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ナカライテスク株式会社

本　　社	604-0855	京都市中京区二条通烏丸西入東玉屋町498	TEL(075)211-2516
本社営業所	604-0855	京都市中京区二条通烏丸西入東玉屋町498	TEL(075)231-5301
京都1営業所	601-8204	京都市南区久世東土川町272	TEL(075)933-6492
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西日本センター	（上記営業所窓口）		
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COSMOSIL

HPLC
COSMOSIL Application Data
HILIC 2012

親水性相互作用クロマトグラフィーは比較的新しい分離機構であり、まだ使用例が多くありません。そこで弊社ではコスモシール HILIC カラムを身近に使っていただくために、分析例をご用意しました。分析したい化合物はもちろんのこと、類似化合物の分離条件の参考としてご利用ください。
新しい分析例は随時追加し Web で公開しております。“COSMOSIL アプリケーション ” で検索してください。

CONTENTS

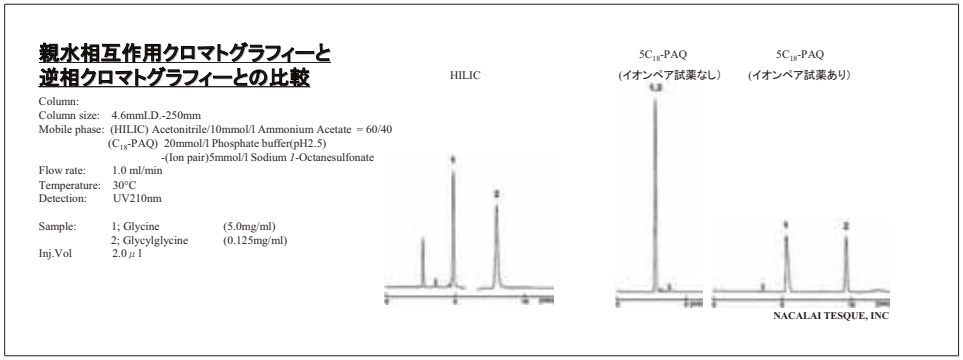
親水性相互作用クロマトグラフィーについて

親水性相互作用クロマトグラフィー（Hydrophilic Interaction Chromatography=HILIC）は、順相クロマトグラフィーの一種です。逆相クロマトグラフィーとは逆に、カラムに注入されたサンプルは、親水性の低い（疎水性の高い）化合物から溶出します。

分離モード	親水性相互作用クロマトグラフィー	逆相クロマトグラフィー
固定相	親水性基（もしくはシリカゲル）	C18 などの疎水性基
移動相	CH_3CN などの有機溶媒 / H_2O	
保持のメカニズム	親水性相互作用	疎水性相互作用
分離対象の化合物	親水性化合物	親水性 ~ 疎水性化合物
特長	・親水性化合物に最適 ・LC-MS に適する	・汎用性が高い ・高分離能 ・分析例（アプリケーション）が豊富

● 親水性相互作用クロマトグラフィーと逆相クロマトグラフィーの比較

C18 カラムで保持のない親水性化合物を分析する場合、イオンペア試薬を使用することが多いですが、コスモシール HILIC ではイオンペア試薬を使用せずに分離が可能となります。イオンペア試薬の問題点であるカラムの平衡に時間がかかる、カラムの劣化が早い、移動相の調製が手間であるなどが解決できます。
また、イオンペア試薬を使わず、揮発性の高い有機溶媒含量が高い移動相を使用することから LC-MS 分析にも適した分離機構です。



COSMOSIL

トリアゾール結合型 HPLC カラム

COSMOSIL HILIC

- 水素結合 + 陰イオン交換能
- C18 カラムで保持がない親水性化合物の分離に最適
- トリアゾール結合型

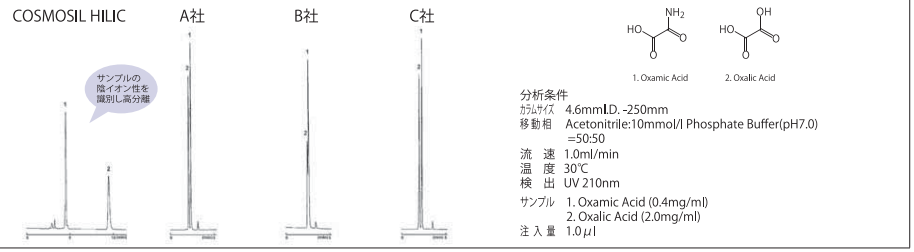
固定相構造の一部

トリアゾール

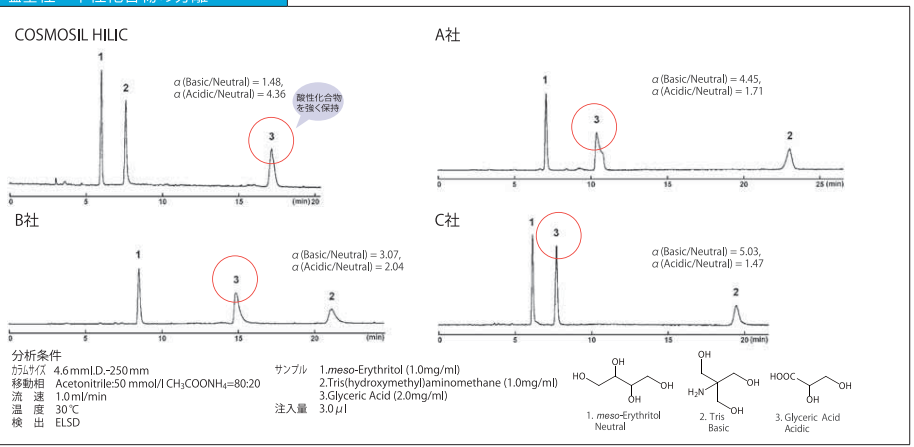
◆ 陰イオン交換能による分離（他社比較例）

コスモシール HILIC は陰イオン交換能を有するため、酸性化合物に対して保持が大きくなる傾向があります。この分離特性により他社 HILIC カラムとは異なる分離挙動を示します。

陰イオン性に差がある化合物の分離



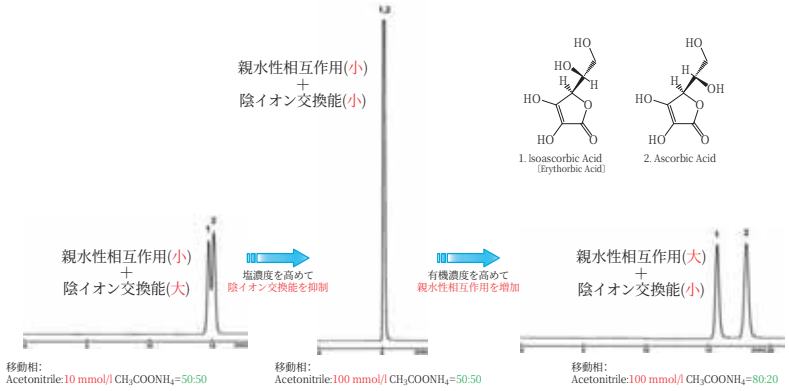
酸性・塩基性・中性化合物の分離



親水性相互作用による分離

コスモシール HILIC は固定相のトリアゾールの効果による親水性相互作用（水素結合による）と陰イオン交換能の２つの相互作用によって化合物を分離します。２つの相互作用は移動相によって使い分けることが出来ます。

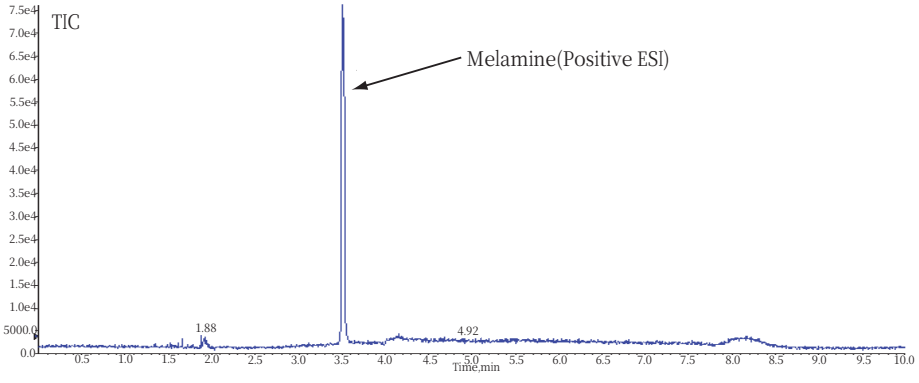
陰イオン性に差がない化合物の分離



分析条件
カラム　COSMOSIL HILIC 4.6mmI.D. -250mm
流　速 1.0ml/min
温　度 30℃
検　出 UV 245nm
サンプル　1. Isoascorbic Acid〔Erythorbic Acid〕(0.5mg/ml)
2. Ascorbic Acid (0.5mg/ml)
注入量　2.0μl

LC-MS を用いたメラミンの分析例

イオンペア試薬を含まない移動相条件で使用できますので、LC-MS にも適用可能です。

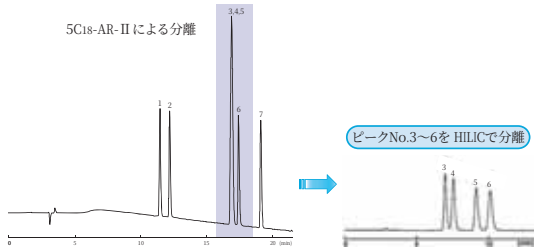


上記 LC-MS/MS データはお客様よりご提供いただきました。

応用例

C18 カラムと組み合わせてお使いいただくことにより分離の幅が広がります。

C18 との併用利用



分析条件
カラムサイズ 4.6mmI.D. -250mm
移動相 5C18-AR-Ⅱ A:10%Acetonitrile/0.1%TFA = 10/90
B:10%Acetonitrile/0.1%TFA = 30/70
B 0→100% 20min linear gradient
HILIC Acetonitrile/10mmol/l Phosphate Buffer(pH7)= 70/30
流　速 1.0ml/min
温　度 30℃
検　出 UV 220nm
サンプル 1.Angiotensin Ⅱ, (Sar1,Thr8) (0.5μg)
2.Angiotensin Ⅱ, (Sar1,Ala8) (0.5μg)
3.Angiotensin Ⅱ, Des-Asp1- (Ile8) (0.5μg)
4.Angiotensin Ⅱ, (Asn1,Val5) (0.5μg)
5.Angiotensin Ⅱ, (Sar1,Ile8) (0.5μg)
6.Angiotensin Ⅱ, (Val5) (0.5μg)
7.Angiotensin Ⅱ (Human)(0.5μg)

価格表

COSMOSIL HILIC Packed Column

サイズ 内径×長さ(mm)	製品番号	価格
1.0×150	07869-11	70,000
1.0×250	07870-71	82,000
2.0× 30	08568-21	45,000
2.0× 50	07052-91	45,000
2.0×100	08569-11	50,000
2.0×150	07054-71	60,000
2.0×250	07489-91	72,000
3.0×150	07871-61	50,000
3.0×250	07872-51	63,000

サイズ 内径×長さ(mm)	製品番号	価格
4.6×150	07056-51	50,000
4.6×150 3ロットセット	09385-23	150,000
4.6×250	07057-41	63,000
10×250	07059-21	150,000
20×250	07060-81	350,000
28×250	07875-21	ご照会

COSMOSIL HILIC Guard Column

サイズ 内径×長さ(mm)	製品番号	価格
2.0×10	07569-41	45,000
4.6×10	07055-61	25,000
10×20	07058-31	53,000
20×20	07854-91	115,000
20×50	07873-41	145,000
28×50	07874-31	ご照会

各種カラムサイズを揃えていますので、詳しくはご照会ください。

移動相の選択について

コスモシール HILIC カラムは、親水性相互作用（おもに水素結合による）と陰イオン交換能によって、保持と分離を行います。下記をご覧いただき、適切な移動相条件を選択ください。

（1）有機溶媒の種類と濃度の効果

・一般には、アセトニトリル／水系の移動相を使用します。
・アセトニトリル濃度を高くすると保持は大きくなり、低くすると保持は小さくなります。（図 1）
・アセトニトリル濃度は 0 ～ 95%（通常 50 ～ 95%）の範囲でご使用ください。
・メタノール／水系は保持が小さくなります。（図 2）
・有機溶媒および水は必ず高速液体クロマトグラフ用をご使用ください。

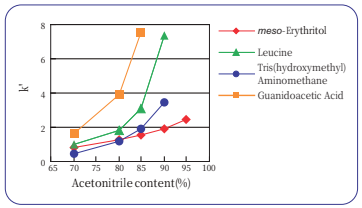


図 1. アセトニトリル濃度と保持との関係

Column; COSMOSIL HILIC
Mobile phase; Acetonitrile/ 10mmol/l CH_3COONH_4

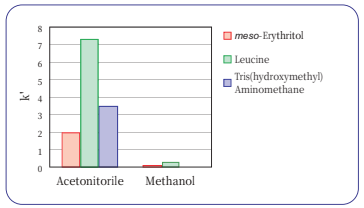


図 2. アセトニトリルとメタノールの保持力の違い

Column; COSMOSIL HILIC
Mobile phase; Organic solvent/ 10mmol/l CH_3COONH_4 = 90/10

（2）pH の効果

・移動相の pH は 2 ～ 7.5 の範囲でご使用ください。
・中性付近の pH で使用すると保持は大きくなります。（図 3）

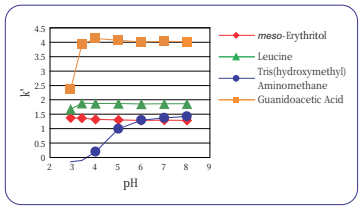


図 3. pH と保持との関係

Column; COSMOSIL HILIC
Mobile phase; Acetonitrile / 10mmol/l buffer = 90/10

（3）緩衝液の種類と濃度の効果

・解離性の試料を分析する場合には、移動相に塩や緩衝液を添加する必要があります。
・HILIC では高濃度のアセトニトリルを移動相としますが、アセトニトリルは塩に対する溶解性が低いので注意が必要です。
　逆相クロマトグラフィーで汎用されるりん酸塩は溶解性が低いために HILIC で使用される場合は注意してください。
　もし、使用される場合には、アセトニトリル濃度を 70% 以下にしてください。また、ご使用前に移動相に塩が析出していないか、必ず確認してください。
・緩衝液の種類としては、高濃度のアセトニトリル中でも溶解性の高い、酢酸アンモニウムやぎ酸アンモニウムを推奨します。
・緩衝液の濃度は、5 ～ 100mmol/l の範囲でご使用ください。また、アセトニトリルと混合後、塩の析出がないか確認してください。
・塩濃度を高くすると、イオン交換能が抑制され、保持が小さくなります。（図 4）
・移動相に緩衝液を使用する場合には、使用前に必ず 0.45 μ m 以下のフィルターでろ過してください。

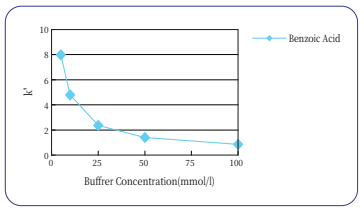


図 4. 塩濃度と保持との関係

Column; COSMOSIL HILIC
Mobile phase; Acetonitrile / CH_3COONH_4 = 50/50

（4）移動相選択フロー

ここでは、化合物の特性から、第一選択の移動相を提示致します。保持時間の増減は主にアセトニトリル濃度で調整してください。

・中性化合物 → Acetonitrile / Water = 90/10
・塩基性化合物 → Acetonitrile / 10mmol/l CH_3COONH_4 = 90/10
・両性化合物 → Acetonitrile / 10mmol/l CH_3COONH_4 = 70/30
・酸性化合物 → Acetonitrile / 10mmol/l CH_3COONH_4 = 50/50
↓溶出しない場合
Acetonitrile / 10mmol/l Phosphate Buffer(pH7.0)= 50/50

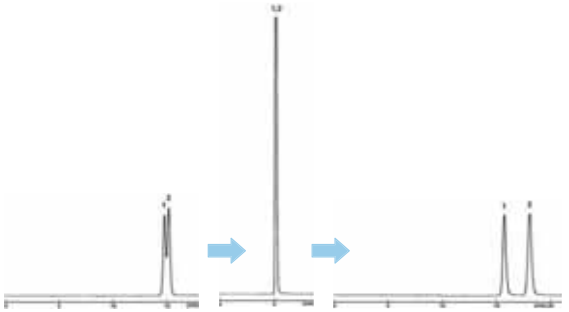
（5）分離機能の使い分け

コスモシール HILIC カラムは、２つの分離機能（親水性相互作用と陰イオン交換）によって、保持と分離を行います。移動相を選択することにより、分離機能を使い分けることができます。
陰イオン交換能は塩濃度によって調整できます。塩濃度を上げることにより陰イオン交換能を抑制することが可能です。一方、親水性相互作用は、アセトニトリル濃度によって調整できます。アセトニトリル濃度を上げることにより親水性相互作用を強めることができます。
下図では、酸性化合物であるアスコルビン酸とイソアスコルビン酸の分離について示しています。（4）の項で推奨している移動相（Acetonitrile / 10mmol/l CH_3COONH_4 = 50/50）では、陰イオン交換能が強く働き保持が生じていますが、２つの化合物間での陰イオン性の差が少ないため、分離が不十分です。そのため、塩濃度を高めて陰イオン交換能を抑え、さらに親水性相互作用を強めるためにアセトニトリル濃度を上げました。その結果、親水性相互作用によって十分な分離が達成できました。

親水性相互作用による分離

50%Acetonitrile/ 10mM CH3COONH4 → 50%Acetonitrile/ 100mM CH3COONH4 → 80%Acetonitrile/ 100mM CH3COONH4

塩濃度を高めて陰イオン交換能を抑制



Column	COSMOSIL HILIC
Column size	4.6mmI.D.-250mm
Flow rate	1.0ml/min
Temperature	30℃
Detection	UV245nm
Sample	1; Isoascorbic Acid (0.5mg/ml)
	2; Ascorbic Acid (0.5mg/ml)
Inj.Vol	2.0 μ l

（6）テーリング時の対処法

ピークがテーリングする場合には、下記の移動相を試してください。ピーク形状が改善する場合があります。

・移動相に 5mmol/l の EDTA を添加する。
・くえん酸緩衝液にする。〔例 10mmol/l Citrate buffer(pH7.0)〕

下記では 5mmol/l EDTA を添加した例を示します。

80%Acetonitrile/ 10mM CH3COONH4 → 80%Acetonitrile/ 10mM CH3COONH4+5mmol/l EDTA

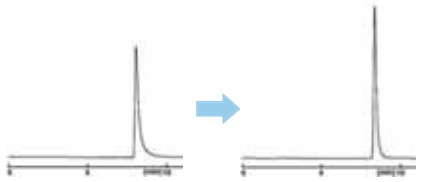


図 5. ピーク形状の改善

Column	COSMOSIL HILIC(4.6mmI.D.-250mm)
Flow rate	1.0ml/min
Temperature	30℃
Detection	UV254nm
Sample	Tryptophan(1ng)

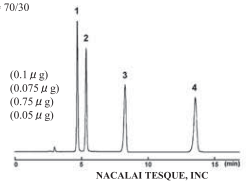
（7）カラムの洗浄

ベースラインが乱れる場合には、50% アセトニトリルを約 30 分間送液して洗浄してください。

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium Acetate = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV225nm

Sample:
1; Melamine (0.1 μg)
2; Ammeline (0.075 μg)
3; Cyanuric Acid (0.75 μg)
4; Ammelide (0.05 μg)

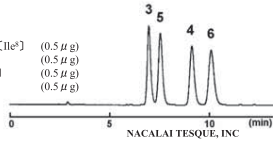


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7.0) = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220nm

Sample:
3; Angiotensin II, Des-Asp1-[Ile8] (0.5 μg)
4; Angiotensin II, [Sar1,Ile8] (0.5 μg)
5; Angiotensin II, [Asn1,Val5] (0.5 μg)
6; Angiotensin II, [Val5] (0.5 μg)

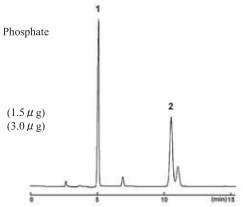


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7.0) = 50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample:
1; Ascorbic Acid (1.5 μg)
2; Malic Acid (3.0 μg)

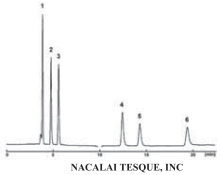


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 100mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220nm

Sample:
1; Nicotinamide (0.125 μg)
2; Pyridoxine(Vitamin B_6) (0.25 μg)
3; Riboflavin (Vitamin B_2) (0.25 μg)
4; Nicotinic Acid (0.125 μg)
5; *D*-Pantothenic Acid (3.125 μg)
6; *L(+)*-Ascorbic Acid (0.875 μg)

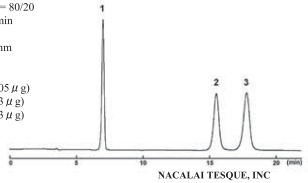


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 100mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254nm

Sample:
1; Sorbic Acid (0.05 μg)
2; Isoascorbic Acid (0.3 μg)
3; Ascorbic Acid (0.3 μg)

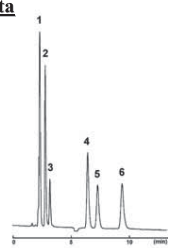


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 2.0mmI.D.-150mm
Mobile phase: Acetonitrile/ 100mmol/l Ammonium Acetate = 80/20
Flow rate: 0.2 ml/min
Temperature: 30°C
Detection: UV220nm

Sample:
1; Nicotinamide (0.125 μg)
2; Pyridoxine(Vitamin B_6) (0.25 μg)
3; Riboflavin (Vitamin B_2) (0.25 μg)
4; Nicotinic Acid (0.125 μg)
5; *D*-Pantothenic Acid (3.125 μg)
6; *L(+)*-Ascorbic Acid (0.875 μg)

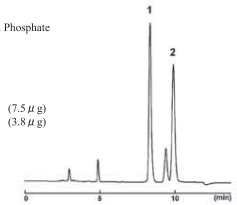


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample:
1; *L*-Citrulline (7.5 μg)
2; Malic Acid (3.8 μg)

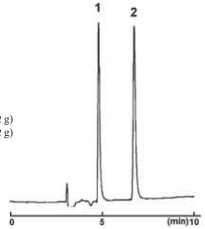


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: 1; Diethylene Glycol (20 μg)
2; Glycerol (20 μg)

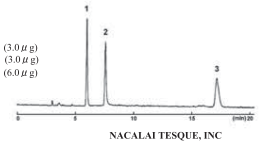


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD

Sample:
1; *meso*-Erythritol (3.0 μg)
2; Tris(hydroxymethyl)aminomethane (3.0 μg)
3; Glyceric Acid (6.0 μg)

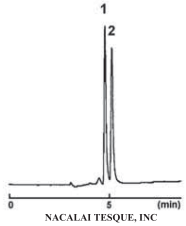


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: 1; Trimethylene Glycol (20 μg)
2; Ethylene Glycol (20 μg)

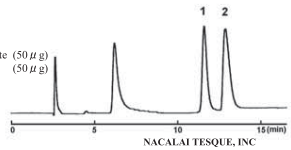


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; *D*-Fructose-*6*-phosphate (50 μg)
2; *D*-Glucose-*6*-phosphate (50 μg)

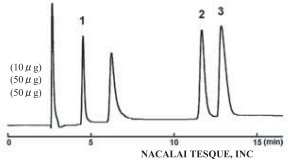


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample:
1; Glucose (10 μg)
2; α-D-Glucose-*1*-phosphate (50 μg)
3; D-Glucose-*6*-phosphate (50 μg)

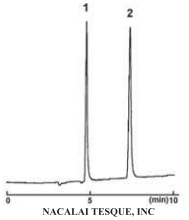


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: 1; Trimethylene Glycol (20 μg)
2; Glycerol (20 μg)

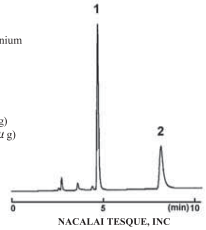


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium Acetate = 60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample: 1; Glycine (10 μg)
2; Glycylglycine (0.25 μg)

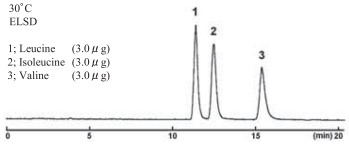


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium Acetate = 85/15
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD

Sample:
1; Leucine (3.0 μg)
2; Isoleucine (3.0 μg)
3; Valine (3.0 μg)

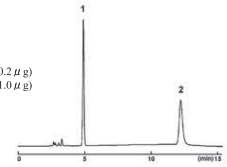


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7.0) = 50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample:
1; Oxamic Acid (0.2 μg)
2; Oxalic Acid (1.0 μg)

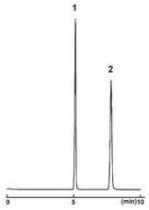


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile / H_2O = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254nm

Sample: 1; Uracil (0.1 μg)
2; Uridine (0.2 μg)

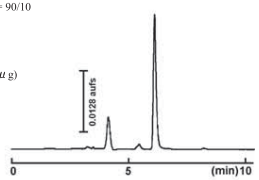


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/H_2O = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample: Urea (20 μg)

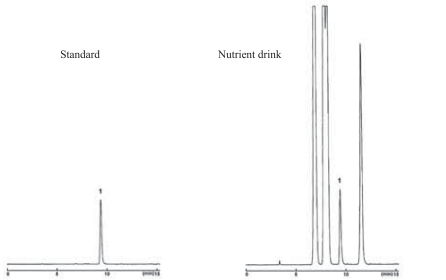


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD

Sample: 1; Taurine Standard (10mg/ml)
Injection Vol. 0.5 μl



NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium Acetate = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220nm

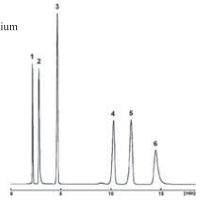
Sample: 1; 4-Methylimidazole (0.25mg/ml)
2; 2-Methylimidazole (0.25mg/ml)
Inj.Vol.: 1.0μl

NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-150mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium Acetate = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220nm

Sample: 1; Caffeine (0.075mg/ml)
2; Quinine (0.075mg/ml)
3; Saccharin (0.15mg/ml)
4; Sorbic Acid (0.15mg/ml)
5; Benzoic Acid (0.15mg/ml)
6; Aspartame (0.75mg/ml)
Inj.Vol.: 1.0μl

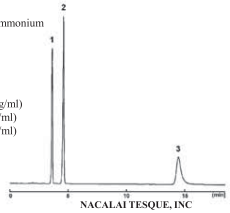


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-150mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium Acetate = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220nm

Sample: 1; Acesulfame (0.075mg/ml)
2; Saccharin (0.15mg/ml)
3; Aspartame (0.75mg/ml)
Inj.Vol.: 1.0μl

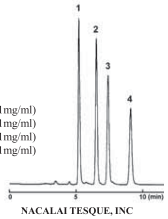


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV249nm

Sample: 1; Creatinine (0.01mg/ml)
2; 2'-Deoxyguanosine (0.01mg/ml)
3; 8-Hydroxy-2'-Deoxyguanosine (0.01mg/ml)
4; 8-Hydroxy Guanosine (0.01mg/ml)
Inj.Vol.: 5.0μl

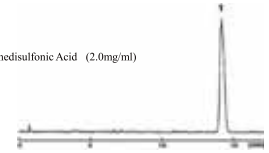


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 200mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD

Sample: 1; 1,5-Naphthalenedisulfonic Acid (2.0mg/ml)
Test solution H_2O
Inj.Vol.: 3.0μl

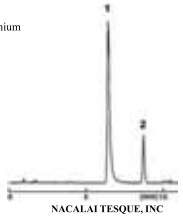


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 200mmol/l Ammonium Acetate = 80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD

Sample: Choline Chloride (2.0mg/ml)
Test solution H_2O
Inj.Vol.: 2.0μl

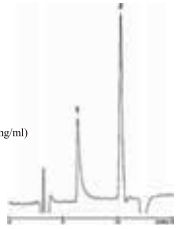


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(p7.0) = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI

Sample: Choline Hydrogen Tartrate (20.0mg/ml)
1; Choline
2; Tartrate
Test solution Mobile phase
Inj.Vol.: 2.0μl

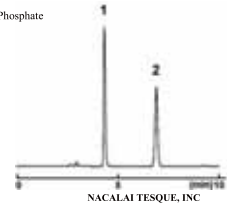


NACALAI TESQUE, INC

COSMOSIL Application Data

Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7.0) = 70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210nm

Sample: 1; Allantoin
2; Allantoic Acid



NACALAI TESQUE, INC

COSMOSIL Application（http://www.nacalai.co.jp/cosmosil/data/csmosrchtop.cfm）

■分析例：業界最大級の7000 件以上

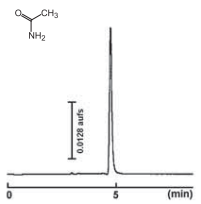
分析したい化合物の分析は、どのカラム・どんな分析条件で行えばいいのか？と迷った際、豊富な分析例の中から的確なカラム・分析条件を見つけることができます。“COMOSIL アプリケーション”で検索してください。

■簡単検索

サンプル名は、もちろん、分析対象のカテゴリー、カラム名、CAS 番号、粒子径で検索が可能です。化合物のいろいろな情報からお探しの分析例を簡単に見つけることができます。

COSMOSIL Chromatogram Index

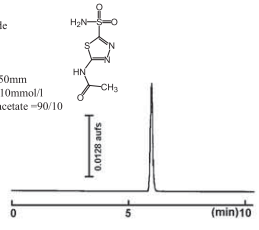
Sample: Acetamide
CAS No.: [60-35-5]
Molecular formula: C_2H_5NO
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 4.75min
Capacity factor: 0.57



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

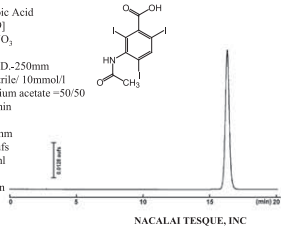
Sample: Acetazolamide
CAS No.: [59-66-5]
Molecular formula: $C_4H_6N_4O_3S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 0.5µl
Retention time: 5.99min
Capacity factor: 1.05



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

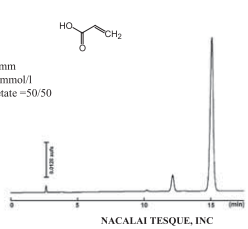
Sample: Acetrizoic Acid
CAS No.: [85-36-9]
Molecular formula: $C_9H_6I_2NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.8mg/ml
Injection volume: 1.0µl
Retention time: 16.39min
Capacity factor: 4.76



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

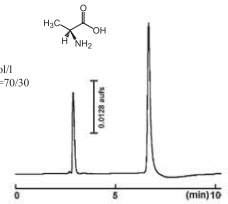
Sample: Acrylic Acid
CAS No.: [79-10-7]
Molecular formula: $C_3H_4O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 15.05min
Capacity factor: 4.28



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

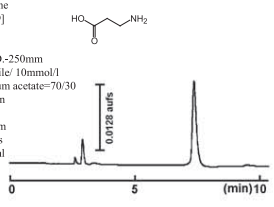
Sample: *L*-α-Alanine
CAS No.: [56-41-7]
Molecular formula: $C_3H_7NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 2.0µl
Retention time: 6.67min
Capacity factor: 1.53



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

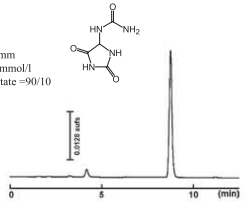
Sample: β- Alanine
CAS No.: [107-95-9]
Molecular formula: $C_3H_7NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 7.38min
Capacity factor: 1.81



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

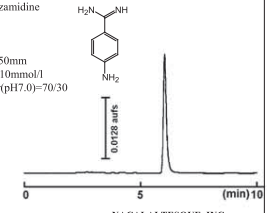
Sample: Allantoin
CAS No.: [97-59-6]
Molecular formula: $C_4H_6N_4O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 8.75min
Capacity factor: 2.02



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

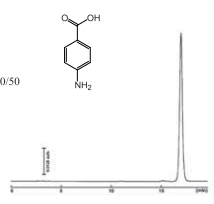
Sample: *p*-Aminobenzamidine
CAS No.: [3858-83-1]
Molecular formula: $C_7H_9N_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 6.07min
Capacity factor: 1.31



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

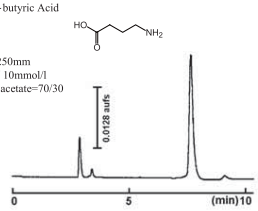
Sample: *p*-Aminobenzoic Acid
CAS No.: [150-13-0]
Molecular formula: $C_7H_7NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.4mg/ml
Injection volume: 1.0µl
Retention time: 16.97min
Capacity factor: 4.91



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

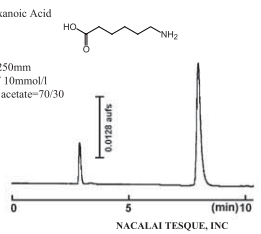
Sample: *4*-Amino-*n*-butyric Acid
CAS No.: [56-12-2]
Molecular formula: $C_4H_9NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 7.67min
Capacity factor: 1.92



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

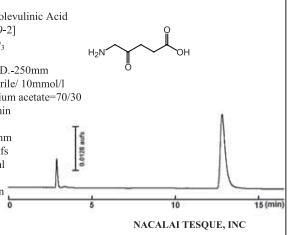
Sample: *6*-Aminohexanoic Acid
CAS No.: [60-32-2]
Molecular formula: $C_6H_{13}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 7.98min
Capacity factor: 2.03



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

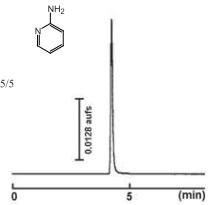
Sample: *5*-Aminolevulinic Acid
CAS No.: [5451-09-2]
Molecular formula: $C_5H_9NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 12.80min
Capacity factor: 3.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

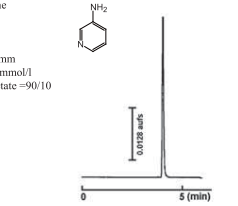
Sample: *2*-Aminopyridine
CAS No.: [504-29-0]
Molecular formula: $C_5H_6N_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 4.25min
Capacity factor: 0.39



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

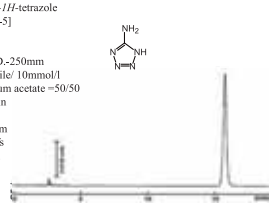
Sample: *3*-Aminopyridine
CAS No.: [462-08-8]
Molecular formula: $C_5H_6N_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 1.0µl
Retention time: 4.05min
Capacity factor: 0.51



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

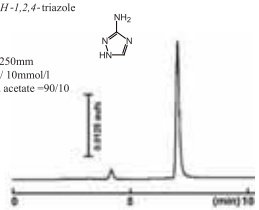
Sample: *5*-Amino-*1H*-tetrazole
CAS No.: [4418-61-5]
Molecular formula: CH_3N_5
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 15.76min
Capacity factor: 4.49



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

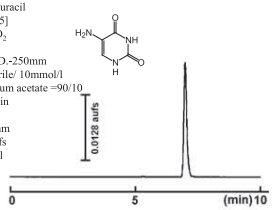
Sample: *3*-Amino-*1H*-*1,2,4*-triazole
CAS No.: [61-82-5]
Molecular formula: $C_2H_4N_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 1.0µl
Retention time: 7.01min
Capacity factor: 1.42



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

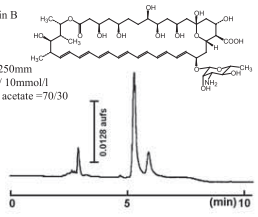
Sample: 5-Aminouracil
CAS No.: [932-52-5]
Molecular formula: $C_4H_5N_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 7.01min
Capacity factor: 1.42



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

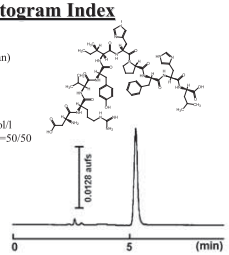
Sample: Amphotericin B
CAS No.: [1397-89-3]
Molecular formula: $C_{47}H_{73}NO_{17}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 0.25mg/ml
Injection volume: 0.5µl
Retention time: 5.34min
Capacity factor: 0.99



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

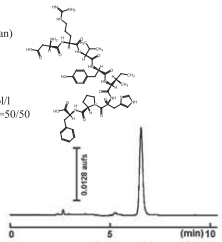
Sample: Angiotensin I(Human)
CAS No.: [484-42-4]
Molecular formula: $C_{62}H_{89}N_{17}O_{14}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.4mg/ml
Injection volume: 0.5µl
Retention time: 5.28min
Capacity factor: 0.84



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II(Human)
CAS No.: [4474-91-3]
Molecular formula: $C_{50}H_{71}N_{13}O_{12}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.4mg/ml
Injection volume: 0.5µl
Retention time: 6.56min
Capacity factor: 1.29

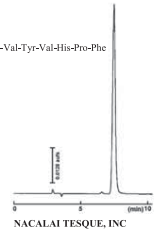


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II,[Asn^1,Val^5]
CAS No.: [53-73-6]
Molecular formula: $C_{49}H_{70}N_{14}O_{11}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 7.48min
Capacity factor: 1.85

Asn-Arg-Val-Tyr-Val-His-Pro-Phe

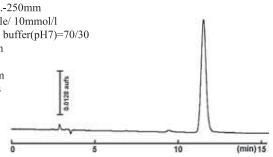


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II,[Sar^1,Ala^8]
CAS No.: [38027-95-1]
Molecular formula: $C_{43}H_{67}N_{13}O_{10}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 11.57min
Capacity factor: 3.41

Sar-Arg-Val-Tyr-Ile-His-Pro-Ala

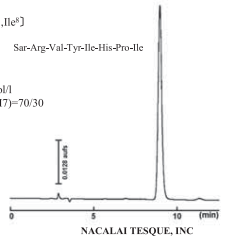


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II,[Sar^1,Ile^8]
CAS No.: [37827-06-8]
Molecular formula: $C_{46}H_{73}N_{13}O_{10}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 9.02min
Capacity factor: 2.44

Sar-Arg-Val-Tyr-Ile-His-Pro-Ile

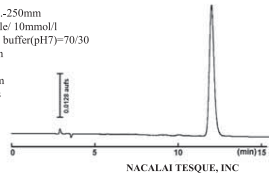


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II,[Sar^1,Thr^8]
CAS No.: [53632-49-8]
Molecular formula: $C_{44}H_{69}N_{13}O_{11}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 12.04min
Capacity factor: 3.59

Sar-Arg-Val-Tyr-Ile-His-Pro-Thr

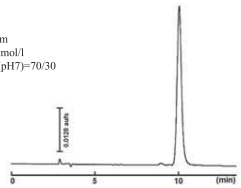


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II,[Val^5]
CAS No.: [58-49-1]
Molecular formula: $C_{49}H_{69}N_{13}O_{12}$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 10.08min
Capacity factor: 2.85

Asp-Arg-Val-Tyr-Val-His-Pro-Phe

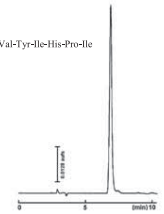


NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Angiotensin II, Des-Asp^1-[Ile^8]
CAS No.: [52498-25-6]
Molecular formula: $C_{43}H_{68}N_{12}O_9$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 6.89min
Capacity factor: 1.63

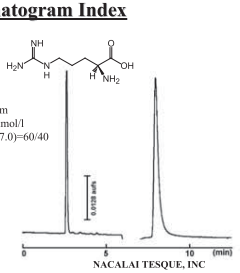
Arg-Val-Tyr-Ile-His-Pro-Ile



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

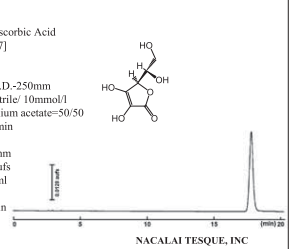
Sample: *L*-Arginine
CAS No.: [74-79-3]
Molecular formula: $C_6H_{14}N_4O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 7.97min
Capacity factor: 1.95



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

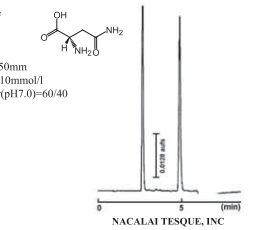
Sample: *L(+)*-Ascorbic Acid
CAS No.: [50-81-7]
Molecular formula: $C_6H_8O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV245nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 3.0µl
Retention time: 17.80min
Capacity factor: 5.31



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

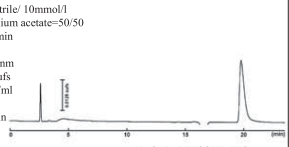
Sample: *L*-Asparagine
CAS No.: [70-47-3]
Molecular formula: $C_4H_8N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 4.88min
Capacity factor: 0.80



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

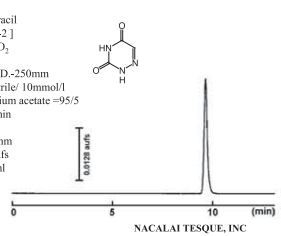
Sample: *L*-Aspartic Acid
CAS No.: [56-84-8]
Molecular formula: $C_4H_7NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 19.79min
Capacity factor: 6.01



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

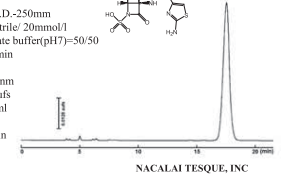
Sample: *6*-Azauracil
CAS No.: [461-89-2]
Molecular formula: $C_3H_3N_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.3mg/ml
Injection volume: 0.5µl
Retention time: 9.65min
Capacity factor: 2.19



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

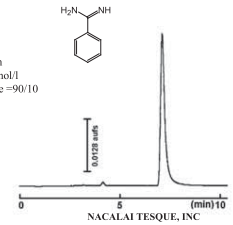
Sample: Aztreonam
CAS No.: [78110-38-0]
Molecular formula: $C_{13}H_{17}N_5O_8S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV280 nm
Attenuation: 0.128 aufs
Sample conc.: 2.5mg/ml
Injection volume: 1.0µl
Retention time: 17.57min
Capacity factor: 5.18



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

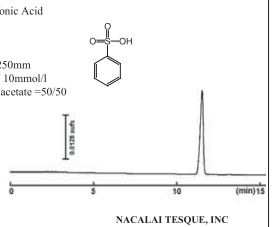
Sample: Benzamidine
CAS No.: [618-39-3]
Molecular formula: $C_7H_8N_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.5mg/ml
Injection volume: 0.5µl
Retention time: 7.16min
Capacity factor: 1.46



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

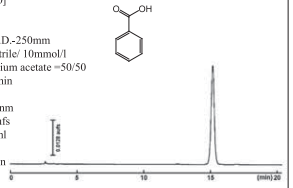
Sample: Benzenesulfonic Acid
CAS No.: [98-11-3]
Molecular formula: $C_6H_6O_3S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 11.54min
Capacity factor: 3.05



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

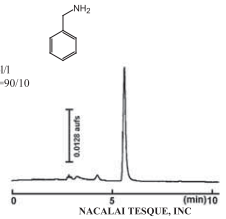
Sample: Benzoic Acid
CAS No.: [65-85-0]
Molecular formula: $C_7H_6O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 0.5µl
Retention time: 15.19min
Capacity factor: 4.29



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

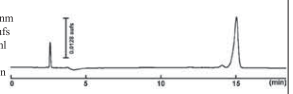
Sample: Benzylamine
CAS No.: [100-46-9]
Molecular formula: C_7H_9N
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 5.58min
Capacity factor: 0.95



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

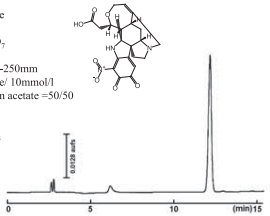
Sample: Bromoacetic Acid
CAS No.: [79-08-3]
Molecular formula: $C_2H_3BrO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 15.04min
Capacity factor: 4.31



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

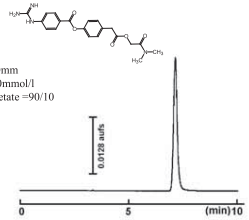
Sample: Cacotheline
CAS No.: [561-20-6]
Molecular formula: $C_{21}H_{21}N_5O_7$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 12.19min
Capacity factor: 3.23



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

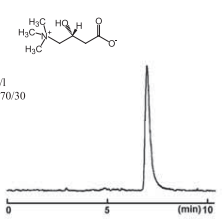
Sample: Camostat
CAS No.: [59721-28-7]
Molecular formula: $C_{20}H_{22}N_4O_5$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV265 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 7.16min
Capacity factor: 1.47



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

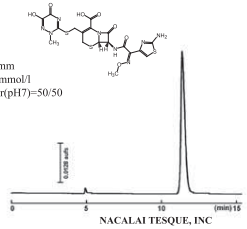
Sample: *L*-Carnitine
CAS No.: [541-15-1]
Molecular formula: $C_7H_{15}NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 2.0mg/ml
Injection volume: 1.5µl
Retention time: 6.96min
Capacity factor: 1.78



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

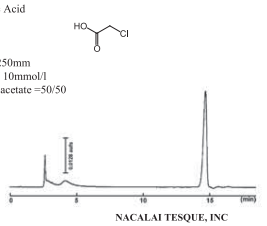
Sample: Ceftriaxone
CAS No.: [73384-59-5]
Molecular formula: $C_{18}H_{18}N_8O_7S_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 11.36min
Capacity factor: 3.05



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

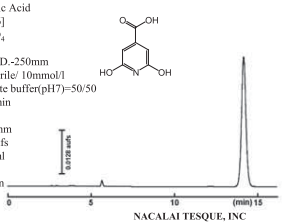
Sample: Chloroacetic Acid
CAS No.: [79-11-8]
Molecular formula: $C_2H_3ClO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 14.69min
Capacity factor: 4.15



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

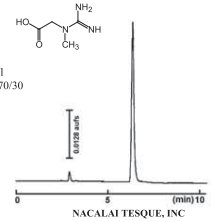
Sample: Citrazinic Acid
CAS No.: [99-11-6]
Molecular formula: $C_6H_5NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 14.16min
Capacity factor: 3.98



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

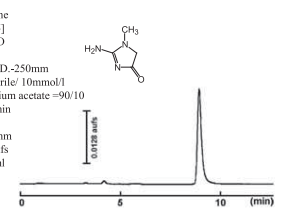
Sample: Creatine
CAS No.: [57-00-1]
Molecular formula: $C_4H_9N_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 6.35min
Capacity factor: 1.40



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

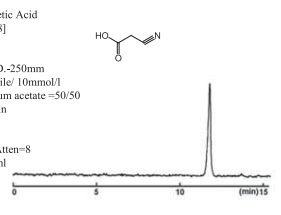
Sample: Creatinine
CAS No.: [60-27-5]
Molecular formula: $C_4H_7N_3O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 8.93min
Capacity factor: 2.08



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

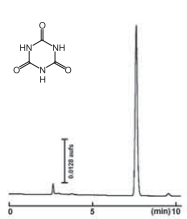
Sample: Cyanoacetic Acid
CAS No.: [372-09-8]
Molecular formula: $C_3H_3NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 11.78min
Capacity factor: 3.56



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

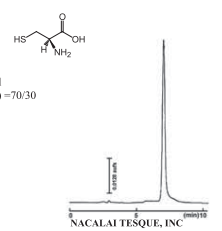
Sample: Cyanuric Acid
CAS No.: [108-80-5]
Molecular formula: $C_3H_3N_3O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 7.61min
Capacity factor: 1.68



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

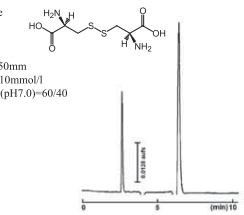
Sample: *L*-Cysteine
CAS No.: [52-90-4]
Molecular formula: $C_3H_7NO_2S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7) =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 2.0µl
Retention time: 7.05min
Capacity factor: 1.69



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

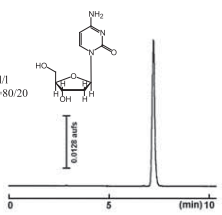
Sample: *L-(-)*-Cystine
CAS No.: [56-89-3]
Molecular formula: $C_6H_{12}N_2O_4S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 0.5µl
Retention time: 6.42min
Capacity factor: 1.38



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

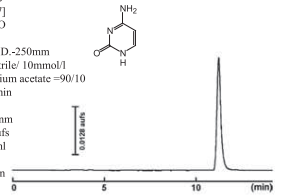
Sample: Cytidine
CAS No.: [65-46-3]
Molecular formula: $C_9H_{13}N_3O_5$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 7.22min
Capacity factor: 1.58



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

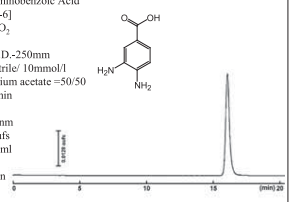
Sample: Cytosine
CAS No.: [71-30-7]
Molecular formula: $C_4H_5N_3O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 11.22min
Capacity factor: 2.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

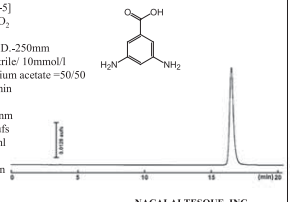
Sample: *3,4*-Diaminobenzoic Acid
CAS No.: [619-05-6]
Molecular formula: $C_7H_8N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 4.0µl
Retention time: 16.13min
Capacity factor: 4.62



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

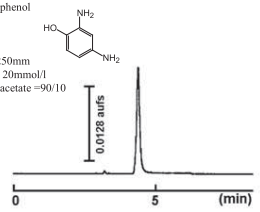
Sample: *3,5*-Diaminobenzoic Acid
CAS No.: [535-87-5]
Molecular formula: $C_7H_8N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 4.0µl
Retention time: 16.54min
Capacity factor: 4.76



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

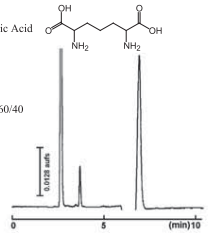
Sample: *2,4*-Diaminophenol
CAS No.: [95-86-3]
Molecular formula: $C_6H_8N_2O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 4.40min
Capacity factor: 0.51



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

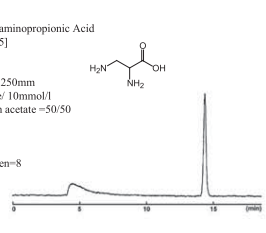
Sample: *DL-2,6*-Diaminopimelic Acid
CAS No.: [583-93-7]
Molecular formula: $C_7H_{14}N_2O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.5µl
Retention time: 6.93min
Capacity factor: 1.56



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

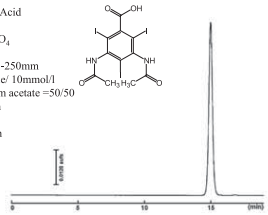
Sample: *DL-2,3*-Diaminopropionic Acid
CAS No.: [54897-59-5]
Molecular formula: $C_3H_8N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 5.0mg/ml
Injection volume: 2.0µl
Retention time: 14.38min
Capacity factor: 4.52



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

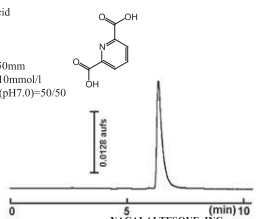
Sample: Diatrizoic Acid
CAS No.: [117-96-4]
Molecular formula: $C_{11}H_9I_3N_2O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.8mg/ml
Injection volume: 1.0µl
Retention time: 14.98min
Capacity factor: 4.26



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Dipicolinic acid
CAS No.: [499-83-2]
Molecular formula: $C_7H_5NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 6.37min
Capacity factor: 1.23



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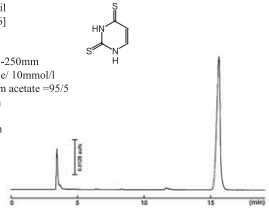
COSMOSIL Chromatogram Index

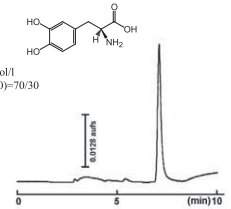
Sample: Dithiouracil
CAS No.: [2001-93-6]
Molecular formula: $C_4H_4N_2S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 1.5µl
Retention time: 15.60min
Capacity factor: 4.15



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

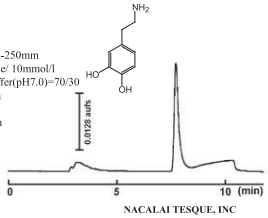
Sample: *L*-DOPA
CAS No.: [59-92-7]
Molecular formula: $C_9H_{11}NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 3.0mg/ml
Injection volume: 3.0µl
Retention time: 7.12min
Capacity factor: 1.72



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

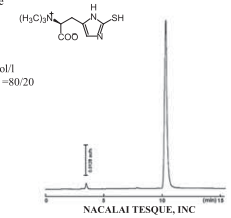
Sample: Dopamine
CAS No.: [51-61-6]
Molecular formula: $C_8H_{11}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 4.0µl
Retention time: 7.73min
Capacity factor: 1.96



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: *L-(+)*-Ergothioneine
CAS No.: [497-30-3]
Molecular formula: $C_9H_{15}N_3O_2S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 10.29min
Capacity factor: 2.79



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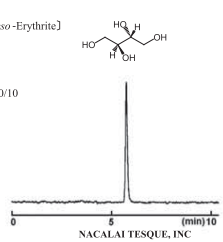
COSMOSIL Chromatogram Index

Sample: *meso*-Erythritol [*meso*-Erythrite]
CAS No.: [149-32-6]
Molecular formula: $C_4H_{10}O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 5.78min
Capacity factor: 1.18



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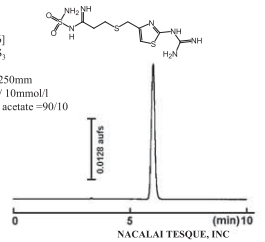
COSMOSIL Chromatogram Index

Sample: Famotidin
CAS No.: [76824-35-6]
Molecular formula: $C_8H_{15}N_7O_2S_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.25mg/ml
Injection volume: 2.0µl
Retention time: 5.99min
Capacity factor: 1.06



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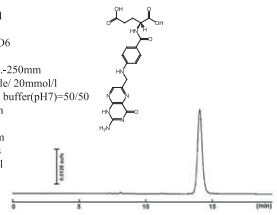
COSMOSIL Chromatogram Index

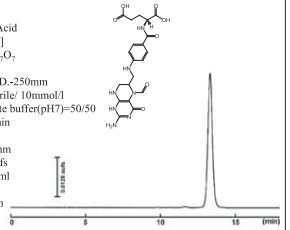
Sample: Folic Acid
CAS No.: [59-30-3]
Molecular formula: $C_{19}H_{19}N_7O6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.25mg/ml
Injection volume: 2.0µl
Retention time: 14.09min
Capacity factor: 3.95



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

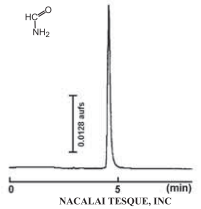
Sample: Folinic Acid
CAS No.: [58-05-9]
Molecular formula: $C_{20}H_{23}N_7O_7$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.25mg/ml
Injection volume: 2.0µl
Retention time: 13.36min
Capacity factor: 3.68



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

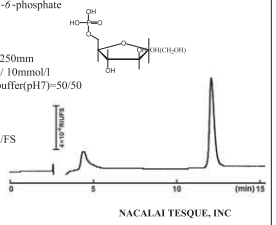
Sample: Formamide
CAS No.: [75-12-7]
Molecular formula: CH_3NO
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 4.58min
Capacity factor: 0.52



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

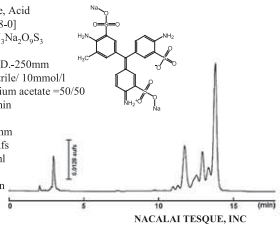
Sample: *D*-Fructose-6-phosphate
CAS No.: [643-13-0]
Molecular formula: $C_6H_{13}O_9P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI
Attenuation: 4 × 10^{-5}RIU/FS
Sample conc.: 10.0mg/ml
Injection volume: 5.0µl
Retention time: 12.16min
Capacity factor: 3.64



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

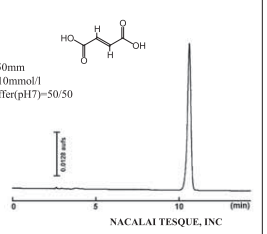
Sample: Fuchsine, Acid
CAS No.: [3244-88-0]
Molecular formula: $C_{20}H_{17}N_3Na_2O_9S_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.5µl
Retention time: 13.82min
Capacity factor: 3.85



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

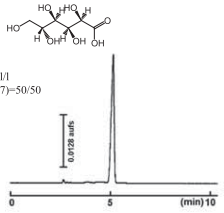
Sample: Fumaric Acid
CAS No.: [110-17-8]
Molecular formula: $C_4H_4O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 0.5µl
Retention time: 10.63min
Capacity factor: 2.75



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

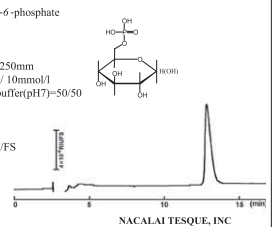
Sample: Gluconic Acid
CAS No.: [526-95-4]
Molecular formula: $C_6H_{12}O_7$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 5.15min
Capacity factor: 0.81



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

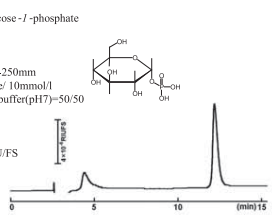
Sample: *D*-Glucose-6-phosphate
CAS No.: [56-73-5]
Molecular formula: $C_6H_{13}O_9P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI
Attenuation: 4 × 10^{-5}RIU/FS
Sample conc.: 10.0mg/ml
Injection volume: 5.0µl
Retention time: 12.95min
Capacity factor: 3.94



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

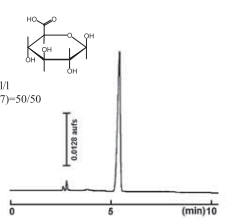
Sample: α-*D*-Glucose-1-phosphate
CAS No.: [59-56-3]
Molecular formula: $C_6H_{13}O_9P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI
Attenuation: 4 × 10^{-5}RIU/FS
Sample conc.: 10.0mg/ml
Injection volume: 5.0µl
Retention time: 12.26min
Capacity factor: 3.68



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

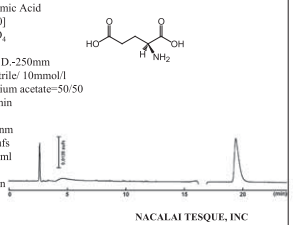
Sample: *D*-Glucuronic Acid
CAS No.: [6556-12-3]
Molecular formula: $C_6H_{10}O_7$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 5.45min
Capacity factor: 0.92



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

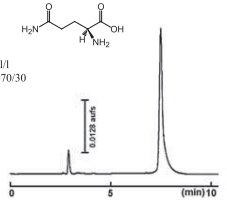
Sample: *L*-Glutamic Acid
CAS No.: [56-86-0]
Molecular formula: $C_5H_9NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 19.38min
Capacity factor: 5.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

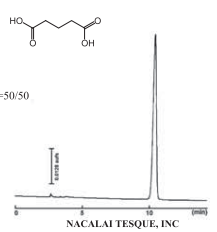
Sample: *L*-Glutamine
CAS No.: [56-85-9]
Molecular formula: $C_5H_{10}N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 7.50min
Capacity factor: 1.85



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

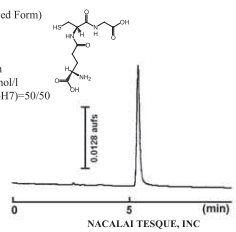
Sample: Glutaric Acid
CAS No.: [110-94-1]
Molecular formula: $C_5H_8O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 10.45min
Capacity factor: 2.68



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

Sample: Glutathione(Reduced Form)
CAS No.: [70-18-8]
Molecular formula: $C_{10}H_{17}N_3O_6S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 2.0µl
Retention time: 5.43min
Capacity factor: 0.89



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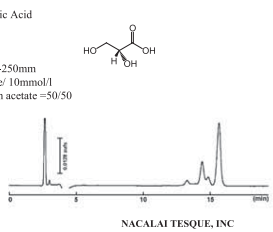
COSMOSIL Chromatogram Index

Sample: *DL*-Glyceric Acid
CAS No.: [600-19-1]
Molecular formula: $C_3H_6O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 6.0mg/ml
Injection volume: 5.0µl
Retention time: 15.68min
Capacity factor: 4.50



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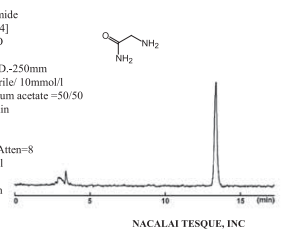
COSMOSIL Chromatogram Index

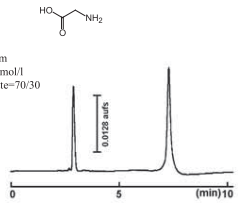
Sample: Glycinamide
CAS No.: [598-41-4]
Molecular formula: $C_2H_6N_2O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 1.0mg/ml
Injection volume: 3.0µl
Retention time: 13.35min
Capacity factor: 3.64



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

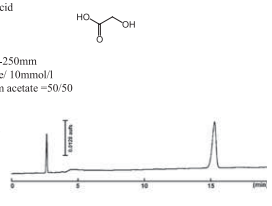
Sample: Glycine
CAS No.: [56-40-6]
Molecular formula: $C_2H_5NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 2.0µl
Retention time: 7.29min
Capacity factor: 1.77



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

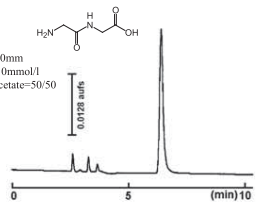
Sample: Glycolic Acid
CAS No.: [79-14-1]
Molecular formula: $C_2H_4O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 15.28min
Capacity factor: 4.39



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

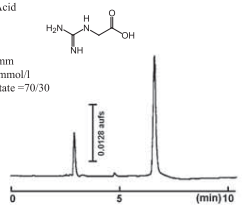
Sample: Glycylglycine
CAS No.: [556-50-3]
Molecular formula: $C_4H_8N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 6.40min
Capacity factor: 1.27



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

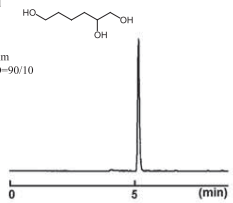
Sample: Guanidoacetic Acid
CAS No.: [352-97-6]
Molecular formula: $C_3H_7N_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 6.61min
Capacity factor: 1.51



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

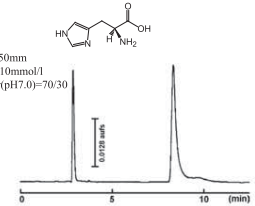
Sample: *1,2,6*-Hexanetriol
CAS No.: [106-69-4]
Molecular formula: $C_6H_{14}O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 1.0mg/ml
Injection volume: 2.0µl
Retention time: 5.19min
Capacity factor: 0.80



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

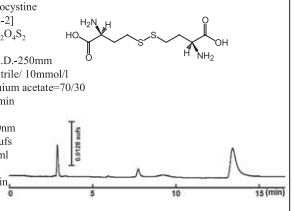
Sample: *L*-Histidine
CAS No.: [71-00-1]
Molecular formula: $C_6H_9N_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.50mg/ml
Injection volume: 1.0µl
Retention time: 8.38min
Capacity factor: 2.19



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

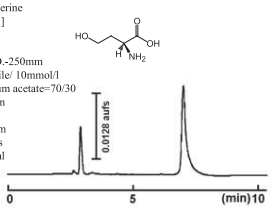
Sample: *L*-Homocystine
CAS No.: [626-72-2]
Molecular formula: $C_8H_{16}N_2O_4S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 2.0mg/ml
Injection volume: 1.0µl
Retention time: 13.41min
Capacity factor: 4.10



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

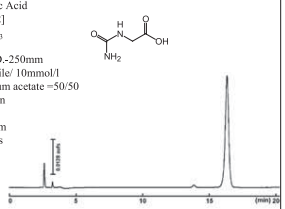
Sample: *L*-Homoserine
CAS No.: [672-15-1]
Molecular formula: $C_4H_9NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 7.03min
Capacity factor: 1.67



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

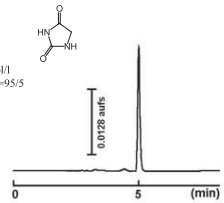
Sample: Hydantoic Acid
CAS No.: [462-60-2]
Molecular formula: $C_3H_6N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 16.33min
Capacity factor: 4.72



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

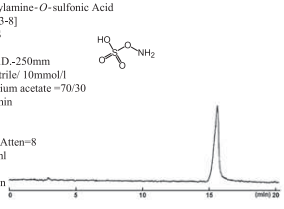
Sample: Hydantoin
CAS No.: [461-72-3]
Molecular formula: $C_3H_4N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 5.01min
Capacity factor: 0.66



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

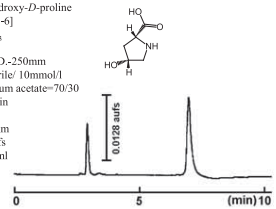
Sample: Hydroxylamine-*O*-sulfonic Acid
CAS No.: [2950-43-8]
Molecular formula: H_3NO_4S
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 2.0mg/ml
Injection volume: 3.0µl
Retention time: 15.60min
Capacity factor: 5.24



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

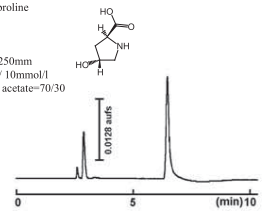
Sample: *cis*-*4*-Hydroxy-*D*-proline
CAS No.: [2584-71-6]
Molecular formula: $C_5H_9NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 6.96min
Capacity factor: 1.65



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

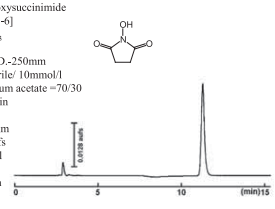
Sample: *L*-Hydroxyproline
CAS No.: [51-35-4]
Molecular formula: $C_5H_9NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 6.49min
Capacity factor: 1.47



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

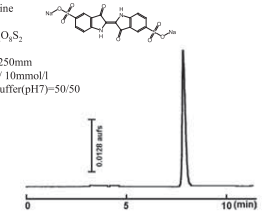
Sample: *N*-Hydroxysuccinimide
CAS No.: [6066-82-6]
Molecular formula: $C_4H_5NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 1.5µl
Retention time: 11.29min
Capacity factor: 3.22



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

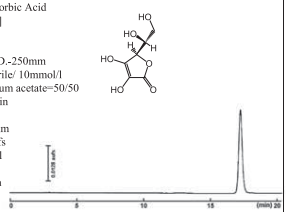
Sample: Indigo carmine
CAS No.: [860-22-0]
Molecular formula: $C_{16}H_8N_2Na_2O_8S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 1.0µl
Retention time: 7.82min
Capacity factor: 1.79



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

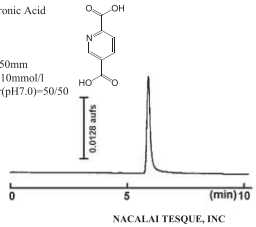
Sample: *D*-Isoascorbic Acid
CAS No.: [89-65-6]
Molecular formula: $C_6H_8O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 245nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 3.0µl
Retention time: 17.26min
Capacity factor: 5.11



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

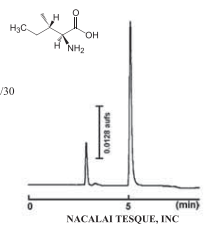
Sample: Isocinchomeronic Acid
CAS No.: [100-26-5]
Molecular formula: $C_7H_5NO_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 5.91min
Capacity factor: 1.07



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

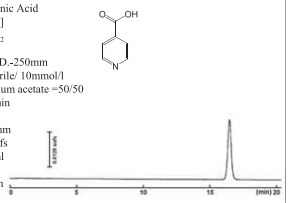
Sample: *L*-Isoleucine
CAS No.: [73-32-5]
Molecular formula: $C_6H_{13}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 5.12min
Capacity factor: 0.95



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

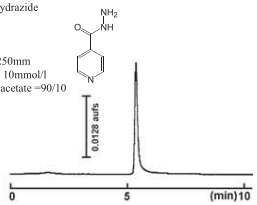
Sample: Isonicotinic Acid
CAS No.: [55-22-1]
Molecular formula: $C_6H_5NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 16.45min
Capacity factor: 4.78



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

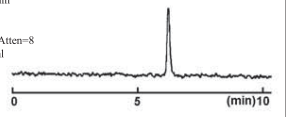
Sample: Isonicotinohydrazide
CAS No.: [54-85-3]
Molecular formula: $C_6H_7N_3O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV265 nm
Attenuation: 0.128 aufs
Sample conc.: 0.50mg/ml
Injection volume: 0.5µl
Retention time: 5.37min
Capacity factor: 0.85



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

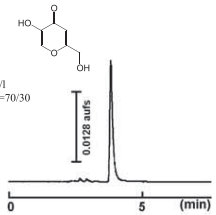
Sample: Isopropyl *β-D-1*-thiogalactopyranoside
CAS No.: [367-93-1]
Molecular formula: $C_9H_{18}O_5S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 6.23min
Capacity factor: 1.15



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

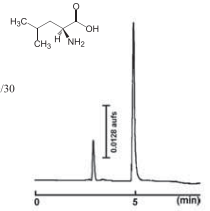
Sample: Kojic Acid
CAS No.: [501-30-4]
Molecular formula: $C_6H_6O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV245 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 1.0µl
Retention time: 3.83min
Capacity factor: 0.46



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

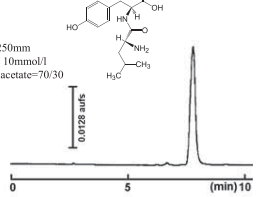
Sample: *L*-Leucine
CAS No.: [61-90-5]
Molecular formula: $C_6H_{13}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 4.91min
Capacity factor: 0.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

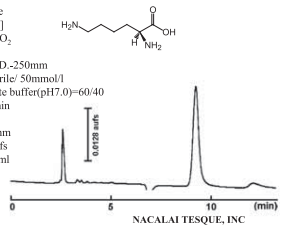
Sample: *D*-Leucyl-*L*-tyrosine
CAS No.: [3303-29-5]
Molecular formula: $C_{15}H_{22}N_2O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 254nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 7.79min
Capacity factor: 1.96



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

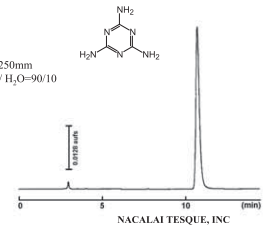
Sample: *L*-Lysine
CAS No.: [56-87-1]
Molecular formula: $C_6H_{14}N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 50mmol/l Phosphate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 9.26min
Capacity factor: 2.55



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

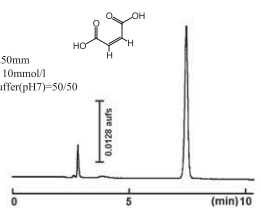
Sample: Melamine
CAS No.: [108-78-1]
Molecular formula: $C_3H_6N_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV240 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 10.79min
Capacity factor: 2.79



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

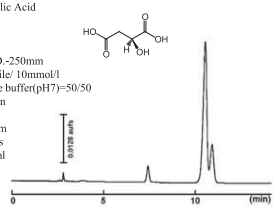
Sample: Maleic Acid
CAS No.: [110-16-7]
Molecular formula: $C_4H_4O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 7.45min
Capacity factor: 1.62



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

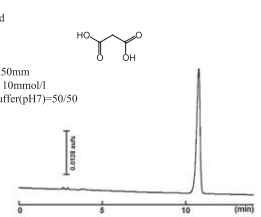
Sample: *L-(−)*-Malic Acid
CAS No.: [97-67-6]
Molecular formula: $C_4H_6O_5$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 10.55min
Capacity factor: 2.71



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

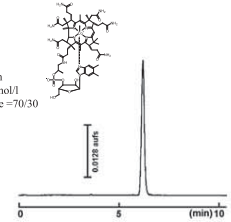
Sample: Malonic Acid
CAS No.: [141-82-2]
Molecular formula: $C_3H_4O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 10.78min
Capacity factor: 2.81



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

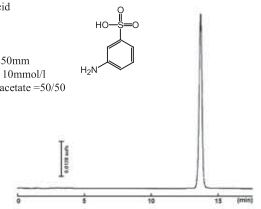
Sample: Mecobalamin
CAS No.: [13422-55-4]
Molecular formula: $C_{63}H_{91}CoN_{13}O_{14}P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV266 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 6.22min
Capacity factor: 1.35



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

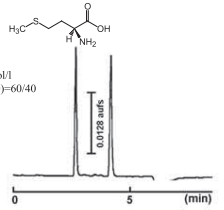
Sample: Metanilic Acid
CAS No.: [121-47-1]
Molecular formula: C6H7NO3S
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 13.68min
Capacity factor: 3.80



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

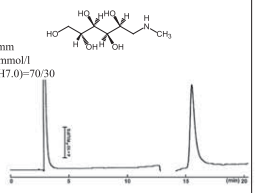
Sample: *L*-Methionine
CAS No.: [63-68-3]
Molecular formula: $C_5H_{11}NO_2S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 4.15min
Capacity factor: 0.54



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

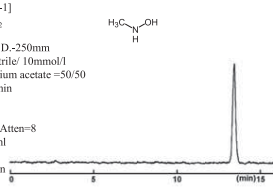
Sample: *N*-Methylglucamine
CAS No.: [6284-40-8]
Molecular formula: $C_7H_{17}NO_5$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI
Attenuation: 4 × 10^5RIU/FS
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 15.52min
Capacity factor: 4.22



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

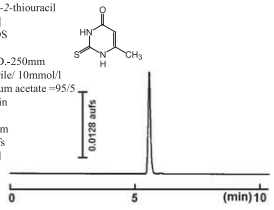
Sample: *N*-Methylhydroxylamine
CAS No.: [593-77-1]
Molecular formula: CH_5NO
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 1.0mg/ml
Injection volume: 2.0µl
Retention time: 13.45min
Capacity factor: 4.21



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

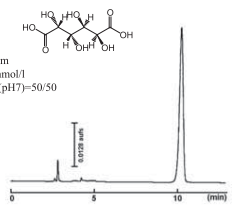
Sample: 6-Methyl-2-thiouracil
CAS No.: [56-04-2]
Molecular formula: $C_5H_6N_2OS$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 5.58min
Capacity factor: 0.84



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

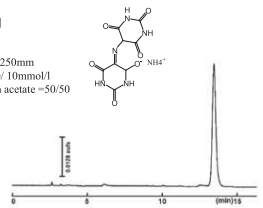
Sample: Mucic Acid
CAS No.: [526-99-8]
Molecular formula: $C_6H_{10}O_8$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 10.27min
Capacity factor: 2.62



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

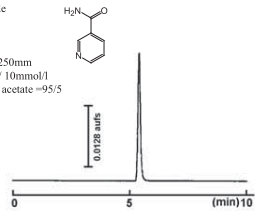
Sample: Murexide
CAS No.: [3051-09-0]
Molecular formula: $C_8H_8N_9O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 13.47min
Capacity factor: 3.69



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

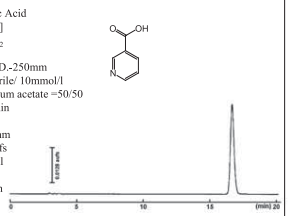
Sample: Nicotinamide
CAS No.: [98-92-0]
Molecular formula: $C_6H_6N_2O$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.2mg/ml
Injection volume: 1.0µl
Retention time: 5.40min
Capacity factor: 0.77



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

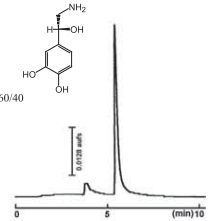
Sample: Nicotinic Acid
CAS No.: [59-67-6]
Molecular formula: $C_6H_5NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 16.67min
Capacity factor: 4.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

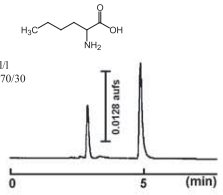
Sample: *L*-Noradrenaline
CAS No.: [51-41-2]
Molecular formula: $C_8H_{11}NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 5.47min
Capacity factor: 1.07



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

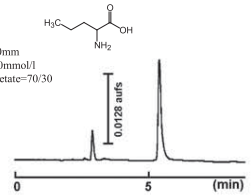
Sample: *DL*-Norleucine
CAS No.: [616-06-8]
Molecular formula: $C_6H_{13}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 4.89min
Capacity factor: 0.86



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

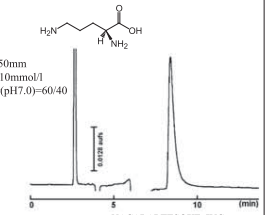
Sample: *DL*-Norvaline
CAS No.: [760-78-1]
Molecular formula: $C_5H_{11}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 5.43min
Capacity factor: 1.07



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

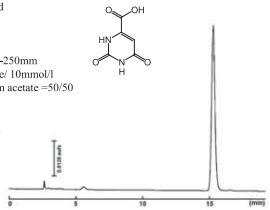
Sample: *L*-Ornithine
CAS No.: [70-26-8]
Molecular formula: $C_5H_{12}N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=60/40
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 8.39min
Capacity factor: 2.10



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

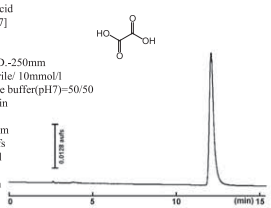
Sample: Orotic Acid
CAS No.: [65-86-1]
Molecular formula: $C_5H_4N_2O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 1.0µl
Retention time: 15.24min
Capacity factor: 4.36



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

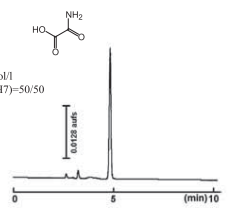
Sample: Oxalic Acid
CAS No.: [144-62-7]
Molecular formula: $C_2H_2O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 0.5µl
Retention time: 12.08min
Capacity factor: 3.27



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

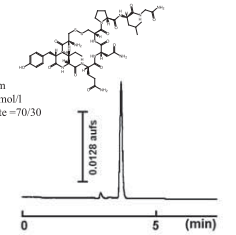
Sample: Oxamic Acid
CAS No.: [471-47-6]
Molecular formula: $C_2H_3NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 1.0µl
Retention time: 4.83min
Capacity factor: 0.71



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

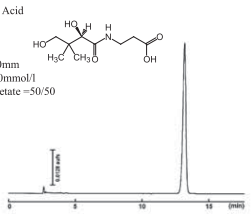
Sample: Oxytocin
CAS No.: [50-56-6]
Molecular formula: $C_{43}H_{66}N_{12}O_{12}S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 0.4mg/ml
Injection volume: 0.5µl
Retention time: 3.71min
Capacity factor: 0.39



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

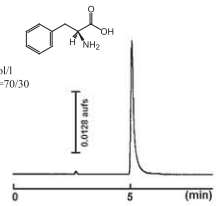
Sample: *D*-Pantothenic Acid
CAS No.: [79-83-4]
Molecular formula: $C_9H_{17}NO_5$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 13.21min
Capacity factor: 3.60



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

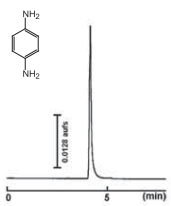
Sample: *L-(-)*-Phenylalanine
CAS No.: [63-91-2]
Molecular formula: $C_9H_{11}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 254nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 5.10min
Capacity factor: 0.94



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

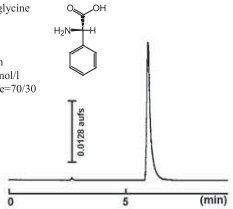
Sample: *p*-Phenylenediamine
CAS No.: [106-50-3]
Molecular formula: $C_6H_8N_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 4.15min
Capacity factor: 0.36



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

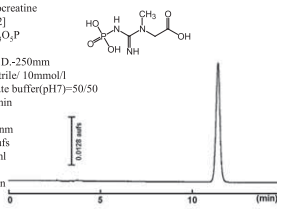
Sample: *L-(+)-* α *-*Phenylglycine
CAS No.: [2935-35-5]
Molecular formula: $C_8H_9NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 5.96min
Capacity factor: 1.27



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

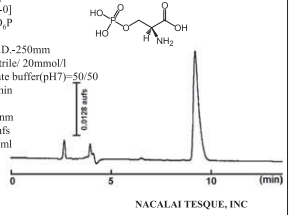
Sample: Phosphocreatine
CAS No.: [67-07-2]
Molecular formula: $C_4H_{10}N_3O_5P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 11.42min
Capacity factor: 3.00



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

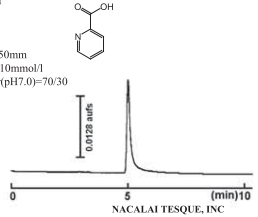
Sample: *O*-Phospho-*L*-serine
CAS No.: [407-41-0]
Molecular formula: $C_3H_8NO_6P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 3.0µl
Retention time: 9.19min
Capacity factor: 2.24



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

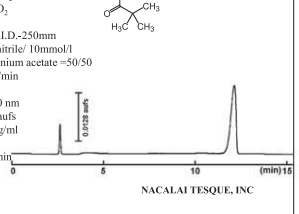
Sample: Picolinic acid
CAS No.: [98-98-6]
Molecular formula: $C_6H_5NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0)=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 5.03min
Capacity factor: 0.92



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

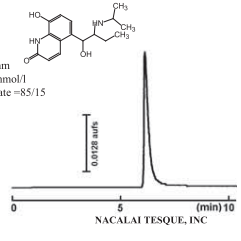
Sample: Pivalic Acid
CAS No.: [75-98-9]
Molecular formula: $C_5H_{10}O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 12.14min
Capacity factor: 3.28



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

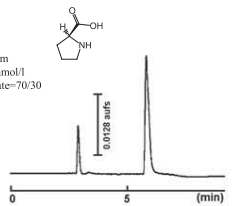
Sample: Procaterol
CAS No.: [72332-33-3]
Molecular formula: $C_{16}H_{22}N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Ammonium acetate =85/15
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 6.17min
Capacity factor: 1.25



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

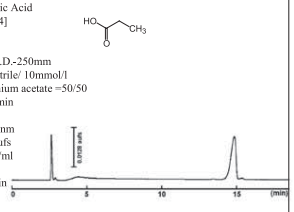
Sample: *L*-Proline
CAS No.: [147-85-3]
Molecular formula: $C_5H_9NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 5.83min
Capacity factor: 1.22



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

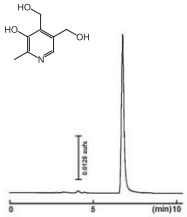
Sample: Propionic Acid
CAS No.: [79-09-4]
Molecular formula: $C_3H_6O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 14.85min
Capacity factor: 4.24



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

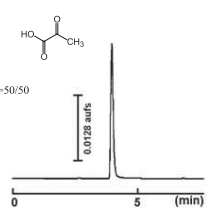
Sample: Pyridoxine
CAS No.: [65-23-6]
Molecular formula: $C_8H_{11}NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 6.78min
Capacity factor: 1.35



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

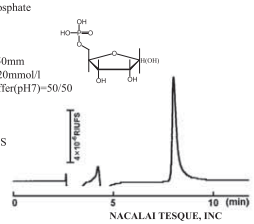
Sample: Pyruvic Acid
CAS No.: [127-17-3]
Molecular formula: $C_3H_4O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 2.0µl
Retention time: 3.97min
Capacity factor: 0.39



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

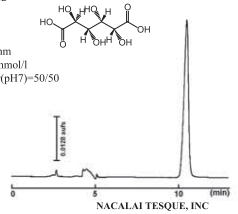
Sample: Ribose-*5*-phosphate
CAS No.: [4300-28-1]
Molecular formula: $C_5H_{11}O_8P$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: RI
Attenuation: 4×10^{-3}RIU/FS
Sample conc.: 10.0mg/ml
Injection volume: 5.0µl
Retention time: 8.02min
Capacity factor: 2.06



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

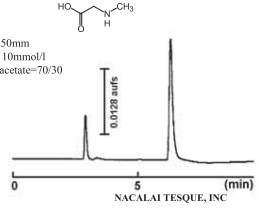
Sample: *D*-Saccharic Acid
CAS No.: [87-73-0]
Molecular formula: $C_6H_{10}O_8$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 10.48min
Capacity factor: 2.69



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

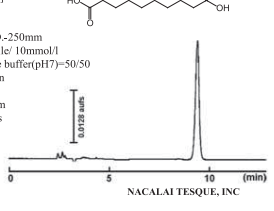
Sample: Sarcosine
CAS No.: [107-97-1]
Molecular formula: $C_3H_7NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 210nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 6.30min
Capacity factor: 1.40



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

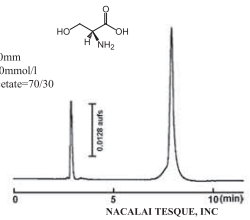
Sample: Sebacic Acid
CAS No.: [111-20-6]
Molecular formula: $C_{10}H_{18}O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.5µl
Retention time: 9.43min
Capacity factor: 2.28



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

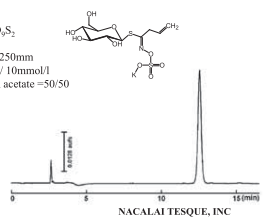
Sample: *L*-Serine
CAS No.: [56-45-1]
Molecular formula: $C_3H_7NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 7.92min
Capacity factor: 2.01



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

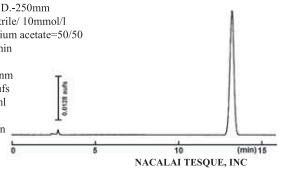
Sample: Sinigrin
CAS No.: [3952-98-5]
Molecular formula: $C_{10}H_{16}KNO_9S_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 12.57min
Capacity factor: 3.38



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

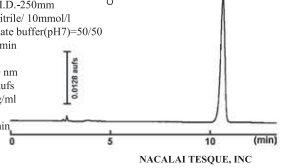
Sample: Sorbic Acid
CAS No.: [110-44-1]
Molecular formula: $C_6H_8O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 13.19min
Capacity factor: 3.59



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

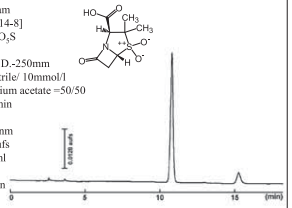
Sample: Succinic Acid
CAS No.: [110-15-6]
Molecular formula: $C_4H_6O_4$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 0.5µl
Retention time: 10.64min
Capacity factor: 2.74



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

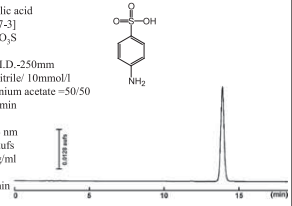
Sample: Sulbactam
CAS No.: [68373-14-8]
Molecular formula: $C_8H_{11}NO_5S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 0.5µl
Retention time: 10.86min
Capacity factor: 2.81



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

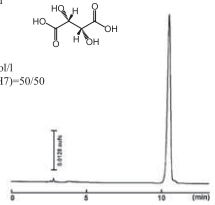
Sample: Sulfanilic acid
CAS No.: [121-57-3]
Molecular formula: $C_6H_7NO_3S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.10mg/ml
Injection volume: 1.0µl
Retention time: 13.87min
Capacity factor: 3.87



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

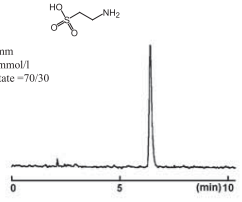
Sample: *L-(+)*-Tartaric Acid
CAS No.: [87-69-4]
Molecular formula: $C_4H_6O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.5µl
Retention time: 10.52min
Capacity factor: 2.70



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

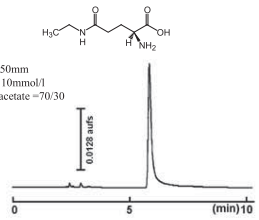
Sample: Taurine
CAS No.: [107-35-7]
Molecular formula: $C_2H_7NO_3S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 6.40min
Capacity factor: 1.25



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

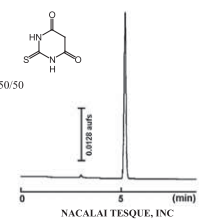
Sample: *L*-Theanine
CAS No.: [3081-61-6]
Molecular formula: $C_7H_{14}N_2O_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 0.5µl
Retention time: 5.89min
Capacity factor: 1.21



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

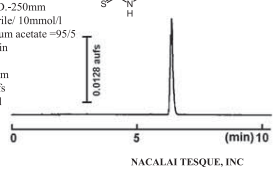
Sample: *2*-Thiobarbituric Acid
CAS No.: [504-17-6]
Molecular formula: $C_4H_4N_2O_2S$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Phosphate buffer(pH7)=50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 5.18min
Capacity factor: 0.82



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

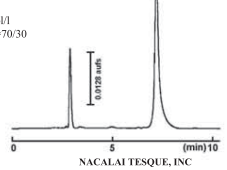
Sample: *2*-Thiouracil
CAS No.: [141-90-2]
Molecular formula: $C_4H_4N_2OS$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 6.38min
Capacity factor: 1.11



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

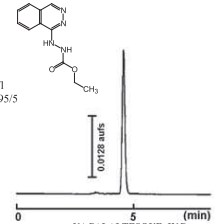
Sample: *L*-Threonine
CAS No.: [72-19-5]
Molecular formula: $C_4H_9NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 7.19min
Capacity factor: 1.73



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

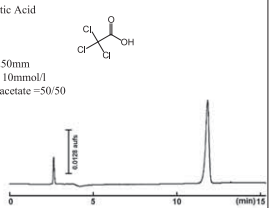
Sample: Todralazine
CAS No.: [14679-73-3]
Molecular formula: $C_{11}H_{12}N_4O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =95/5
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV240 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 4.56min
Capacity factor: 0.51



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

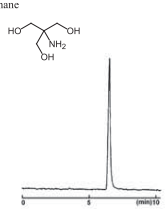
Sample: Trichloroacetic Acid
CAS No.: [76-03-9]
Molecular formula: $C_2HCl_3O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =50/50
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 11.83min
Capacity factor: 3.17



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

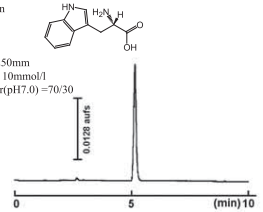
Sample: Tris(hydroxymethyl)aminomethane
CAS No.: [77-86-1]
Molecular formula: $C_4H_{11}NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =80/20
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: ELSD
Attenuation: Gain=6,Atten=8
Sample conc.: 2.0mg/ml
Injection volume: 1.0µl
Retention time: 6.47min
Capacity factor: 1.48



NACALAI TESQUE, INC

COSMOSIL Chromatogram Index

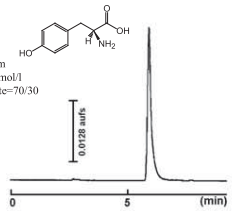
Sample: *L*-Tryptophan
CAS No.: [73-22-3]
Molecular formula: $C_{11}H_{12}N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Citrate buffer(pH7.0) =70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254 nm
Attenuation: 0.128 aufs
Sample conc.: 0.5mg/ml
Injection volume: 0.5µl
Retention time: 5.14min
Capacity factor: 0.95



NACALAI TESQUE, INC

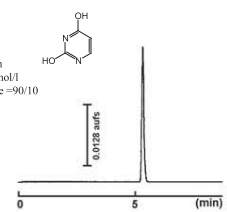
COSMOSIL Chromatogram Index

Sample: L-Tyrosine
CAS No.: [60-18-4]
Molecular formula: $C_9H_{11}NO_3$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV 254nm
Attenuation: 0.128 aufs
Sample conc.: 5.0mg/ml
Injection volume: 1.0µl
Retention time: 5.92min
Capacity factor: 1.25



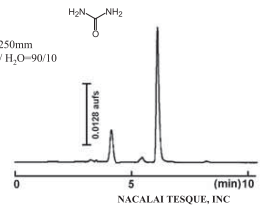
COSMOSIL Chromatogram Index

Sample: Uracil
CAS No.: [66-22-8]
Molecular formula: $C_4H_4N_2O_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 0.5µl
Retention time: 5.33min
Capacity factor: 0.84



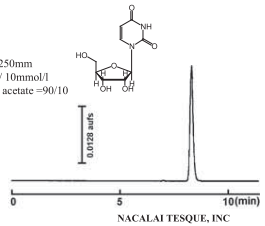
COSMOSIL Chromatogram Index

Sample: Urea
CAS No.: [57-13-6]
Molecular formula: CH_4N_2O
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ H_2O=90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 2.0µl
Retention time: 6.12min
Capacity factor: 1.15



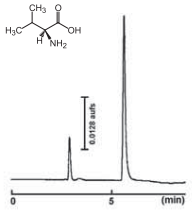
COSMOSIL Chromatogram Index

Sample: Uridine
CAS No.: [58-96-8]
Molecular formula: $C_9H_{12}N_2O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV260 nm
Attenuation: 0.128 aufs
Sample conc.: 0.1mg/ml
Injection volume: 1.0µl
Retention time: 8.30min
Capacity factor: 1.86



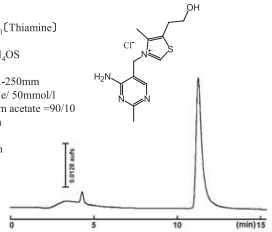
COSMOSIL Chromatogram Index

Sample: L-Valine
CAS No.: [72-18-4]
Molecular formula: $C_5H_{11}NO_2$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate=70/30
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV210 nm
Attenuation: 0.128 aufs
Sample conc.: 10.0mg/ml
Injection volume: 1.0µl
Retention time: 5.63min
Capacity factor: 1.14



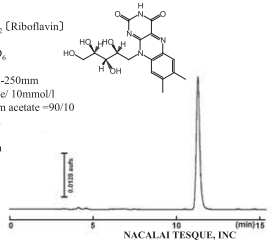
COSMOSIL Chromatogram Index

Sample: Vitamin B_1〔Thiamine〕
CAS No.: [67-03-8]
Molecular formula: $C_{12}H_{17}ClN_4OS$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 50mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 1.0µl
Retention time: 11.25min
Capacity factor: 2.93



COSMOSIL Chromatogram Index

Sample: Vitamin B_2〔Riboflavin〕
CAS No.: [83-88-5]
Molecular formula: $C_{17}H_{20}N_4O_6$
Column: HILIC
Column size: 4.6mmI.D.-250mm
Mobile phase: Acetonitrile/ 10mmol/l Ammonium acetate =90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV220 nm
Attenuation: 0.128 aufs
Sample conc.: 1.0mg/ml
Injection volume: 0.5µl
Retention time: 11.33min
Capacity factor: 2.92



コスモシール使用者様の声 HILIC 抜粋

" こんなに役立った情報 "

ナカライテスクでは、C_{18} カラムの分離で困った時のカラムとしてコスモシール高機能カラム Cholester、π NAP、HILIC、PYE、PBB-R を紹介しています。
今回、コスモシールを使用されているお客様からいただきました " こんなに役立った情報 " から HILIC についてのお客様の声をご紹介します。(研究者の皆様のご所属等の情報は、データご提供時の情報に基づいています。)

■ HILIC 情報抜粋

提供者名	近畿大学薬学総合研究所 食品薬学研究室　森川 敏生 准教授
カラムサイズ	4.6 × 250，20 × 250
サンプル名	天然由来化合物（配糖体成分）
内容	今まで C_{18} カラムで分離が出来なかったアシル基の結合位置の異なる配糖体成分がコスモシール HILIC を使用することにより完全分離する事が出来た。

提供者名	大学 薬学部 研究者様
カラムサイズ	4.6 × 250、10 × 250
サンプル名	糖の結合する位置が異なるフラボノイド C 配糖体の分離
内容	結合する位置が異なるフラボノイド C 配糖体の分離を試みたとき、ODS はだめでゲル濾過カラム等ではやはり分子量も同じなので分離はできなかったのですが、コスモシール HILIC を使ったら一発でした。(条件：98% CH_3CN)

提供者名	食品メーカー 研究者様
カラムサイズ	2.0 × 150
サンプル名	脂質、糖質、ステロイド類、脂溶性ビタミンなど
内容	コスモシール HILIC は他社のカラムと比べ、分離が良く使いやすい。MS 用のカラムとして十分利用できる。

提供者名	大学 薬学部 研究者様
カラムサイズ	4.6 × 250
サンプル名	微生物 Pseudomonas 属が分泌する細胞外代謝産物
内容	非常に親水性が高い化合物であるため C_{18} カラムによる分析が不可能でした。コスモシール HILIC を用いることで、再現性のある分析が行うことができました。

提供者名	公的研究機関 研究者
カラムサイズ	2.0 × 50、4.6 × 250、10 × 250
サンプル名	化粧品など
内容	コスモシール HILIC を使用することで既報の方法ではうまく HPLC 分離できなかった成分を分離できるようになりました。さらには、試料中で生じていた分解物を分取精製し、構造決定にまで至るなど、非常に重宝しています。今後の課題として、耐久性の向上に期待しています。

" こんなに役立った情報 " 提供依頼

今回ご紹介しましたようなコスモシール使用者様の声を " こんなに役立った情報 " として充実・共有化することで、皆様の研究にお役に立ちたいと考えています。
今後、" こんなに役立った情報 " を充実させることで、使用者様の声が共有化できるコミュニティーサイトのオープンを検討したいと考えていますので、是非とも、使用者様の " こんなに役立った情報 " をお寄せください。

(投稿アドレス)
弊社 Web に投稿ページを準備していますので、是非、投稿を宜しくお願い申し上げます。
http://www.nacalai.co.jp/update/cosmosil.html

COSMOSIL

COSMOSIL HILIC

アシル基の結合位置の異なるサポニン成分の分析および分取

Technical Note

データご提供：近畿大学　薬学総合研究所　食品薬学研究室　森川 敏生　准教授

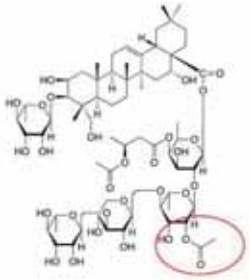
クロマトグラフィーで汎用されている C_{18} カラムは、疎水性に差がないような糖置換体や糖の結合位置が異なる化合物に対して分離が不十分な場合があります。このような化合物の中で親水性基に差があるような化合物に対して親水性相互作用を有するコスモシール HILIC を用いることにより分離が改善する場合があります。
今回、アシル基の結合位置が異なる配糖体の分析データをご提供いただきましたのでご紹介いたします。

(1) 緒論

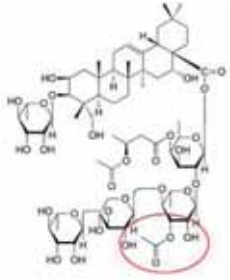
キク科 (Asteraceae) 植物デイジー (Bellis perennis) は西ヨーロッパ原産の多年生草本で、その花期が長いことから和名をヒナギク（雛菊）、チョウメイギク（長命菊）およびエンメイギク（延命菊）などと称されます。日本ではおもに園芸品種として親しまれていますが、西欧諸国においては、古くからその開花時の全草や根部を打撲傷、出血、筋肉痛および皮膚病やリウマチの治療に用いられているとともに、その若葉や蕾、花弁などをサラダに加えて生食するなど、食用としても供されています。また、デイジーの花部であるデイジーフラワーはハーブティーなどにも利用され、高度に酸化されたアグリコン部（非糖部）を有するビスデスモシド型トリテルペンサポニン類が含有成分として報告されています。とりわけ、アシル基の有無や種類、あるいは結合位置の違いなど、その化学構造が微妙に異なるサポニン類が多数報告されています。

(2) アシル基の結合位置の異なるサポニン成分の分析

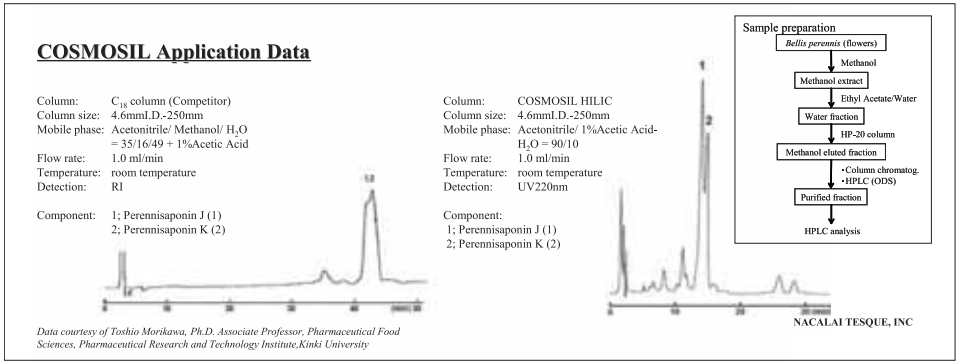
一般的に親水性相互作用クロマトグラフィー用カラムは、疎水性が非常に小さく C_{18} カラムで保持が小さいような化合物に対して有効なカラムとなります。 C_{18} カラムで十分保持があるアシル基の結合位置の異なる化合物に対して C_{18} カラムおよびコスモシール HILIC を用いて分析を行いました。



perennisaponin J (1)



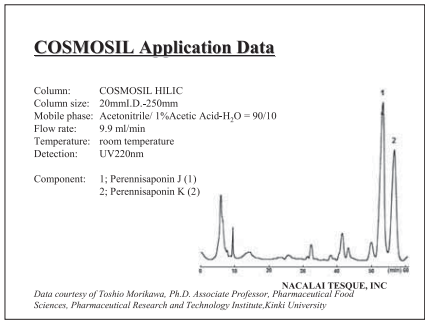
perennisaponin K (2)



結果、疎水性が類似しているため C_{18} カラムで分離できませんでしたが、コスモシール HILIC を用いることによりアシル基の結合位置のみが異なるサポニン（perennisaponin J および K）の分離について、極めて良好な分離ができました。

(3) コスモシール HILIC による分取精製

内径 20mm の分取カラムを用いて、それぞれのサポニンを精製しました。



結果、コスモシール HILIC においてセミ分取サイズのカラムにおいても再現し、それぞれのサポニンが単離することができました。

(4) 考察

C_{18} カラムで分離できなかったアシル基の結合位置のみが異なるサポニン（perennisaponin J および K）の分離について、コスモシール HILIC を用いて検討したところ極めて良好な分離ができました。この良好な分離はセミ分取サイズのカラムにおいても再現し、それぞれのサポニンが単離することができ、NMR などによる構造解析および各種フィジカルデータ測定に必要なサンプル量を確保することができました。

(5) 参考文献

T.Morikawa et.al Acylated Oleanane-Type Triterpene Bisdesmosides: Perennisaponins G, H, I, J, K, L,and M with Pancreatic Lipase Inhibitory Activity from the Flowers of Bellis perennis. Helv. Chim. Acta 93 573-586 (2010).

COSMOSIL HILIC 掲載論文について

年々親水性相互作用クロマトグラフィー関連の文献は増加傾向にあり、注目されている手法の一つです。
ここでは、弊社オリジナルカラムであるコスモシールHILICが記載されている最近の文献リストの一部をご紹介します。なお、著作権の関係で弊社より文献をご提供することはできませんのでご了承ください。

■ HILIC 文献抜粋

No.	Title	AUTHOR	JOURNAL	ISSUE	PAGE	YEAR
1	Characterization of the decomposition of compounds derived from imidazolidinyl urea in cosmetics and patch test materials	Takahiro Doi, Akihiro Takeda, Akiko Asada, Keiji Kajimura	Contact Dermatitis	67 (5)	284–292	2012
2	A simple graphical representation of selectivity in hydrophilic interaction liquid chromatography	Mohammed E.A. Ibrahim, Yang Liu, Charles A. Lucy	Journal of Chromatography A	1260	126-131	2012
3	Comparison of 2-amino-[3-11C] isobutyric acid and 2-deoxy-2-[18F] fluoro-D-glucose in nude mice with xenografted tumors and acute inflammation	Tsuji, Atsushi B; Kato, Koichi; Sugyo, Aya; Okada, Maki; Sudo, Hitomi; Yoshida, Chisato; Wakizaka, Hidekatsu; Zhang, Ming-Rong; Saga, Tsuneo	Nuclear Medicine Communications	33 (10)	1058–1064	2012
4	In Vitro and in Vivo Metabolism of Verproside in Rats	Min Gi Kim, Deok-Kyu Hwang, Hyeon-Uk Jeong, Hye Young Ji, Sei-Ryang Oh , Yongnam Lee, Ji Seok Yoo, Dae Hee Shin and Hye Suk Lee	Molecules	17 (10)	11990-12002	2012
5	Functional expression of carnitine/ organic cation transporter OCTN1 in mouse brain neurons: Possible involvement in neuronal differentiation	Noritaka Nakamichi, Takayuki Taguchi, Hiroshi Hosotani, Tomohiko Wakayama, Takuya Shimizu, Tomoko Sugiura, Shoichi Iseki, Yukio Kato,	Neurochemistry International	In Press		2012
6	Characterization and use of hydrophilic interaction liquid chromatography type stationary phases in supercritical fluid chromatography	Caroline West, Syame Khater, Eric Lesellier	Journal of Chromatography A	1250	182-195	2012
7	Analysis of 8-hydroxy-2 ′ -deoxyguanosine in human urine using hydrophilic interaction chromatography with tandem mass spectrometry	Chiemi Hosozumi, Akira Toriba, Thanyarat Chuesaard, Takayuki Kameda, Ning Tang, Kazuichi Hayakawa	Journal of Chromatography B	893-894	173-176	2012
8	A NOVEL NORMAL PHASE HPLC METHOD FOR THE QUANTIFICATION OF N-FORMYL IMPURITY IN AZACITIDINE ACTIVE PHARMACEUTICAL INGREDIENTS AND PHARMACEUTICAL DOSAGE FORMS	T. Satyanarayana Raju, L. Kalyanaraman, K. S. V. Raghavachary & P. Yadagiri Swamy	Journal of Liquid Chromatography & Related Technologies	35 (8)	1070-1080	2012
9	Determination of Histamine in Seafood by Hydrophilic Interaction Chromatography/Tandem Mass Spectrometry	Tatsuo YOSHIDA, Hirotoshi HAMADA, Hiroshi MURAKAWA, Hidekazu YOSHIMOTO, Toshiaki TOBINO, Kei TODA	Analytical Sciences	28 (2)	179-182	2012
10	Triazole-Linked DNA as a Primer Surrogate in the Synthesis of First-Strand cDNA	Dr. Tomoko Fujino, Dr. Ken-ichi Yasumoto, Naomi Yamazaki, Ai Hasome, Prof. Kazuhiro Sogawa, Prof. Hiroyuki Isobe	Chemistry – An Asian Journal	6 (11)	2956-2960	2011
11	Retention and selectivity of stationary phases for hydrophilic interaction chromatography	Yong Guo, Sheetal Gaiki	Journal of Chromatography A	1218 (35)	5920-5938	2011
12	Chromatographic characterization of hydrophilic interaction liquid chromatography stationary phases: Hydrophilicity, charge effects, structural selectivity, and separation efficiency	Yuusuke Kawachi, Tohru Ikegami, Hirotaka Takubo, Yuka Ikegami, Masatoshi Miyamoto, Nobuo Tanaka	Journal of Chromatography A	1218 (35)	5903-5919	2011
13	The different decomposition properties of diazolidinyl urea in cosmetics and patch test materials	Takahiro Doi, Keiji Kajimura, Shuzo Taguchi	Contact Dermatitis	65 (2)	81-91	2011
14	Stationary and mobile phases in hydrophilic interaction chromatography: a review	Pavel Jandera	Analytica Chimica Acta	692 (1-2)	1-25	2011
15	Degradation of N-Acetyl-D-glucosamine and D-Glucosamine in Subcritical Water and Properties of the Degradation Products	Rongchun WANG, Takashi KOBAYASHI and Shuji ADACHI	Food Science and Technology Research	17 (4)	273-278	2011
16	Determination of isoascorbic acid in fish tissue by hydrophilic interaction liquid chromatography–ultraviolet detection	Spyros Drivelos, Marilena E. Dasenaki and Nikolaos S. Thomaidis	Analytical and Bioanalytical Chemistry	397 (6)	2199-2210	2010
17	Hepatoprotective Effects of Flavonoids from Shekwasha (Citrus depressa) against D-Galactosamine-Induced Liver Injury in Rats	Toshiyuki AKACHI, Yasuyuki SHIINA, Yayoi OHISHI, Takumi KAWAGUCHI, Hirokazu KAWAGISHI, Tatsuya MORITA, Makoto MORI and Kimio SUGIYAMA	J. Nutr Sci Vitaminol	56 (1)	60-67	2010
18	A Novel Glucosylation Reaction on Anthocyanins Catalyzed by Acyl-Glucose–Dependent Glucosyltransferase in the Petals of Carnation and Delphinium	Yuki Matsuba, Nobuhiro Sasaki, Masayuki Tera, Masachika Okamura, Yutaka Abe, Emi Okamoto, Haruka Nakamura, Hisakage Funabashi, Makoto Takatsu, Mikako Saito, Hideaki Matsuoka, Kazuo Nagasawa and Yoshihiro Ozeki	The Plant Cell	22 (10)	3374-3389	2010
19	Molecular identification of unsaturated uronate reductase prerequisite for alginate metabolism in Sphingomonas sp. A1	Ryuichi Takase, Akihito Ochiai, Bunzo Mikami, Wataru Hashimoto, Kousaku Murata,	Biochimica et Biophysica Acta (BBA) - Proteins & Proteomics	1804 (9)	1925-1936	2010
20	Inhibitory Effects of Acylated Acyclic Sesquiterpene Oligoglycosides from the Pericarps of Sapindus rarak on Tumor Necrosis Factor- α -Induced Cytotoxicity	Toshio Morikawa, Yuanyuan Xie, Kiyofumi Ninomiya, Masaki Okamoto, Osamu Muraoka, Dan Yuan, Masayuki Yoshikawa and Takao Hayakawa	Chem. Pharm. Bull.	58 (9)	1276-1280	2010
21	Approach to hydrophilic interaction chromatography column selection: Application to neurotransmitters analysis	Raluca-Ioana Chirita, Caroline West, Adriana-Luminita Finaru, Claire Elfakir	Journal of Chromatography A	1217 (18)	3091-3104	2010
22	Medicinal Flowers. Part 29. Acylated Oleanane-Type Triterpene Bisdesmosides: Perennisaponins G, H, I, J, K, L, and M with Pancreatic Lipase Inhibitory Activity from the Flowers of Bellis perennis	Toshio Morikawa, Xuezheng Li, Eriko Nishida, Seikou Nakamura, Kiyofumi Ninomiya, Hisashi Matsuda, Yoshimi Oda, Osamu Muraoka, Masayuki Yoshikawa	Helvetica Chimica Acta	93 (3)	573-586	2010
23	Unusual amino acid derivatives from the mushroom Pleurocybella porrigens	Takumi Kawaguchi, Tomohiro Suzuki, Yuka Kobayashi, Shinya Kodani, Hirofumi Hirai, Kaoru Nagai, Hirokazu Kawagishi	Tetrahedron	66 (2)	504-507	2010
24	Structures of Acetylated Oleanane-Type Triterpene Saponins, Rarasaponins IV, V, and VI, and Anti-hyperlipidemic Constituents from the Pericarps of Sapindus rarak	Yasunobu Asao, Toshio Morikawa, Yuanyuan Xie, Masaki Okamoto, Makoto Hamao, Hisashi Matsuda, Osamu Muraoka, Dan Yuan and Masayuki Yoshikawa	Chem. Pharm. Bull.	57 (2)	198-203	2009
25	Development and validation of a reversed-phase high-performance liquid chromatographic method for quantification of peptide dendrimers in human skin permeation experiments	S. Mutalik, A.K. Hewavitharana, P.N. Shaw, Y.G. Anissimov, M.S. Roberts, H.S. Parekh,	Journal of Chromatography B	877 (29)	3556-3562	2009
26	Determination of para-aminohippuric acid (PAH) in human plasma and urine by liquid chromatography–tandem mass spectrometry	Phey Yen Han, P. Nicholas Shaw, Carl M.J. Kirkpatrick	Journal of Chromatography B	877 (27)	3215-3220	2009
27	Oxidation of Methionine to Dehydromethionine by Reactive Halogen Species Generated by Neutrophils	Alexander V. Peskin, Rufus Turner, Ghassan J. Maghzal, Christine C. Winterbourn and Anthony J. Kettle	Biochemistry	48 (42)	10175–10182	2009
28	Oleanane-type triterpene oligoglycosides with pancreatic lipase inhibitory activity from the pericarps of Sapindus rarak	Toshio Morikawa, Yuanyuan Xie, Yasunobu Asao, Masaki Okamoto, Chihiro Yamashita, Osamu Muraoka, Hisashi Matsuda, Yutana Pongpiriyadacha, Dan Yuan, Masayuki Yoshikawa	Phytochemistry	70 (9)	1166-1172	2009
29	Direct Evidence for Efficient Transport and Minimal Metabolism of L-Cephalexin by Oligopeptide Transporter 1 in Budded Baculovirus Fraction	Keisuke Mitsuoka, Ikumi Tamai, Yasushi Morohashi, Yoshiyuki Kubo, Ryoichi Saitoh, Akira Tsuji and Yukio Kato	Biol. Pharm. Bull.	32 (8)	1459-1461	2009
30	Simultaneous measurement of diazolidinyl urea, urea, and allantoin in cosmetic samples by hydrophilic interaction chromatography	Takahiro Doi, Keiji Kajimura, Satoshi Takatori, Naoki Fukui, Shuzo Taguchi, Shozo Iwagami	Journal of Chromatography B	877 (10)	1005-1010	2009
31	親水性相互作用クロマトグラフィー(HILIC)—開発の背景，および分離モードの特徴	池上亨，田窪宏貴，田中信男	Chromatography	29 (2)		2008
32	Tetrodotoxin poisoning evidenced by solid-phase extraction combining with liquid chromatography–tandem mass spectrometry	Hsiao-Chin Jen, Shin-Jung Lin, Yung-Hsiang Tsai, Chun-Hsiang Chen, Zu-Chun Lin, Deng-Fwu Hwang,	Journal of Chromatography B	871 (1)	95-100	2008