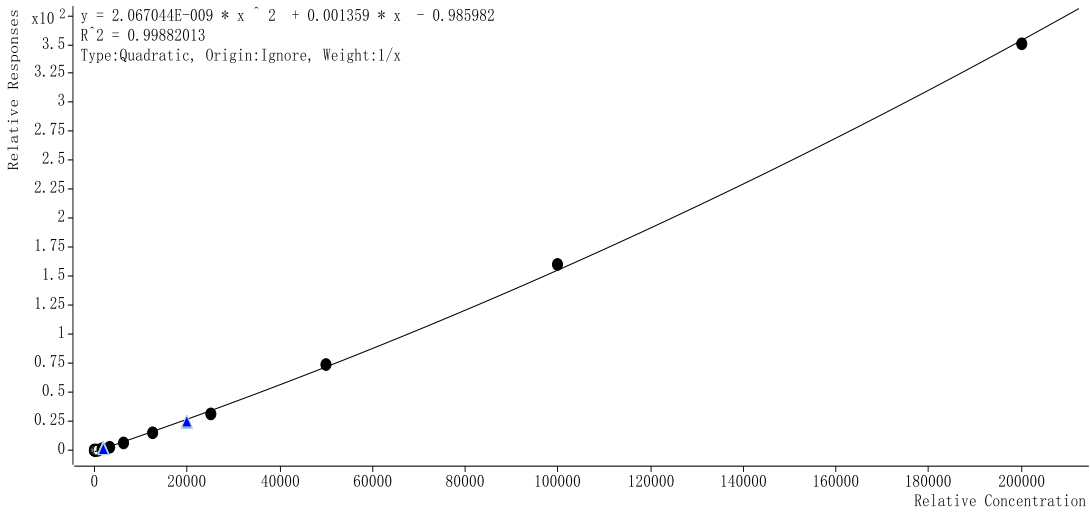
## L-Serine

L-Serine - 16 Levels, 12 Levels Used, 16 Points, 12 Points Used, 14 QCs



## L-Lysine

L-Lysine - 16 Levels, 8 Levels Used, 16 Points, 8 Points Used, 14 QCs





**Table S4. Recovery and RSD of UHPLC-MS-MS**

<b>Compound Name</b>	<b>Concentration (nmol/L)</b>	<b>Recovery</b>	<b>RSD</b>
L-Tryptophan	4000.00	95.2	1.4%
L-Phenylalanine	4000.00	102.1	2.0%
L-Valine	10000.00	106.2	1.0%
L-Methionine	4000.00	99.5	3.5%
4-Aminobutyric acid	2000.00	101.6	1.9%
L-Tyrosine	4000.00	103.6	1.4%
L-Proline	4000.00	95.9	2.2%
Beta-Alanine	4000.00	101.2	2.2%
Glycine	4000.00	101.9	3.5%
4-Hydroxyproline	4000.00	104.2	2.0%
L-Glutamic acid	8000.00	99.8	1.1%
L-Threonine	9000.00	105.3	2.1%
L-Aspartic acid	4000.00	105.4	1.4%
L-Asparagine	4000.00	105.3	1.6%
L-Citrulline	4000.00	103.9	2.5%
1-Methyl-L-histidine	8000.00	101.8	1.5%
L-Arginine	4000.00	95.2	1.9%
3-Methyl-L-histidine	2000.00	101.7	1.7%
L-Histidine	8000.00	98.6	1.7%
L-Ornithine	8000.00	98.5	1.7%
5-Hydroxylysine	2000.00	104.3	1.3%
L-Alanine	50000.00	100.7	0.6%
L-Glutamine	20000.00	106.1	1.2%
L-Serine	9000.00	100.0	1.4%
L-Lysine	20000.00	91.3	2.0%