Guaranteed Reproducibility
High Purity Base Deactivated Silica
Preface

This ACE HPLC Application Guide contains over 100 applications including pharmaceutical, environmental, food, vitamin and protein/peptide separations. The chromatograms were produced by Advanced Chromatography Technologies and by satisfied ACE customers throughout the world.

The purpose of this guide is to assist chromatographers with the selection of the best HPLC column and conditions for their HPLC methods, by providing good examples of successful separations.

However, the information in this guide is provided for reference purposes only and Advanced Chromatography Technologies assumes no risk or liabilities that may result from its use by others. Furthermore, Advanced Chromatography Technologies makes no representations or warranties that the information provided in this guide will address any particular need or purpose of any user of the Application Guide.

Send us your application and receive a FREE ACE HPLC column

Send us your ACE HPLC application and help us extend our applications database. Your proven method will enable your chromatography colleagues to benefit and if we select your application for publication we’ll send you a FREE ACE HPLC column.

To submit your application contact your local ACE distributor or email us at: info@act-hplc.com

ACE performance guarantee

If ACE does not outperform the column you are currently using, simply contact us for a full refund and keep the ACE column FREE OF CHARGE.
ACE® - Excellent Chromatographic Performance

- Guaranteed Reproducibility
- LC/MS to Preparative Scale Dimensions
- Ultra Inert Base Deactivated HPLC Columns

ACE HPLC columns are designed to meet even the most challenging of chromatographic applications, giving excellent performance with acidic, basic and neutral molecules. A wide range of particle sizes, pore sizes, bonded chemistries and column dimensions are available.

Ultra high purity, ultra inert ACE columns also provide unmatched reproducibility and excellent column lifetime. Independent comparison tests show ACE HPLC columns give outstanding performance.

Excellent Performance with Acidic, Basic and Neutral Molecules

<table>
<thead>
<tr>
<th>ACE</th>
<th>Leading Base Deactivated Silica</th>
<th>Leading Conventional Silica</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ultra High Purity</td>
<td>• High Purity</td>
<td>• Low Purity</td>
</tr>
<tr>
<td>• Fully Validated</td>
<td>• Limited Validation</td>
<td>• No Validation</td>
</tr>
<tr>
<td>• Excellent Chromatography</td>
<td>• Acceptable Chromatography</td>
<td>• Poor Chromatography</td>
</tr>
<tr>
<td>• Guaranteed Reproducibility</td>
<td>• Moderate Reproducibility</td>
<td>• Poor Reproducibility</td>
</tr>
</tbody>
</table>

Basic molecules are commonly used to demonstrate silanol activity on HPLC columns. ACE columns provide measurably better peak shape and column efficiency compared to other popular base deactivated columns.

ACE Ultra Inert Base Deactivated HPLC Columns

ACE columns are available in capillary through to preparative dimensions, with a wide range of particle sizes (3, 5, 10 and 15μm), pore sizes (100Å and 300Å) and surface chemistries (C18, C8, C4, CN, Phenyl, AQ, SIL and C18-HL).

ACE ultra inert HPLC columns are designed to meet even the most challenging of chromatographic applications, giving excellent performance with acidic, basic and neutral molecules. Excellent column performance (up to 200,000 plates/metre) and reproducible chromatography are ensured by the most stringent of validation protocols.

Independent comparison tests show ACE columns give outstanding performance.
**ACE® - HPLC Columns**

### Product Specifications

<table>
<thead>
<tr>
<th>PHASE</th>
<th>FUNCTIONAL GROUP</th>
<th>ENDCAPPED</th>
<th>PARTICLE SIZE (μm)</th>
<th>PORE SIZE (Å)</th>
<th>SURFACE AREA (m²/g)</th>
<th>CARBON LOAD (%)</th>
<th>USP CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C18</td>
<td>Octadecyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>15.5</td>
<td>L1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>9.0</td>
<td>L1</td>
</tr>
<tr>
<td>C8</td>
<td>Octyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>9.0</td>
<td>L7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>5.0</td>
<td>L7</td>
</tr>
<tr>
<td>C4</td>
<td>Butyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>5.5</td>
<td>L26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>2.6</td>
<td>L26</td>
</tr>
<tr>
<td>CN</td>
<td>Cyano</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>5.5</td>
<td>L10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>2.6</td>
<td>L10</td>
</tr>
<tr>
<td>Phenyl</td>
<td>Phenyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>9.5</td>
<td>L11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>5.3</td>
<td>L11</td>
</tr>
<tr>
<td>AQ</td>
<td>Proprietary</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>14.0</td>
<td>L1</td>
</tr>
<tr>
<td>SIL</td>
<td>Unbonded</td>
<td>-</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>-</td>
<td>L3</td>
</tr>
<tr>
<td>C18-HL</td>
<td>Octadecyl</td>
<td>Yes</td>
<td>3, 5, 10, 15</td>
<td>90</td>
<td>400</td>
<td>20.0</td>
<td>L1</td>
</tr>
</tbody>
</table>

**Independant Comparison of HPLC Columns**

**Comparison of Leading 5μm C18 Columns**
- Data obtained from the National Institute of Standards and Technology (NIST), USA

- Leading 5μm C18 Column Brands
- Basic Molecule Testing
- Peak Asymmetry Investigation

"Elution of organic bases (eg. amitriptyline) with severe peak tailing is often associated with high silanol activity; however, the elution of such compounds with symmetrical peak shape is considered indicative of column deactivation."

**Peak Asymmetry Comparison**

![Peak Asymmetry Comparison Diagram]

Column: 150 x 4.6mm, 5μm  Mobile Phase: 80:20 MeOH/5mM potassium phosphate buffer (pH 7.0)  Flow: 2.0ml/min  Temperature: 24°C

The above data was obtained from the National Institute of Standards and Technology (NIST), Certificate of Analysis for Standard Reference Material 870 - "Column Performance Test Mixture for Liquid Chromatography" at the NIST internet site http://ois.nist.gov/srmcatalog/certificates/870.pdf in September 2002. The NIST test mixture, which is designed to characterize general aspects of HPLC was revised in December 2002.
Choosing the Bonded Phase that’s Best for Your Application

As a general rule, retention increases with chain length of the bonded phase, that is:

RETENTION (R):
more retentive
---
less retentive

C18-HL
C18
C8, AQ
Phenyl
C4, CN

We recommend starting most method development projects with C18 or C8, knowing that if more retention and hence more resolution is needed, your next choice is C18-HL (Hi-Load). Starting with C8 offers the benefit of shorter analysis times and/or lower organic solvent use. The elution order for most compounds will be the same on the aliphatic (C18, C8, C4) phases. If a different elution order is required for compound verification or to resolve matrix components, changing to a phenyl or CN phase may be far simpler than trying to change selectivity by mobile phase or temperature changes. In many cases, the ACE CN and ACE Phenyl phases will offer a significant difference in selectivity from the aliphatic phases.

ACE AQ is particularly recommended for applications requiring high aqueous content mobile phases. Improved resistance to retention loss caused by “pore dewetting” is seen compared to standard C18 phases.

Need even more resolution?
- Choose 3 micron ACE columns

With today’s increased pace of drug discovery, fast and efficient methods are the rule. Short, narrow-bore columns are replacing the conventional 250 x 4.6mm versions. ACE HPLC columns are available in 3μm, 5μm and 10μm particle sizes. Although 5μm particles are sufficient for most applications, greater efficiency can be obtained by using smaller particles. This increased efficiency enables the use of shorter (<150mm) column lengths, resulting in decreased analysis times. Due to the excellent flow characteristics of ACE silica, you will not experience the high back pressures often encountered with other columns.

Narrow-bore? Rapid analysis?
LC/MS? Preparative?
- No problem!

ACE bonded phases are available in a range of particle sizes, so regardless of your application, you can scale up or scale down and be assured of the same selectivity. For fast, high resolution preparative chromatography, a range of pre-packed ACE preparative and combinatorial chemistry columns are available.

Analysis of Biomolecules?
- Choose wide pore 300Å ACE columns

When molecular weight > 5000 it is generally recommended to use wide pore materials in preference to small pore (ie. 100Å) materials, although molecular shape and structure can affect this boundary.

The same ultra pure silica as used with the ACE 100Å range is now available in a 300Å pore size for the analysis of proteins, peptides and other biomolecules. A range of bonded phases and particles sizes are available to enable complete assay optimisation.

Application Summary

<table>
<thead>
<tr>
<th>PHASE</th>
<th>DESCRIPTION</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C18</td>
<td>Optimised for maximum efficiency, superior peak shape and resolution. Utilises the same ultra high purity silica as all ACE phases.</td>
<td>A C18 phase for most HPLC applications. Available in a range of particle sizes, from LC/MS and microbore applications through to preparative scale separations.</td>
</tr>
<tr>
<td>C8</td>
<td>Increased bonding density compared to ACE C18. Similarly optimised for maximum efficiency, superior peak shape and resolution.</td>
<td>Recommended starting point for method development. Also suited to high aqueous conditions and for rapid analysis applications.</td>
</tr>
<tr>
<td>C4</td>
<td>Combines lower hydrophobicity with excellent chromatographic performance. Improved hydrolytic stability compared to conventional C4 phases.</td>
<td>Use for rapid analysis optimisation, when less retention than C8 or C18 is required. Also suitable for analysis of small proteins.</td>
</tr>
<tr>
<td>CN</td>
<td>Suitable for use in both normal- and reversed-phase modes. Greatly improved performance, stability and reproducibility compared to conventional CN phases.</td>
<td>Use to increase retention of polar compounds. Ideal for gradients and rapid screening applications due to fast equilibration capabilities.</td>
</tr>
<tr>
<td>Ph</td>
<td>Hydrophobicity between C4 and C8 phases, with increased polar selectivity. Improved performance, stability and reproducibility compared to conventional phenyl phases.</td>
<td>Offers alternative selectivity for aromatic, amine or polar compounds.</td>
</tr>
<tr>
<td>AQ</td>
<td>A unique C18 bonded phase with integral polar functionality. Resistant to phase collapse even with 100% aqueous mobile phase.</td>
<td>Recommended for applications where 100% aqueous mobile phases are required. Ideal for fast gradients due to rapid re-equilibration properties.</td>
</tr>
<tr>
<td>C18-HL</td>
<td>High surface area, high carbon load phase, leading to increased retention and loading compared to ACE C18.</td>
<td>Suitable for LC/MS due to increased retention characteristics. Availability of particle sizes up to 15μm ensures easy scale-up for preparative and process scale applications.</td>
</tr>
<tr>
<td>300Å</td>
<td>The same ultra inert, ultra pure silica as the ACE 100Å columns is now available in a wide pore 300Å format. A range of bonded phases and particle sizes are available.</td>
<td>Analysis of proteins, peptides and other biomolecules. The ultra high purity 300Å silica provides improved peak shapes, especially at very low TFA concentrations which in turn provides increased sensitivity.</td>
</tr>
</tbody>
</table>
# Application Index

<table>
<thead>
<tr>
<th>Compound/Compound Class</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia farnesiana - ethanol extract from seed cover</td>
<td>7</td>
</tr>
<tr>
<td>Additives and intense sweeteners</td>
<td>7</td>
</tr>
<tr>
<td>Amino acids and biogenic amines in wine and beer</td>
<td>8</td>
</tr>
<tr>
<td>Amino acids derivatised with dabsyl chloride</td>
<td>7</td>
</tr>
<tr>
<td>Angiotensins</td>
<td>9</td>
</tr>
<tr>
<td>Annotto</td>
<td>9</td>
</tr>
<tr>
<td>Antihistamines and expectorants</td>
<td>9</td>
</tr>
<tr>
<td>Antihistamines and expectorants - bonded phase effects</td>
<td>9</td>
</tr>
<tr>
<td>Antihistamines and expectorants - mobile phase effects</td>
<td>10</td>
</tr>
<tr>
<td>Antihistamines and expectorants - rapid analysis</td>
<td>10</td>
</tr>
<tr>
<td>Artemisinin</td>
<td>10</td>
</tr>
<tr>
<td>Artificial food colours</td>
<td>10</td>
</tr>
<tr>
<td>Avena nacins</td>
<td>11</td>
</tr>
<tr>
<td>Benzo(a)pyrene-7,8-quinone derived deoxynucleotide DNA adducts</td>
<td>11</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>11</td>
</tr>
<tr>
<td>Brompheniramine maleate</td>
<td>11</td>
</tr>
<tr>
<td>Catechins</td>
<td>12</td>
</tr>
<tr>
<td>Catecholamines</td>
<td>12</td>
</tr>
<tr>
<td>Catecholamines from plasma</td>
<td>12</td>
</tr>
<tr>
<td>Catecholamines from urine</td>
<td>13</td>
</tr>
<tr>
<td>Cefquinome</td>
<td>13</td>
</tr>
<tr>
<td>Clausena excavate - semi-preparative HPLC of methanolic leaf extract</td>
<td>13</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>13</td>
</tr>
<tr>
<td>Cold medicine components</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin mixture</td>
<td>14</td>
</tr>
<tr>
<td>Didanosine</td>
<td>14</td>
</tr>
<tr>
<td>Dipeptidyl peptidase IV (DPP-IV)</td>
<td>14</td>
</tr>
<tr>
<td>Entacapone</td>
<td>15</td>
</tr>
<tr>
<td>Epanolol</td>
<td>15</td>
</tr>
<tr>
<td>Epinastine</td>
<td>15</td>
</tr>
<tr>
<td>Flavone and dibucaaine - effect of temperature</td>
<td>16</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>16</td>
</tr>
<tr>
<td>Flurbiprofen and related substances</td>
<td>16</td>
</tr>
<tr>
<td>Galanthamine</td>
<td>16</td>
</tr>
<tr>
<td>Garlic analysis 1</td>
<td>17</td>
</tr>
<tr>
<td>Garlic analysis 2</td>
<td>17</td>
</tr>
<tr>
<td>Herbicide - benfluralin</td>
<td>17</td>
</tr>
<tr>
<td>Herbicide - trifluralin</td>
<td>17</td>
</tr>
<tr>
<td>Hippuric acid</td>
<td>19</td>
</tr>
<tr>
<td>Ibuprofen and related impurities</td>
<td>18</td>
</tr>
<tr>
<td>Illegal dyes in spices</td>
<td>18</td>
</tr>
<tr>
<td>Insulins</td>
<td>19</td>
</tr>
<tr>
<td>Isoflavones</td>
<td>19</td>
</tr>
<tr>
<td>Local anaesthetics</td>
<td>19</td>
</tr>
<tr>
<td>Malachite green</td>
<td>20</td>
</tr>
<tr>
<td>Maleic and fumaric acids</td>
<td>20</td>
</tr>
<tr>
<td>Nitroanilines</td>
<td>20</td>
</tr>
<tr>
<td>Nitrofurans</td>
<td>21</td>
</tr>
<tr>
<td>Ochratoxin A</td>
<td>22</td>
</tr>
<tr>
<td>Organic acids</td>
<td>22</td>
</tr>
<tr>
<td>Organotin compounds</td>
<td>23</td>
</tr>
<tr>
<td>OTC gastric drugs</td>
<td>22</td>
</tr>
<tr>
<td>Oxymetazoline in nasal spray formulation</td>
<td>23</td>
</tr>
<tr>
<td>Paclitaxel</td>
<td>23</td>
</tr>
<tr>
<td>Paroxetine and desfluoro analogue</td>
<td>23</td>
</tr>
<tr>
<td>Peptide test mix</td>
<td>26</td>
</tr>
<tr>
<td>Peptides - selectivity changes with bonded phase and mobile phase</td>
<td>24</td>
</tr>
<tr>
<td>Peptides - varying mobile phase</td>
<td>25</td>
</tr>
<tr>
<td>Peptides - varying pH</td>
<td>25</td>
</tr>
<tr>
<td>Pesticides in water</td>
<td>26</td>
</tr>
<tr>
<td>Phenolic acids</td>
<td>26</td>
</tr>
<tr>
<td>Phenols in purple coneflower <em>(echinacea purpurea)</em></td>
<td>27</td>
</tr>
<tr>
<td>Pilocarpine</td>
<td>27</td>
</tr>
<tr>
<td>Polyamines</td>
<td>27</td>
</tr>
<tr>
<td>Polyethylene glycol 1000</td>
<td>27</td>
</tr>
<tr>
<td>Preservatives</td>
<td>28</td>
</tr>
<tr>
<td>Prostaglandins</td>
<td>28</td>
</tr>
<tr>
<td>Protein test mix</td>
<td>28</td>
</tr>
<tr>
<td>Proton pump inhibitors (PPIs)</td>
<td>28</td>
</tr>
<tr>
<td>PPI - Lansoprazole degradation studies</td>
<td>29</td>
</tr>
<tr>
<td>PPI - Lansoprazole degradation studies - 0.4M NaOH</td>
<td>29</td>
</tr>
<tr>
<td>Selectivity test mix</td>
<td>30</td>
</tr>
<tr>
<td>Selectivity test mix - high throughput analysis</td>
<td>30</td>
</tr>
<tr>
<td>Sotalol</td>
<td>30</td>
</tr>
<tr>
<td>Statins - atorvastatin</td>
<td>30</td>
</tr>
<tr>
<td>Statins - fluvastatin</td>
<td>31</td>
</tr>
<tr>
<td>Statins - pravastatin</td>
<td>31</td>
</tr>
<tr>
<td>Statins - simvastatin</td>
<td>31</td>
</tr>
<tr>
<td>Statin mixture</td>
<td>31</td>
</tr>
<tr>
<td>Substituted naphthalenes</td>
<td>32</td>
</tr>
<tr>
<td>Telithromycin</td>
<td>32</td>
</tr>
<tr>
<td>Terfenadine and fexofenadine in rat plasma</td>
<td>32</td>
</tr>
<tr>
<td>Test mix - Dolan 1</td>
<td>32</td>
</tr>
<tr>
<td>Test mix - Dolan 2</td>
<td>33</td>
</tr>
<tr>
<td>Test mix - Engelhardt</td>
<td>33</td>
</tr>
<tr>
<td>Test mix - Euerby</td>
<td>33</td>
</tr>
<tr>
<td>Test mix - Mutton</td>
<td>33</td>
</tr>
<tr>
<td>Testosterone</td>
<td>34</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>34</td>
</tr>
<tr>
<td>Tocopherols</td>
<td>34</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>35</td>
</tr>
<tr>
<td>Tryptic digest of BSA</td>
<td>34</td>
</tr>
<tr>
<td>Vitamins - fat soluble</td>
<td>35</td>
</tr>
<tr>
<td>Vitamins - water soluble (isocratic)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamins - water soluble (gradient)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamins - water soluble (isocratic)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamins - water soluble (gradient)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamins - water soluble (phase selectivity)</td>
<td>37</td>
</tr>
<tr>
<td>Vitamins - water soluble (rapid analysis)</td>
<td>37</td>
</tr>
<tr>
<td>Water soluble artificial colours</td>
<td>38</td>
</tr>
<tr>
<td>Whey proteins from whole milk</td>
<td>38</td>
</tr>
</tbody>
</table>
## Analyte Index

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>14</td>
</tr>
<tr>
<td>Acetophenone</td>
<td>32</td>
</tr>
<tr>
<td>4-ACETYL-2-FLUOROBIPHENYL</td>
<td>16</td>
</tr>
<tr>
<td>n-ACETYLPROCAINAMIDE</td>
<td>33</td>
</tr>
<tr>
<td>ACETYLsalicylic acid (aspirin)</td>
<td>14,22</td>
</tr>
<tr>
<td>Adrenaline (epinephrine)</td>
<td>12,13</td>
</tr>
<tr>
<td>Agmatine</td>
<td>8</td>
</tr>
<tr>
<td>Ajohnene</td>
<td>17</td>
</tr>
<tr>
<td>Alachlor</td>
<td>26</td>
</tr>
<tr>
<td>α-ALANINE</td>
<td>8</td>
</tr>
<tr>
<td>β-ALANINE</td>
<td>8</td>
</tr>
<tr>
<td>Allicin</td>
<td>17</td>
</tr>
<tr>
<td>Allin</td>
<td>17</td>
</tr>
<tr>
<td>Allura red</td>
<td>38</td>
</tr>
<tr>
<td>Amaranth</td>
<td>10,38</td>
</tr>
<tr>
<td>L-2-Aminoanidipic acid</td>
<td>8</td>
</tr>
<tr>
<td>P-Aminobenzoic acid</td>
<td>36,37</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>33,35</td>
</tr>
<tr>
<td>Ammonium ion</td>
<td>7,8</td>
</tr>
<tr>
<td>Angiotensin I</td>
<td>9,24,25,26</td>
</tr>
<tr>
<td>Angiotensin II</td>
<td>9</td>
</tr>
<tr>
<td>Angiotensin III</td>
<td>.9</td>
</tr>
<tr>
<td>Aniline</td>
<td>33</td>
</tr>
<tr>
<td>Anisole</td>
<td>32</td>
</tr>
<tr>
<td>Apomyoglobin</td>
<td>28</td>
</tr>
<tr>
<td>Arginine</td>
<td>7,8</td>
</tr>
<tr>
<td>Artaminsin</td>
<td>10</td>
</tr>
<tr>
<td>Ascorbic acid (vitamin C)</td>
<td>14,22,36</td>
</tr>
<tr>
<td>Asparagine</td>
<td>8</td>
</tr>
<tr>
<td>Aspartame</td>
<td>7</td>
</tr>
<tr>
<td>Aspartic acid</td>
<td>.8</td>
</tr>
<tr>
<td>Aspirin (acetylsalicylic acid)</td>
<td>14,22</td>
</tr>
<tr>
<td>Atorvastatin</td>
<td>30,31</td>
</tr>
<tr>
<td>Atrazine</td>
<td>26</td>
</tr>
<tr>
<td>Avenacin A-1</td>
<td>11</td>
</tr>
<tr>
<td>Avenacin A-2</td>
<td>11</td>
</tr>
<tr>
<td>Avenacin B-1</td>
<td>11</td>
</tr>
<tr>
<td>Avenacin B-2</td>
<td>11</td>
</tr>
<tr>
<td>Benfurlanil</td>
<td>17</td>
</tr>
<tr>
<td>Benzalkonium chloride</td>
<td>23</td>
</tr>
<tr>
<td>Benzoic acid</td>
<td>22,28</td>
</tr>
<tr>
<td>Benzonitrile</td>
<td>33</td>
</tr>
<tr>
<td>Benzenophen</td>
<td>18</td>
</tr>
<tr>
<td>Benzyl alcohol</td>
<td>33</td>
</tr>
<tr>
<td>Benzyllamine</td>
<td>33</td>
</tr>
<tr>
<td>D-Biotin (vitamin H)</td>
<td>36,37</td>
</tr>
<tr>
<td>9'-Cis-Bixin</td>
<td>.9</td>
</tr>
<tr>
<td>9'-trans-Bixin</td>
<td>.9</td>
</tr>
<tr>
<td>Brompheniramine maleate</td>
<td>11</td>
</tr>
<tr>
<td>BSA (tryptic digest)</td>
<td>34</td>
</tr>
<tr>
<td>Butter yellow</td>
<td>18</td>
</tr>
<tr>
<td>n-Butylbenzene</td>
<td>32</td>
</tr>
<tr>
<td>4-Butylbenzoic acid</td>
<td>30,33</td>
</tr>
<tr>
<td>Cadaverine</td>
<td>8,27</td>
</tr>
<tr>
<td>Caffeic acid</td>
<td>26</td>
</tr>
<tr>
<td>Caffeine</td>
<td>7,14</td>
</tr>
<tr>
<td>Caffeic acid</td>
<td>27</td>
</tr>
<tr>
<td>Carbamazepine</td>
<td>38</td>
</tr>
<tr>
<td>Cefquinome</td>
<td>13</td>
</tr>
<tr>
<td>cis-Chalcone</td>
<td>33</td>
</tr>
<tr>
<td>trans-Chalcone</td>
<td>33</td>
</tr>
<tr>
<td>4-Chlorocinnamic acid</td>
<td>33</td>
</tr>
<tr>
<td>Chlorogenic acid</td>
<td>27</td>
</tr>
<tr>
<td>Chlorpheniramine maleate</td>
<td>9,10</td>
</tr>
<tr>
<td>Chlorotetracycline</td>
<td>34</td>
</tr>
<tr>
<td>Cichoric acid</td>
<td>27</td>
</tr>
<tr>
<td>Cimetidine</td>
<td>22</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>13</td>
</tr>
<tr>
<td>Cocaine</td>
<td>19</td>
</tr>
<tr>
<td>p-Coumaric acid</td>
<td>26</td>
</tr>
<tr>
<td>Cyanazine</td>
<td>26</td>
</tr>
<tr>
<td>Cyanocobalamin (vitamin B12)</td>
<td>36,37</td>
</tr>
<tr>
<td>Cyclamate</td>
<td>7</td>
</tr>
<tr>
<td>Cyclosporin A</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin B</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin C</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin D</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin E</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin F</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin G</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin L</td>
<td>14</td>
</tr>
<tr>
<td>Cyclosporin U</td>
<td>14</td>
</tr>
<tr>
<td>Cysteine</td>
<td>8</td>
</tr>
<tr>
<td>Cytochrome C</td>
<td>28</td>
</tr>
<tr>
<td>Daidzein</td>
<td>19</td>
</tr>
<tr>
<td>Daidzin</td>
<td>19</td>
</tr>
<tr>
<td>Demeclocycline</td>
<td>34</td>
</tr>
<tr>
<td>Dexoyaliin</td>
<td>17</td>
</tr>
<tr>
<td>Desethyaltazine</td>
<td>26</td>
</tr>
<tr>
<td>Desfluoroperoxetine</td>
<td>23</td>
</tr>
<tr>
<td>Desisopropylatrazine</td>
<td>26</td>
</tr>
<tr>
<td>Dextromethorphan</td>
<td>9,10</td>
</tr>
<tr>
<td>Dibucaine</td>
<td>16</td>
</tr>
<tr>
<td>Dibutylin</td>
<td>23</td>
</tr>
<tr>
<td>Didanosine</td>
<td>14</td>
</tr>
<tr>
<td>Diethylacetamide</td>
<td>32</td>
</tr>
<tr>
<td>Dihydrcyclosporin A</td>
<td>9,14</td>
</tr>
<tr>
<td>2,3-Dihydroxyxypthalene</td>
<td>33</td>
</tr>
<tr>
<td>3,4-Dihydroxyxynaphthalene</td>
<td>12,13</td>
</tr>
<tr>
<td>N,N-Dimethylaniline</td>
<td>30,33</td>
</tr>
<tr>
<td>1,4-Dimethylnaphthalene</td>
<td>32</td>
</tr>
<tr>
<td>Dimethyl phthalate</td>
<td>30</td>
</tr>
<tr>
<td>Diphenyl ether</td>
<td>33</td>
</tr>
<tr>
<td>L-DOPA</td>
<td>12</td>
</tr>
<tr>
<td>Dopamine</td>
<td>12,13</td>
</tr>
<tr>
<td>cis-Doxepin</td>
<td>14</td>
</tr>
<tr>
<td>trans-Doxepin</td>
<td>14</td>
</tr>
<tr>
<td>Doxycline</td>
<td>34</td>
</tr>
<tr>
<td>Entacapone</td>
<td>15</td>
</tr>
<tr>
<td>Epanolol</td>
<td>15</td>
</tr>
<tr>
<td>(+)-Epicatechin</td>
<td>12</td>
</tr>
<tr>
<td>Epigallocatechin</td>
<td>12</td>
</tr>
<tr>
<td>Epigallocatechin gallate</td>
<td>12</td>
</tr>
<tr>
<td>Epinastine</td>
<td>15</td>
</tr>
<tr>
<td>Erythrosine</td>
<td>38</td>
</tr>
<tr>
<td>Ethenamidze</td>
<td>14</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>32,33</td>
</tr>
<tr>
<td>Ethyl benzoate</td>
<td>33</td>
</tr>
<tr>
<td>1-Ethynaphthalene</td>
<td>32</td>
</tr>
<tr>
<td>2-Ethynaphthalene</td>
<td>32</td>
</tr>
<tr>
<td>Ethyl paraben</td>
<td>28</td>
</tr>
<tr>
<td>Farnotidine</td>
<td>22</td>
</tr>
<tr>
<td>Furfural</td>
<td>26</td>
</tr>
<tr>
<td>Fexofenadine</td>
<td>32</td>
</tr>
<tr>
<td>Flavone</td>
<td>16</td>
</tr>
<tr>
<td>Flurbiprofen</td>
<td>16</td>
</tr>
<tr>
<td>Fluvastatin</td>
<td>31</td>
</tr>
<tr>
<td>Folic acid (vitamin M)</td>
<td>36,37</td>
</tr>
<tr>
<td>Fumaric acid</td>
<td>20</td>
</tr>
<tr>
<td>Furfaltadone</td>
<td>21</td>
</tr>
<tr>
<td>Furazolidone</td>
<td>21</td>
</tr>
<tr>
<td>GABA</td>
<td>8</td>
</tr>
<tr>
<td>Galanthamine</td>
<td>16</td>
</tr>
<tr>
<td>Genistein</td>
<td>19</td>
</tr>
<tr>
<td>Genistin</td>
<td>19</td>
</tr>
<tr>
<td>Glutamic acid</td>
<td>8</td>
</tr>
<tr>
<td>Glutamine</td>
<td>8</td>
</tr>
<tr>
<td>Glycine</td>
<td>8</td>
</tr>
<tr>
<td>Gly-Tyr</td>
<td>24,25,26</td>
</tr>
<tr>
<td>Guaiacol</td>
<td>9,10</td>
</tr>
<tr>
<td>Guaiifenesin</td>
<td>9,10</td>
</tr>
<tr>
<td>Hippuric acid</td>
<td>19</td>
</tr>
<tr>
<td>Histamine</td>
<td>8</td>
</tr>
<tr>
<td>Histidine</td>
<td>8</td>
</tr>
<tr>
<td>Holo-transferrin</td>
<td>28</td>
</tr>
<tr>
<td>p-Hydroxybenzoic acid</td>
<td>28</td>
</tr>
<tr>
<td>Hydroxyproline</td>
<td>8</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>18</td>
</tr>
<tr>
<td>Impiramine</td>
<td>35</td>
</tr>
<tr>
<td>Insulin (bovine)</td>
<td>19</td>
</tr>
<tr>
<td>Insulin (human)</td>
<td>19</td>
</tr>
<tr>
<td>Insulin (porcine)</td>
<td>19</td>
</tr>
<tr>
<td>Analyte Index (continued)</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Isoamylamine</td>
<td>8</td>
</tr>
<tr>
<td>Isoeugenol</td>
<td>14</td>
</tr>
<tr>
<td>Isocitrate</td>
<td>8</td>
</tr>
<tr>
<td>Isopilocarpine</td>
<td>27</td>
</tr>
<tr>
<td>Kaempferol</td>
<td>16</td>
</tr>
<tr>
<td>α-Lactalbumin</td>
<td>38</td>
</tr>
<tr>
<td>β-Lactoglobulin A</td>
<td>38</td>
</tr>
<tr>
<td>β-Lactoglobulin B</td>
<td>38</td>
</tr>
<tr>
<td>Lansoprazole</td>
<td>29, 29</td>
</tr>
<tr>
<td>Leucine</td>
<td>7, 8</td>
</tr>
<tr>
<td>Leucine enkephalin</td>
<td>24, 25</td>
</tr>
<tr>
<td>Leucomalachite green</td>
<td>20</td>
</tr>
<tr>
<td>Lignocaine</td>
<td>19</td>
</tr>
<tr>
<td>Lysine</td>
<td>7, 8</td>
</tr>
<tr>
<td>Malachite green</td>
<td>20</td>
</tr>
<tr>
<td>Maleic acid</td>
<td>9, 10, 11, 20, 22</td>
</tr>
<tr>
<td>Metanil yellow</td>
<td>18</td>
</tr>
<tr>
<td>Methionine</td>
<td>7, 8</td>
</tr>
<tr>
<td>Methionine enkephalin</td>
<td>24, 25</td>
</tr>
<tr>
<td>2-Methylhippuric acid</td>
<td>19</td>
</tr>
<tr>
<td>2-Methylvaleraldehyde</td>
<td>32</td>
</tr>
<tr>
<td>Methyl paraben</td>
<td>28</td>
</tr>
<tr>
<td>Metoprolol</td>
<td>11</td>
</tr>
<tr>
<td>Neohesperidin dihydrochalcone</td>
<td>7</td>
</tr>
<tr>
<td>Neurotensin</td>
<td>26</td>
</tr>
<tr>
<td>Niacinamide (vitamin B3)</td>
<td>36</td>
</tr>
<tr>
<td>Nicotine</td>
<td>33</td>
</tr>
<tr>
<td>Nicotinic acid</td>
<td>36</td>
</tr>
<tr>
<td>m-Ontrolanilene</td>
<td>20</td>
</tr>
<tr>
<td>o-Nitroaniline</td>
<td>20</td>
</tr>
<tr>
<td>p-Nitroaniline</td>
<td>20</td>
</tr>
<tr>
<td>4-Nitrobenzoic acid</td>
<td>33</td>
</tr>
<tr>
<td>Nitrofurazone</td>
<td>21</td>
</tr>
<tr>
<td>Noradrenaline (norepinephrine)</td>
<td>12, 13</td>
</tr>
<tr>
<td>Norephedrine</td>
<td>9, 35</td>
</tr>
<tr>
<td>Norbixin</td>
<td>9</td>
</tr>
<tr>
<td>Norfenicine</td>
<td>7</td>
</tr>
<tr>
<td>Norfotyline</td>
<td>35</td>
</tr>
<tr>
<td>Ochratoxin A</td>
<td>22</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>28</td>
</tr>
<tr>
<td>Orange II</td>
<td>18</td>
</tr>
<tr>
<td>Ornithine</td>
<td>8</td>
</tr>
<tr>
<td>Oxymetazoline</td>
<td>23</td>
</tr>
<tr>
<td>Oxprenol</td>
<td>11</td>
</tr>
<tr>
<td>Oxytetracycline</td>
<td>34</td>
</tr>
<tr>
<td>Oxytocin</td>
<td>26</td>
</tr>
<tr>
<td>Paclitaxel (taxol)</td>
<td>23</td>
</tr>
<tr>
<td>Pantothenic acid (vitamin B5)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Para red</td>
<td>18</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>23</td>
</tr>
<tr>
<td>Pendimethalin</td>
<td>26</td>
</tr>
<tr>
<td>Phenol</td>
<td>30, 33</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>8</td>
</tr>
<tr>
<td>Phenylthylamine</td>
<td>8</td>
</tr>
<tr>
<td>Phthalic acid</td>
<td>9</td>
</tr>
<tr>
<td>Pilocarpine</td>
<td>27</td>
</tr>
<tr>
<td>Pindolol</td>
<td>11</td>
</tr>
<tr>
<td>Polyethylene glycol</td>
<td>27</td>
</tr>
<tr>
<td>Ponceau 4R</td>
<td>10, 38</td>
</tr>
<tr>
<td>Pravastatin</td>
<td>31</td>
</tr>
<tr>
<td>Procanamide</td>
<td>33</td>
</tr>
<tr>
<td>Procaine</td>
<td>19</td>
</tr>
<tr>
<td>Proline</td>
<td>7, 8</td>
</tr>
<tr>
<td>Prometryn</td>
<td>26</td>
</tr>
<tr>
<td>Propafenone</td>
<td>26</td>
</tr>
<tr>
<td>Propranolol</td>
<td>11</td>
</tr>
<tr>
<td>Propyl paraben</td>
<td>28</td>
</tr>
<tr>
<td>Prostaglandin F2</td>
<td>28</td>
</tr>
<tr>
<td>8-iso-Prostaglandin F2</td>
<td>28</td>
</tr>
<tr>
<td>Putrescine</td>
<td>8, 27</td>
</tr>
<tr>
<td>Pyridine</td>
<td>30, 33</td>
</tr>
<tr>
<td>Pyridoxal</td>
<td>36</td>
</tr>
<tr>
<td>Pyridoxamine</td>
<td>36</td>
</tr>
<tr>
<td>Pyridoxine</td>
<td>36, 37</td>
</tr>
<tr>
<td>Quercetin</td>
<td>16</td>
</tr>
<tr>
<td>Quercitrin</td>
<td>16</td>
</tr>
<tr>
<td>Quinine sulphate</td>
<td>7</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>22</td>
</tr>
<tr>
<td>Red 2G</td>
<td>38</td>
</tr>
<tr>
<td>Rhodamine B</td>
<td>18</td>
</tr>
<tr>
<td>Riboflavin (vitamin B2)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Ribonucleic A</td>
<td>28</td>
</tr>
<tr>
<td>Rutin</td>
<td>16</td>
</tr>
<tr>
<td>Saccharin</td>
<td>7</td>
</tr>
<tr>
<td>Salbutamol</td>
<td>33</td>
</tr>
<tr>
<td>Salicylamide</td>
<td>9, 10</td>
</tr>
<tr>
<td>Salicylic acid</td>
<td>22</td>
</tr>
<tr>
<td>Sebutylazolaine</td>
<td>26</td>
</tr>
<tr>
<td>Serine</td>
<td>8</td>
</tr>
<tr>
<td>Sesamol</td>
<td>23</td>
</tr>
<tr>
<td>Simazine</td>
<td>26</td>
</tr>
<tr>
<td>Simvastatin</td>
<td>31</td>
</tr>
<tr>
<td>Sorbic acid</td>
<td>28</td>
</tr>
<tr>
<td>Sotolol</td>
<td>30</td>
</tr>
<tr>
<td>Sperridine</td>
<td>8</td>
</tr>
<tr>
<td>Suralose</td>
<td>7</td>
</tr>
<tr>
<td>Sudan I</td>
<td>18</td>
</tr>
<tr>
<td>Sudan II</td>
<td>18</td>
</tr>
<tr>
<td>Sudan III</td>
<td>18</td>
</tr>
<tr>
<td>Sudan IV</td>
<td>18</td>
</tr>
<tr>
<td>Sudan black G</td>
<td>18</td>
</tr>
<tr>
<td>Sudan orange G</td>
<td>18</td>
</tr>
<tr>
<td>Sudan red B</td>
<td>18</td>
</tr>
<tr>
<td>Sudan red 7B</td>
<td>18</td>
</tr>
<tr>
<td>Sudan red G</td>
<td>18</td>
</tr>
<tr>
<td>Sunset yellow</td>
<td>10, 38</td>
</tr>
<tr>
<td>Tartrazine</td>
<td>10</td>
</tr>
<tr>
<td>Taxol (paclitaxel)</td>
<td>23</td>
</tr>
<tr>
<td>Telithromycin</td>
<td>32</td>
</tr>
<tr>
<td>Terbutaline</td>
<td>33</td>
</tr>
<tr>
<td>Terbutylazine</td>
<td>26</td>
</tr>
<tr>
<td>Terbutryne</td>
<td>26</td>
</tr>
<tr>
<td>Terfenadine</td>
<td>32</td>
</tr>
<tr>
<td>Testosterone</td>
<td>34</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>34</td>
</tr>
<tr>
<td>Theobromine</td>
<td>7</td>
</tr>
<tr>
<td>Theophylline</td>
<td>7</td>
</tr>
<tr>
<td>Thiamine (vitamin B1)</td>
<td>36</td>
</tr>
<tr>
<td>Thiocine</td>
<td>36</td>
</tr>
<tr>
<td>Thiorurea</td>
<td>33</td>
</tr>
<tr>
<td>Threonine</td>
<td>7, 8</td>
</tr>
<tr>
<td>c-Tocopherol</td>
<td>34</td>
</tr>
<tr>
<td>β-Tocopherol</td>
<td>34</td>
</tr>
<tr>
<td>γ-Tocopherol</td>
<td>34</td>
</tr>
<tr>
<td>δ-Tocopherol</td>
<td>34</td>
</tr>
<tr>
<td>Tolune</td>
<td>30, 33, 35</td>
</tr>
<tr>
<td>Toluidine</td>
<td>33</td>
</tr>
<tr>
<td>Toluidine red</td>
<td>18</td>
</tr>
<tr>
<td>Tributyltin</td>
<td>23</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>17</td>
</tr>
<tr>
<td>Tryptamine</td>
<td>8</td>
</tr>
<tr>
<td>Trystophan</td>
<td>7, 8</td>
</tr>
<tr>
<td>Tyramine</td>
<td>8</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>8, 12</td>
</tr>
<tr>
<td>Uracil</td>
<td>30</td>
</tr>
<tr>
<td>Valine</td>
<td>7, 8</td>
</tr>
<tr>
<td>Val-Tyr-Val</td>
<td>24, 25</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin A acetate</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin B1 (thiamine)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamin B2 (riboflavin)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Vitamin B3 (niacinamide)</td>
<td>36</td>
</tr>
<tr>
<td>Vitamin B5 (pantethenic acid)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Vitamin B12 (cyanocobalamin)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Vitamin C (ascorbic acid)</td>
<td>14, 22, 36</td>
</tr>
<tr>
<td>Vitamin D2</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin D3</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin E acetate</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin H (d-biotin)</td>
<td>36, 37</td>
</tr>
<tr>
<td>Vitamin K1</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin K3</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin M (folic acid)</td>
<td>36, 37</td>
</tr>
<tr>
<td>VMA (vanillylmandelic acid)</td>
<td>12</td>
</tr>
</tbody>
</table>
Acacia Farnesiana - Ethanol Extract from Seed Cover

Analytical method development for subsequent scale-up to preparative HPLC

**Conditions**

- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:**
  - A: MeOH
  - B: H₂O
- **Flow Rate:** 2.0ml/min
- **Gradient:**
  - T(min) 0 2.5 60 62.5 70
  - %A 15 15 50 50 15
  - %B 85 85 50 50 85
- **Temperature:** Ambient
- **Detection:** UV, 230nm

Additives and Intense Sweeteners

**Conditions**

- **Column:** ACE 5 C18, 250 x 4.0mm
- **Part Number:** ACE-121-2504
- **Mobile Phase:**
  - A: H₂O
  - B: MeCN
  - C: 1% TFA
- **Gradient:**
  - T(min) %A %B %C
  - 0 8 2 1 0
  - 25 50 40 10
  - 30 30 60 10
  - 35 88 2 10
- **Flow Rate:** 1.0ml/min
- **Temperature:** 30°C
- **Detection:** ELSD

Compounds

1. Acesulfame K
2. Theobromine
3. Theophylline
4. Cyclamate
5. Saccharin
6. Caffeine
7. Sucralose
8. Quinine sulphate
9. Aspartame
10. Neohesperidin dihydrochalcone

Amino Acids Derivatised with Dabsyl Chloride

**Conditions**

- **Column:** ACE 3 C18, 150 x 3.0mm
- **Part Number:** ACE-111-1503
- **Mobile Phase:**
  - A. 10mM KH₂PO₄ buffer (pH 6.55)
  - B: 70:30 MeCN/2-Propanol
- **Flow Rate:** 0.5ml/min
- **Gradient:**
  - T(min) %A %B
  - 0 90 10
  - 3 82 18
  - 17 82 18
  - 27 78 22
  - 35 78 22
  - 50 65 35
  - 57 65 35
  - 70 35 65
  - 70.1 35 65
  - 89 90 10
  - 90 90 10
- **Temperature:** 50°C
- **Detection:** UV, 436nm (PDA detector)
- **Injection Volume:** 20μl

Compounds

1. L-Arginine
2. L-Threonine
3. L-Proline
4. L-Valine
5. L-Methionine
6. L-Isoleucine
7. L-Tryptophan
8. L-Norleucine
9. L-Leucine
10. Ammonium ion
11. L-Lysine

---

Reproduced with kind permission of School of Pharmacy, University of Sunderland, UK

Reproduced with kind permission of Durham County Council, UK

Reproduced with kind permission of Department of Veterinary Public Health, University of Veterinary Medicine, Vienna, Austria
**Amino Acids and Biogenic Amines in Wine and Beer**

### Conditions

**Sample Preparation:** Derivatisation with diethyl ethoxymethylmalonate

**Column:** ACE 5 C18-HL, 250 x 4.6mm

**Part Number:** ACE-321-2546

**Mobile Phase:**
- A: 25mM acetate buffer (pH 5.8)
- B: 80:20 MeCN/MeOH

**Flow Rate:** 0.8ml/min

**Gradient:**

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>%A</th>
<th>%B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>30.5</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>33.5</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>65</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>73</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>78</td>
<td>18</td>
<td>82</td>
</tr>
<tr>
<td>82</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>85</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

**Temperature:** 16°C

**Detection:** DAD, 280, 269 and 300nm

**Injection Volume:** 20μl

### Compounds

1. Aspartic acid
2. Glutamic acid
3. I.S. (L-2-Aminoadipic acid)
4. Asparagine
5. Serine
6. Hydroxyproline
7. Glutamine
8. Histidine
9. Threonine
10. beta-Alanine
11. Arginine
12. alpha-Alanine
13. GABA
14. Proline
15. Histamine
16. Tyrosine
17. Ammonium ion
18. Agmatine
19. Valine
20. Methionine
21. Cysteine
22. Isoleucine
23. Tryptophan
24. Leucine
25. Phenylalanine
26. Ornithine
27. Lysine
28. Spermidine
29. Tyramine
30. Putrescine
31. Tryptamine
32. Cadaverine
33. Phenylethylamine
34. Isoamylamine

---

Reproduced with kind permission of Instituto de la Vid y el Vino de Castilla-La Mancha, Spain
**Angiotensins**

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 50:50 MeOH/50mM KH2PO4 (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: 22°C
- Detection: UV, 220nm

**Compounds**
1. Angiotensin II
2. Angiotensin III
3. Angiotensin I

---

**Annatto**

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 70:30 MeCN/0.16% CH3CO2H in H2O
- Flow Rate: 1.2ml/min
- Temperature: Ambient
- Detection: UV/VIS, 478nm

**Compounds**
1. Norbixin
2. 9'-trans-Bixin
3. 9'-cis-Bixin

---

**Antihistamines and Expectorants**

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 45:55 MeCN/20mM KH2PO4 (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Injection Volume: 0.4μl

**Compounds**
1. Maleic acid
2. Salicylamide
3. Guaifenesin
4. Guaiacol
5. Chlorpheniramine maleate
6. Dextromethorphan

---

**Antihistamines and Expectorants - Bonded Phase Effects**

**Conditions**
- Column: ACE S C18 and ACE S Phenyl
- Column Dimensions: 150 x 4.6mm
- Part Number: ACE-121-1546 and ACE-125-1546
- Mobile Phase: 45:55 MeCN/20mM KH2PO4 (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Injection Volume: 0.4μl

**Compounds**
1. Maleic acid
2. Salicylamide
3. Guaifenesin
4. Guaiacol
5. Chlorpheniramine maleate
6. Dextromethorphan
Antihistamines and Expectorants - Mobile Phase Effects

**Conditions**

Column: ACE 5 C18, 150 x 4.6mm  
Part Number: ACE-5121-1546  
Mobile Phase: (a) 45:55 MeOH/50mM KH₂PO₄ (pH 3.0)  
(b) 28:72 MeCN/50mM KH₂PO₄ (pH 3.0)

**Compounds**

1. Maleic acid  
2. Salicylamide  
3. Guaifenesin  
4. Guaiacol  
5. Chlorpheniramine maleate  
6. Dextromethorphan

**App. No. 1045**

(a) Methanol based mobile phase

**App. No. 1046**

(b) Acetonitrile based mobile phase

---

Antihistamines and Expectorants - Rapid Analysis

**Conditions (a)**

Column: ACE 3 C18, 100 x 4.6mm  
Part Number: ACE-3111-1046  
Mobile Phase: 45:55 MeOH/20mM KH₂PO₄ (pH 3.0)

**Compounds**

1. Maleic acid  
3. Guaiacol  
5. Chlorpheniramine maleate  
6. Dextromethorphan

**App. No. 1047**

(b) Acetonitrile based mobile phase

---

Artificial Food Colours

**Conditions**

Column: ACE 3 C18, 100 x 4.6mm  
Part Number: ACE-3111-1046  
Mobile Phase: A. 3.1mM TBAB  
B. 5mM KH₂PO₄ in MeOH

**Compounds**

1. Tartrazine  
2. Amaranth  
3. Sunset Yellow  
4. Ponceau 4R

**App. No. 1048**

Reproduced with kind permission of Neem Biotech, Cardiff, UK

---

Reproduced with kind permission of Lincolne Sutton & Wood, Norwich, UK
### Avenacins

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 70:30 MeOH/H₂O
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 225nm
- Sample: Partially purified extract from oat root

**Compounds**
1. Avenacin A-2
2. Avenacin B-2
3. Avenacin A-1
4. Avenacin B-1

---

### Beta Blockers

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 65:35 MeOH/50mM
1-methylpiperidine (pH 11.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 215nm

**Compounds**
1. Pindolol
2. Metoprolol
3. Oxprenolol
4. Propranolol

---

### Benzo(a)pyrene-7,8-quinone Derived Deoxynucleotide DNA Adducts

**Conditions**
- Column: ACE 3 C18, 150 x 4.6mm
- Part Number: ACE-111-1546
- Mobile Phase: A. 0.1% HCO₂H  
B: MeCN
- Flow Rate: 1.0ml/min
- Gradient: T(mins) %A %B  
0 7 5 2  
8 45 55
- Temperature: 35°C
- Detection: UV, 285nm
- Injection Volume: 5μl

**Compounds**
1. BPQ-dG#1
2. BPQ-dG#2
3. BPQ-dG#3
4. BPQ-dG#4

---

### Brompheniramine Maleate

**Conditions**
- Column: ACE 5 CN, 150 x 4.6mm
- Part Number: ACE-124-1546
- Mobile Phase: 5:95 MeOH/H₂O containing 20mM HCO₂H, pH 3.0 with HCO₂H
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 265nm
- Injection Volume: 20μl (0.2mg/ml solution)

**Compounds**
1. Maleic acid
2. Brompheniramine maleate
**Catechins**

**Conditions**
- Column: ACE S C18, ACE 5 Phenyl, ACE 5 CN
- Column Dimensions: 150 x 4.6mm
- Mobile Phase: 25-75 MeOH/0.1% HCOOH
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 280nm
- Injection Volume: 2μl

**Compounds**
1. Epigallocatechin
2. (-)-Epicatechin
3. Epigallocatechin gallate

---

**Catecholamines from Plasma**

**Conditions**
- Sample Preparation: Ion pair extraction using diphenyl-borate-ethanolamine. Derivatisation using diphenyl-ethylenediamine as fluorescent probe
- Column: ACE S C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 50:35:15 50mM CH3CO2Na buffer (pH 7.0), 50mM KH2PO4 (pH 2.0), 0.1% TFA
- Flow Rate: 0.9ml/min
- Temperature: Ambient
- Detection: Fluorescence - λex 350nm, λem 350nm, 480nm
- Injection Volume: 2μl

**Compounds**
1. Noradrenaline (norepinephrine)
2. 3,4-Dihydroxyphenylacetic acid (DOPAC)
3. Dopamine
4. L-Tyrosine
5. VMA (vanillylmandelic acid)

---

**Catecholamines**

**Conditions**
- Column: ACE S AQ, 150 x 4.6mm
- Part number: ACE-126-1546
- Mobile Phase: (a) 50mM KH2PO4 (pH 3.0), (b) 50mM KH2PO4 (pH 2.0), (c) 0.1% TFA, (d) 0.1% HCO2H
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 210nm
- Injection Volume: 2μl

**Compounds**
1. Noradrenaline
2. Adrenaline
3. L-DOPA
4. Dopamine
5. L-Tyrosine
6. VMA (vanillylmandelic acid)

---

Reproduced with kind permission of Malmö University Hospital, Malmö, Sweden
Catecholamines from Urine

**Conditions**
- **Sample Preparation:** Ion pair extraction using diphenyl-borate-ethanolamine. Derivatisation using diphenyl-ethylenediamine as fluorescent probe.
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 50:35:15 50mM CH$_3$CO$_2$Na buffer (pH 7.0)/MeCN/MeOH
- **Flow Rate:** 0.9ml/min
- **Temperature:** Ambient
- **Detection:** Fluorescence - $\lambda_{ex}$ 350nm - $\lambda_{em}$ 480nm

**Compounds**
1. Noradrenaline (norepinephrine)
2. 3,4-Dihydroxynorephedrine (I.S.)
3. Adrenaline (epinephrine)
4. Dopamine

**App. No. 1060**

Clausena Excavate - Semi-preparative HPLC of Methanolic Leaf Extract

While it is possible to scale up from analytical (4.6mm i.d.) to preparative (21.2mm i.d.) dimensions, in this case it was convenient to carry out both the method development and the actual isolation of fractions on the semi-preparative column to yield enough material for testing and identification.

**Cefquinome**

**Conditions**
- **Column:** ACE 5 C18, 150 x 2.1mm
- **Part Number:** ACE-121-1502
- **Mobile Phase:** A: 2mM HCO$_2$H in H$_2$O
  B: 2mM HCO$_2$H in MeCN
- **Flow Rate:** 0.2ml/min
- **Gradient:**
  - Time %A %B
  - 0 5 5
  - 1 5 5
  - 10 5 95
  - 30 5 95
- **Temperature:** 25°C
- **Detection:** ESI-MS (+)

**Compounds**
1. Cefquinome
2. Excipient

**App. No. 1061**

Clopidogrel

Analysis of clopidogrel and photodegradation products after 3.5 hours exposure to UV light.

**Conditions**
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 75:25 MeOH/aqueous TEA (pH 5.3 with H$_3$PO$_4$)
- **Flow Rate:** 1.2ml/min
- **Temperature:** 25°C
- **Detection:** UV, 220nm
- **Injection Volume:** 20μl

**App. No. 1063**

Reproduced with kind permission of School of Pharmacy, University of Sunderland, UK.

Reproduced with kind permission of Brazilian Pharmacopoeia.
Cold Medicine Components

**Conditions**
- **Column**: ACE 5 C18, 250 x 4.6mm
- **Part Number**: ACE-121-2546
- **Mobile Phase**: 50:50 MeOH/50mM KH$_2$PO$_4$ (pH 3.0)
- **Flow Rate**: 1.0ml/min
- **Temperature**: 22°C
- **Detection**: UV, 220nm

**Compounds**
1. Vitamin C
2. Acetaminophen
3. Caffeine
4. Aspirin
5. Ethozamide

---

Cyclosporin Mixture

**Conditions**
- **Column**: ACE 5 C18, 250 x 3.0mm
- **Part Number**: ACE-121-2503
- **Mobile Phase**: 46:51:3:0.1 H$_2$O/MeCN/MTBE/H$_3$PO$_4$
- **Flow Rate**: 0.8ml/min
- **Temperature**: 80°C
- **Detection**: UV, 210nm

**Compounds**
1. Isocyclosporin A
2. Cyclosporin C
3. Cyclosporin B
4. Cyclosporin L
5. Cyclosporin U
6. Cyclosporin A
7. Dihydrocyclosporin A
8. Cyclosporin G
9. Cyclosporin D
10. Cyclosporin E

---

Didanosine

**Conditions**
- **Column**: ACE 5 C18-HL, 250 x 4.6mm
- **Part Number**: ACE-321-2546
- **Mobile Phase**: 20:80 MeOH/50mM CH$_3$COONH$_4$, pH 8.0
- **Flow Rate**: 1.5ml/min
- **Temperature**: Ambient
- **Detection**: UV, 254nm

**Compounds**
1. Didanosine

---

Doxepin (cis and trans isomers)

**Conditions**
- **Column**: ACE 5 SIL, 250 x 4.6mm
- **Part Number**: ACE-127-2546
- **Mobile Phase**: 95:5:0.3 Hexane/ethanol/TEA
- **Flow Rate**: 1.0ml/min
- **Temperature**: Ambient
- **Detection**: UV, 254nm

**Compounds**
1. cis-Doxepin
2. trans-Doxepin

---

Reproduced with kind permission of Camurus AB, Lund, Sweden

Reproduced with kind permission of Aptuit Ltd, Edinburgh, UK
### Entacapone

**Analysis of entacapone standard in methanol solution after exposure to direct UV radiation (254nm).**

**Conditions**
- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:** 35:65 MeCN/aqueous H$_3$PO$_4$ (pH 3.0)
- **Flow Rate:** 2.0ml/min
- **Temperature:** 25°C
- **Detection:** UV, 305nm
- **Injection Volume:** 20μl

**Compounds**
- 1. Degradation product
- 2. Entacapone

### Epanolol

**Conditions**
- **Column:** ACE 5 CN, 150 x 4.6mm
- **Part Number:** ACE-124-1546
- **Mobile Phase:** 60:40 0.3% aqueous TEA (pH 4.0 with H$_3$PO$_4$)/MeOH
- **Flow Rate:** 1.0ml/min
- **Temperature:** 25°C
- **Detection:** UV, 254nm
- **Injection Volume:** 20μl (0.2mg/ml solution)

**Compounds**
- 1. Epanolol

### Epinastine

**Development and validation of HPLC and UV derivate spectrophotometric methods for determination of epinastine hydrochloride in coated tablets**

**Conditions**
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 60:40 0.3% aqueous TEA (pH 4.0 with H$_3$PO$_4$)/MeOH
- **Flow Rate:** 1.0ml/min
- **Temperature:** 25°C
- **Detection:** UV, 254nm
- **Injection Volume:** 20μl

**Compounds**
- 1. Epinastine

---

**Fig. 1** Epinastine Hydrochloride reference substance (A) before and (B) after 18 hours in a UV254nm chamber

**Fig. 2** Magnified version of Fig. 1

---

Reproduced with kind permission of Brazilian Pharmacopoeia.

Reproduced with kind permission of School of Pharmacy, University of Sunderland, UK.
Flavone and Dibucaine - Effect of Temperature

**Conditions**
- **Column:** ACE 3 C18, 30 x 4.6mm
- **Part Number:** ACE-111-0346
- **Mobile Phase:**
  - A: 6.5mM CH\textsubscript{3}CO\textsubscript{2}NH\textsubscript{4}
  - B: MeCN
  - C: MeOH
- **Flow Rate:** 2.0ml/min
- **Gradient:**
  - Time | %A | %B | %C
  - 0 | 80 | 0 | 20
  - 0.5 | 0 | 50 | 50
  - 5.6 | 0 | 0 | 100
- **Temperature:** 40°C and 60°C
- **Detection:** DAD, 200-450nm

**Compounds**
1. Flavone
2. Dibucaine

---

Flavonoids

**Conditions**
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 40:60 MeCN/0.1% HCO\textsubscript{2}H
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 254nm
- **Injection Volume:** 1μl

**Compounds**
1. Rutin
2. Quercetin
3. Quercitrin
4. Kaempferol

---

Flurbiprofen and Related Substances

**Conditions**
- **Column:** ACE 3 C18, 50 x 4.6mm
- **Part Number:** ACE-111-0546
- **Mobile Phase:** 34:64:0.5 MeCN/H\textsubscript{2}O/TFA
- **Flow Rate:** 2.0ml/min
- **Temperature:** 28°C
- **Detection:** UV, 254nm
- **Injection Volume:** 20μl (1mg/ml solution)

**Compounds**
1. 2-[(2-Fluoro-4-biphenyl)-2-hydroxypropionic acid
2. cis-2-[(2-Fluoro-4-biphenyl)-2-hydroxypropionic acid
3. 2-Fluoro-4-biphenyl-4-carboxylic acid
4. Flurbiprofen
5. 4-Acetyl-2-fluorobiphenyl

---

Galanthamine

**Conditions**
- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:** 8:92 MeCN/0.1% TFA
- **Flow Rate:** 1.0ml/min
- **Temperature:** 20°C
- **Detection:** UV, 210nm
- **Injection Volume:** 10μl

**Compounds**
1. Galanthamine

---

Reproduced with kind permission of Johnson & Johnson Pharmaceutical Research & Early Development, a division of Janssen-Cilag, S.A, Toledo, Spain

Reproduced with kind permission of School of Pharmacy, University of Sunderland, UK

Reproduced with kind permission of Neem Biotech, Cardiff, UK
Garlic Analysis 1

Conditions
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 50:50 MeOH/H₂O
- Flow Rate: 1.0ml/min
- Temperature: 30°C
- Detection: UV, 210nm
- Injection Volume: 20 μl

Compounds
- 1. Allicin
- 2. Alliin
- 3. Deoxyalliin

Garlic Analysis 2

Conditions
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: A: H₂O, B: MeCN
- Gradient:
  - T(mins) %A %B
  - 0 0 4 0
  - 20 0 100
  - 25 0 100
- Flow Rate: 1.0ml/min
- Temperature: 30°C
- Detection: UV, 254nm
- Injection Volume: 20 μl

Compounds
- 1. Allicin
- 2. Ajoene

Herbicide - Benfluralin

Conditions
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 85:15 MeOH/H₂O
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm

Compounds
- 1. Benfluralin

Herbicide - Trifluralin

Conditions
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 85:15 MeOH/H₂O
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm

Compounds
- 1. Trifluralin
Ibuprofen and Related Impurities

Conditions

Column: ACE 5 C18, 150 x 3.0mm
Part Number: ACE-121-1503
Mobile Phase: 36.64:0.1% TFA in MeCN/0.1% TFA in H2O
Flow Rate: 1.5ml/min
Temperature: 40°C
Detection: UV, 214nm

Compounds

1. 2-(4-Methylphenyl)propanoic acid (Impurity D)
2. 2-(4-Isobutylphenyl)propanamide (Impurity C)
3. Benzophenone (Internal Standard)
4. 2-(3-Isobutylphenyl)propanoic acid (Impurity A)
5. Ibuprofen
6. 2-(4-Butylphenyl)propanoic acid (Impurity B)
7. 1-(4-Isobutylphenyl)ethanone (Impurity E)

Illegal Dyes in Spices

Conditions

Column: ACE 3 C18, 100 x 4.6mm
Part Number: ACE-111-1046
Mobile Phase: A: H2O
B: MeOH
C: 0.06M TBAB and 0.5M KH2PO4 in H2O, pH 2.55
Flow Rate: 1.0ml/min
Gradient:

Time (min) %A %B %C
0 45 50 5
45 92 5 6
66 92 5 11
75 45 50 5 1

Temperature: Ambient
Detection: UV/VIS, 420nm, 520nm and 600nm
Injection Volume: 10μl

Compounds

1. Rhodamine B
2. Orange II
3. Metanil Yellow
4. Butter Yellow
5. Para Red
6. Sudan Orange G
7. Toluidine Red
8. Sudan I
9. Sudan Red G
10. Sudan II
11. Sudan Black
12. Sudan III
13. Sudan Red 7B
14. Sudan Red B
15. Sudan IV

Reproduced with kind permission of Lincolne Sutton & Wood, Norwich, UK
Hippuric Acid

**Conditions**
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 85:15 10mM KH₂PO₄ (pH 3.5)/MeCN
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 254nm

**Compounds**
1. Hippuric acid
2. 2-Methylhippuric acid

**App. No. 1010**

Insulins

**Conditions**
- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase A:** 29:71 MeCN/H₂O + 0.1% TFA
- **Mobile Phase B:** 32:68 MeCN/H₂O + 0.1% TFA
- **Flow Rate:** 1.0ml/min
- **Gradient:** T(mins) %A %B
  - 0 0 100
  - 16 10 90
- **Temperature:** Ambient
- **Detection:** UV, 215nm

**Compounds**
1. Bovine insulin
2. Human insulin
3. Porcine insulin

**App. No. 1011**

Isoflavones

**Conditions**
- **Column:** ACE 5 AQ, 250 x 4.6mm
- **Part Number:** ACE-126-2546
- **Mobile Phase:** 21:79:0.1 MeCN/H₂O/2.5M H₂SO₄
- **Flow Rate:** 1.5 ml/min
- **Detection:** UV

**Compounds**
1. Daidzin
2. Genistin
3. Daidzein
4. Genistein

**App. No. 1081**

Local Anaesthetics

**Conditions**
- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:** 21:79:0.1 MeCN/H₂O/2.5M H₂SO₄
- **Flow Rate:** 1.5 ml/min
- **Detection:** UV

**Compounds**
1. Procaine
2. Lignocaine
3. Cocaine

**App. No. 1012**

Reproduced with kind permission of Forensic Science Laboratories, Lothian and Borders Police, UK
**Malachite Green**

**Conditions**
- **Column:** ACE 5 C18, 150 x 3.0mm
- **Part Number:** ACE-121-1503
- **Mobile Phase:** 20:80 MeCN/10mM oxalic acid (pH 2.9)
- **Flow Rate:** 0.4ml/min
- **Temperature:** Ambient
- **Detection:** UV/VIS, 618nm

**Compounds**
- 1. Malachite green
- 2. Leucomalachite green

![Malachite green](image)

---

**Maleic and Fumaric Acids**

**Conditions**
- **Column:** ACE 5 AQ, 250 x 4.6mm
- **Part Number:** ACE-126-2546
- **Mobile Phase:** 50mM KH₂PO₄ (pH 7.0)
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 210nm

**Compounds**
- 1. Fumaric acid
- 2. Maleic acid

---

**Nitroanilines**

**Conditions**
- **Columns:** A. ACE 5 C18, B. ACE 5 Phenyl, C. ACE 5 CN
- **Column Dimensions:** 250 x 4.6mm
- **Mobile Phase:** Columns A & B: 50:50 MeCN/50mM KH₂PO₄ (pH 3.15)
  - Column C: 90:10 Heptane/EtOAc
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 254nm

**Compounds**
- 1. p-Nitroaniline
- 2. m-Nitroaniline
- 3. o-Nitroaniline

---

**FREE HPLC Column Slide Chart**

- Column characteristics for over 40 HPLC column brands
- Quick cleaning procedure for silica-based columns
- Calculate changes in resolution, analysis time and pressure with changes in column length or packing particle size
- Calculate how to change flow rate to maintain constant linear velocity when changing column ID

To receive your FREE HPLC Column slide chart or the latest ACE HPLC Columns Catalogue contact your local distributor or email: info@ace-hplc.com

---

Reproduced with kind permission of Central Science Laboratory, York, UK
Nitrofuran metabolites by LC-MS/MS

Nitrofuran veterinary antibiotics are banned in many countries due to potential carcinogenic risks to human health. These nitrofurans are rapidly metabolised in tissue. As a result, the metabolites are used as markers for detection of the parent drug in animal food products. The metabolites are derivatised with 2-nitrobenzaldehyde to form nitrophenyl derivatives, prior to LC-MS analysis.

<table>
<thead>
<tr>
<th>Nitrofuran</th>
<th>Metabolite</th>
<th>Derivative</th>
<th>Parent Ion (m/z)</th>
<th>MRM Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furazolidone</td>
<td>3-amino-2-oxazolidinone (AOZ)</td>
<td>NBAOZ</td>
<td>236</td>
<td>236 ➔ 134</td>
</tr>
<tr>
<td>Furaltadone</td>
<td>5-methylmorpholino-3-amino-2-oxazolidinone (AMOZ)</td>
<td>NBAMOZ</td>
<td>335</td>
<td>335 ➔ 291</td>
</tr>
<tr>
<td>Nitrofurazone</td>
<td>1-aminohydantoin (AHD)</td>
<td>NBAHD</td>
<td>249</td>
<td>249 ➔ 134</td>
</tr>
</tbody>
</table>

Extracts were assayed by LC-MS/MS using electrospray ionisation in the positive ion mode. Figure 1 shows the MRM transitions used for quantitation of each antibiotic. Figure 2 shows representative chromatograms for different concentration calibration standards of NBAHD. Good limits of quantitation and linearity of detector response (see Figure 3) were obtained.

Figure 1. MRM Chromatograms

Figure 2. Typical MRM Chromatograms for NBAHD

Reproduced with kind permission of Agricultural Ministry, Brazil
**Organic Acids**

**Conditions**
- **Column:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:** 51:47:2 MeCN/H₂O/CH₃CO₂H (pH 5.7)
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 220nm

**Compounds**
1. L-Ascorbic acid
2. Maleic acid
3. Acetylsalicylic acid
4. Benzoic acid
5. Salicylic acid

---

**OTC Gastric Drugs**

**Conditions**
- **Column:** ACE 5 C18, 150 x 4.6mm
- **Part Number:** ACE-121-1546
- **Mobile Phase:** 51:47:2 MeCN/H₂O/CH₃CO₂H (pH as specified)
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** Fluorescence - λ<sub>ex</sub> 333nm, λ<sub>em</sub> 443nm

**Compounds**
1. Ochra toxin A
2. Famotidine
3. Cimetidine
4. Ranitidine

---

**Compounds**
1. Ochra toxin A
2. L-Ascorbic acid
3. Maleic acid
4. Acetylsalicylic acid
5. Benzoic acid
6. Salicylic acid
7. Famotidine
8. Cimetidine
9. Ranitidine
**Organotin Compounds**

**Conditions**
- Column: ACE 3 C18, 150 x 2.1mm
- Part Number: ACE-111-1502
- Mobile Phase: MeCN/H2O/CH3CO2H/TEA
- Flow Rate: 0.2ml/min
- Detection: ICP-MS

**Compounds**
1. Dibutyltin
2. Tributyltin

---

**Oxymetazoline in Nasal Spray Formulation**

**Conditions**
- Column: ACE 5 CN, 150 x 4.6mm
- Part Number: ACE-124-1546
- Mobile Phase: MeCN/aqueous Na2HPO4, pH 7.0
- Flow Rate: 1.5ml/min
- Temperature: 30°C
- Detection: UV, 214nm

**Compounds**
1. Oxymetazoline
2. Benzalkonium chloride

---

**Paclitaxel**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 55:45 MeCN/H2O
- Flow Rate: 1.0ml/min
- Temperature: 40°C
- Detection: UV, 227nm

**Compounds**
1. Paclitaxel (taxol)

---

**Paroxetine and Desfluoro Analogue**

**Conditions**
- Column: ACE 5 CN, 150 x 4.6mm
- Part Number: ACE-124-1546
- Mobile Phase: 40:60 MeOH/H2O containing 20mM HCO3N-, pH 3.0
- Flow Rate: 2.0ml/min
- Temperature: Ambient
- Detection: UV, 295nm
- Injection Volume: 20μl (0.05mg/ml solution)

**Compounds**
1. Paroxetine
2. Desfluoroparoxetine
3. Sesamol
Peptides - Selectivity changes with bonded phase and mobile phase

Conditions

- Columns: ACE 5 C18-300, ACE 5 C8-300, ACE 5 C4-300, ACE 5 Phenyl-300, ACE 5 CN-300
- Column Dimensions: 250 x 4.6mm
- Mobile Phase: A: 0.1% TFA or 0.1% HCO$_2$H, B: MeCN
- Flow Rate: 1.0ml/min
- Gradient:
  - T(mins) %A %B
  - 0 90 10
  - 25 60 40
- Temperature: Ambient
- Detection: UV, 220nm

Compounds
1. Gly-Tyr
2. Val-Tyr-Val
3. Methionine enkephalin
4. Angiotensin II
5. Leucine enkephalin
Peptides - Varying Mobile Phase

**Conditions**

- **Column**: ACE 5 C18-300
- **Part Number**: ACE-221-2546
- **Column Dimensions**: 250 x 4.6mm
- **Mobile Phase**: A: Buffer as indicated
  - B: MeCN
- **Flow Rate**: 1.0ml/min
- **Gradient**:
  - T(min) %A %B
  - 0 90 10
  - 25 60 40
- **Temperature**: Ambient
- **Detection**: UV, 220nm

**Compounds**

1. Gly-Tyr
2. Val-Tyr-Val
3. Methionine enkephalin
4. Angiotensin II
5. Leucine enkephalin

---

Peptides - Varying pH

**Conditions**

- **Column**: ACE 5 C18-300
- **Part Number**: ACE-221-2546
- **Column Dimensions**: 250 x 4.6mm
- **Mobile Phase**: A: 20mM KH$_2$PO$_4$, pH as indicated
  - B: MeCN
- **Flow Rate**: 1.0ml/min
- **Gradient**:
  - T(min) %A %B
  - 0 90 10
  - 25 60 40
- **Temperature**: Ambient
- **Detection**: UV, 220nm

**Compounds**

1. Gly-Tyr
2. Val-Tyr-Val
3. Methionine enkephalin
4. Angiotensin II
5. Leucine enkephalin
**Peptide Test Mix**

**Conditions**
- Column: ACE 5 C18-300, 250 x 4.6mm
- Part Number: ACE-221-2546
- Mobile Phase: A. 0.1% TFA in H\(_2\)O
  - B. 0.1% TFA in MeCN
- Flow Rate: 1.0ml/min
- Gradient: T(mins) %A %B
  - 0 90 10
  - 25 60 40
- Temperature: Ambient
- Detection: UV, 220nm

**Compounds**
1. Gly-Tyr
2. Oxytocin
3. Angiotensin II
4. Neurotensin

---

**Phenolic acids**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 20:80 MeCN/0.1% HCO\(_2\)H
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Injection Volume: 1μl

**Compounds**
1. Caffeic acid
2. p-Coumaric acid
3. Ferulic acid

---

**Pesticides in Water**

**Conditions**
- Column: ACE 3 C18, 150 x 2.1mm
- Part Number: ACE-111-1502
- Mobile Phase: A: 0.1M CH\(_3\)COONH\(_4\)
  - B: MeCN
- Flow Rate: 0.3ml/min
- Gradient: T(mins) %A %B
  - 0 90 10
  - 40 20 80
  - 47 10 90
  - 49 90 10
- Temperature: 40°C
- Detection: UV, 220nm (pendimethalin at 245nm)
- Injection Volume: 25μl
- Sample: 0.05μg/l standards in 10:90 MeCN/H\(_2\)O

**Compounds**
1. Desisopropylatrazine
2. Desethylatrazine
3. Simazine
4. Cyanazine
5. Atrazine
6. Internal standard
7. Sebuthylazine
8. Propazine
9. Terbutylazine
10. Prometryn
11. Terbutryn
12. Alachlor
13. Pendimethalin

Reproduced with kind permission of Amt der Tiroler Landesregierung, Chemisch-technische Umweltschutzanstalt, Innsbruck, Austria
Phenols in Purple Coneflower (Echinacea Purpurea)

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: A: 0.1% H3PO4 in H2O, B: MeCN
- Flow Rate: 1.5ml/min
- Gradient:
  - 0-9 minutes: 0% A, 100% B
  - 13 minutes: 78% A, 22% B
  - 14 minutes: 60% A, 40% B
- Temperature: 35°C
- Detection: UV, 330nm
- Injection Volume: 10μl

**Compounds**
1. Caftaric acid
2. Chlorogenic acid
3. Cichoric acid

Reproduced with kind permission of Bionorica Extracts SL, Spain

---

Pilocarpine

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 15:85 MeCN/2mM tetrabutylammonium dihydrogen phosphate
- Flow Rate: 1.0ml/min
- Detection: UV, 254nm

**Compounds**
1. Isopilocarpine
2. Pilocarpine

Reproduced with kind permission of Controlled Therapeutics, Scotland, UK

---

Polyamines

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 90:10 MeOH/TRIS buffer (pH 7.0)
- Flow Rate: 1.2ml/min
- Gradient:
  - T(min) 0 45 50 60
  - %A 50 45 50 50
  - %B 50 15 50 50
- Detection: Fluorescence - λex 340nm, λem 450nm

**Compounds**
1. Putrescine
2. Cadaverine (as OPA derivatives)

Reproduced with kind permission of Centre for Chemical Sciences, Royal Holloway University of London, UK

---

Polyethylene Glycol 1000

**Conditions**
- Column: ACE 3 C8, 150 x 4.6mm
- Part Number: ACE-112-1546
- Mobile Phase: A: 0.1% HCO2H in H2O, B: MeOH
- Flow Rate: 1.0ml/min
- Gradient:
  - T(min) 0 45 50 60
  - %A 50 15 50 50
  - %B 50 85 50 50
- Detection: APCI (negative ion)

**Compounds**

Reproduced with kind permission of Wickham Laboratories, UK
Preservatives

Conditions
Column: ACE 5 C18, 250 x 4.6mm
Part Number: ACE-121-2546
Mobile Phase: 40:60 MeCN/50mM KH₂PO₄ (pH 4.4)
Flow Rate: 1.0ml/min
Temperature: Ambient
Detection: UV, 230nm

Compounds
1. Phthalic acid
2. p-Hydroxybenzoic acid
3. Benzoic acid
4. Soric acid
5. Methyl paraben
6. Ethyl paraben
7. Propyl paraben

Prostaglandins

Conditions
Column: ACE 5 C18, 150 x 4.6mm
Part Number: ACE-121-1546
Mobile Phase: 35:65 MeCN/10mM HCO₂NH₄ (pH 3.0)
Flow Rate: 1.0ml/min
Temperature: Ambient
Detection: UV, 254nm

Compounds
1. Omeprazole
2. Lansoprazole

Protein Test Mix

Conditions
Column: ACE 5 C18-300, 250 x 4.6mm
Part Number: ACE-221-2546
Mobile Phase: A. 0.1% TFA in H₂O
B. 0.1% TFA in MeCN
Flow Rate: 1.0ml/min
Gradient: T(mins) %A %B %C
0 7 0 2 0 1 0 1
9 1 0 6 6 3 3 0
10 0.1 6 6.6 3 3 3
Temperature: Ambient
Detection: UV, 280nm

Compounds
1. Ribonuclease A
2. Cytochrome C
3. Holo-transferrin
4. Apomyoglobin

Proton Pump Inhibitors (PPIs)

Conditions
Column: ACE 5 C18, 150 x 4.6mm
Part Number: ACE-121-1546
Mobile Phase: 35:65 MeCN/10mM HCO₂NH₄ (pH 3.0)
Flow Rate: 1.0ml/min
Temperature: Ambient
Detection: UV, 254nm

Compounds
1. Omeprazole
2. Lansoprazole

Reproduced with kind permission of Department of Internal Medicine, Fukuoka University, Japan
PPI - Lansoprazole Degradation Studies

Conditions

- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 33:67 MeCN/10mM HCO₂H, NH₄₂⁺ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm

Non-degraded Lansoprazole

Degraded Lansoprazole after 24 hours with 0.4M NaOH

Degraded Lansoprazole after 24 hours with 0.4M HCl

Degraded Lansoprazole after 24 hours with 3% H₂O₂

PPI - Lansoprazole Degradation Studies - Bonded Phase Effects

Conditions

- Column: ACE 5 C18, ACE 5 C8, ACE 5 C4, ACE 5 CN, ACE 5 Phenyl, ACE 5 AQ, ACE 5 C18-HL
- Column Dimensions: 150 x 4.6mm
- Mobile Phase: 33:67 MeCN/10mM HCO₂H, NH₄₂⁺ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Sample: Degraded Lansoprazole (24 hours with 0.4M NaOH)
Selectivity Test Mix

**Conditions**

<table>
<thead>
<tr>
<th>Column:</th>
<th>ACE 5 C18, 250 x 4.6mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number:</td>
<td>ACE-121-2546</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>60:40 MeCN/50mM KH2PO4 (pH 3.2)</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1.0ml/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>Ambient</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV, 254nm</td>
</tr>
</tbody>
</table>

**Compounds**

1. Uracil
2. Pyridine
3. Phenol
4. Dimethyl phthalate
5. N,N-Dimethylaniline
6. 4-Butylbenzoic acid

---

Selectivity Test Mix - High Throughput Analysis

**Conditions (a)**

<table>
<thead>
<tr>
<th>Column:</th>
<th>ACE 3 C18, 150 x 4.6mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number:</td>
<td>ACE-111-1546</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>60:40 MeCN/10mM HCO2NH4 (pH 3.2)</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1.0ml/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>23°C</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV, 254nm</td>
</tr>
</tbody>
</table>

**Compounds**

1. Pyridine
2. Phenol
3. Dimethyl phthalate
4. N,N-Dimethylaniline
5. 4-Butylbenzoic acid
6. Toluene

**Conditions (b)**

<table>
<thead>
<tr>
<th>Column:</th>
<th>ACE 3 C18, 20 x 4.6mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number:</td>
<td>ACE-111-0246</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>56.5:43.5 MeCN/10mM HCO2NH4 (pH 3.2)</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>2.0ml/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>23°C</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV, 254nm</td>
</tr>
</tbody>
</table>

---

Sotalol

**Conditions**

<table>
<thead>
<tr>
<th>Column:</th>
<th>ACE 5 CN, 150 x 4.6mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number:</td>
<td>ACE-124-1546</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>15:85 MeOH/H2O containing 20mM HCO2NH4, pH 3.0 with HCO2H</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1.0ml/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>Ambient</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV, 254nm</td>
</tr>
</tbody>
</table>

**Compounds**

1. Sotalol

---

Statins - Atorvastatin

**Conditions**

<table>
<thead>
<tr>
<th>Column:</th>
<th>ACE 5 C18, 150 x 4.6mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number:</td>
<td>ACE-121-1546</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>53:47 MeCN/10mM HCO2NH4 (pH 3.0)</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1.0ml/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>Ambient</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV, 254nm</td>
</tr>
</tbody>
</table>

**Compounds**

1. Atorvastatin
**Statins - Fluvastatin**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 53:47 MeCN/10mM HCO₂H₂ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Injection Volume: 5μl

**Compounds**
1. Fluvastatin

![Fluvastatin](image)

**Statins - Pravastatin**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 32:68 MeCN/10mM HCO₂H₂ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Injection Volume: 5μl

**Compounds**
1. Pravastatin

![Pravastatin](image)

**Statins - Simvastatin**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 75:25 MeCN/10mM HCO₂H₂ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Injection Volume: 5μl

**Compounds**
1. Simvastatin

![Simvastatin](image)

**Statin Mixture**

**Conditions**
- Column: ACE 5 C18, 150 x 4.6mm
- Part Number: ACE-121-1546
- Mobile Phase: 50:50 MeCN/10mM HCO₂H₂ (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 254nm
- Injection Volume: 5μl

**Compounds**
1. Impurity
2. Pravastatin
3. Atorvastatin
4. Simvastatin

![Statin Mixture](image)
**Substituted Naphthalenes**

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 51:49 MeCN/H2O
- Flow Rate: 1.5ml/min
- Temperature: 18°C
- Detection: UV, 225nm

**Compounds**
1. 2-Methylnaphthalene
2. 1-Ethynaphthalene
3. 1,4-Dimethylnaphthalene
4. 2-Ethylnaphthalene
5. n-Butylbenzene

![Substituted Naphthalenes Graph](image)

---

**Telithromycin**

**Analysis of telithromycin after 1 hour exposure to 3% H2O2**

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 55:45 MeOH/0.05M phosphate buffer (pH 4.0)
- Flow Rate: 1.0ml/min
- Temperature: 50°C
- Detection: UV, 265nm
- Injection Volume: 20μl

![Telithromycin Graph](image)

---

**Test Mix - Dolan 1**

**Conditions**
- Column: ACE 3 C18, 150 x 4.6mm
- Part Number: ACE-111-1546
- Mobile Phase: 50:50 MeCN/60mM KH2PO4 (pH 2.8)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 215nm

![Test Mix - Dolan 1 Graph](image)
### Test Mix - Dolan 2

**Conditions**
- **Column:** ACE 3 C18, 150 x 4.6mm
- **Part Number:** ACE-111-1546
- **Mobile Phase:** 50:50 MeCN/60mM KH₂PO₄ (pH 2.8)
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 215nm

**Compounds**
1. Amitriptyline
2. Benzonitrile
3. Butylbenzoic acid
4. cis-Chalcone
5. trans-Chalcone

### Test Mix - Engelhardt

**Conditions**
- **Column:** ACE 3 C18, 150 x 4.6mm
- **Part Number:** ACE-111-1546
- **Mobile Phase:** 55:45 MeOH/H₂O
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 254nm

**Compounds**
1. Thiourea
2. Aniline
3. Phenol
4. Toluidine (o,m,p combined)
5. Dimethylamine
6. Ethyl benzate
7. Toluene
8. Ethylbenzene

### Test Mix - Euerby

**Conditions**
- **Column:** ACE 3 C18, 150 x 4.6mm
- **Part Number:** ACE-111-1546
- **Mobile Phase:** 5:95 MeOH/20mM KH₂PO₄ (pH 2.7)
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 210nm

**Compounds**
1. Nicotine
2. Benzylamine
3. Procainamide
4. Terbutaline
5. Salbutamol
6. Phenol
7. Benzyl alcohol

### Test Mix - Mutton

**Conditions**
- **Column:** ACE 3 C18, 150 x 4.6mm
- **Part Number:** ACE-111-1546
- **Mobile Phase:** A: 0.1% H₃PO₄ in H₂O, B: 0.1% H₃PO₄ in MeCN
- **Gradient:** T[min] %A %B
- **Flow Rate:** 1.0ml/min
- **Temperature:** Ambient
- **Detection:** UV, 215nm

**Compounds**
1. Pyridine
2. Benzylamine
3. n-Acetylprocainamide
4. Benzyl alcohol
5. Phenol
6. 4-Nitrobenzoic acid
7. 2,3-Dihydroxynaphthalene
8. 4-Chlorocinnamic acid
9. Diphenyl ether
**Testosterone**

**Conditions**
- Column: ACE 5 C18, 150 x 0.075mm
- Part Number: ACE-121-1500075
- Mobile Phase: A: 10:90 0.1% HCO$_2$H in MeCN/0.1% HCO$_2$H in H$_2$O
  
  B: 90:10 0.1% HCO$_2$H in MeCN/0.1% HCO$_2$H in H$_2$O
- Flow Rate: 1.0μl/min
- Gradient:
  - Time: %A %B
    - 0 6 0 4
    - 5 60 4 0
    - 30 5 95
- Temperature: Ambient
- Detection: ESI (+) MS/MS

**Compounds**

1. Testosterone

---

**Tetracyclines**

**Conditions**
- Column: ACE 5 C18, 150 x 3.0mm
- Part Number: ACE-121-1503
- Mobile Phase: 20:80 MeCN/10mM oxalic acid (pH 2.9)
- Flow Rate: 0.5ml/min
- Temperature: Ambient
- Detection: UV/VIS, 350nm
- Injection Volume: 20μl

**Compounds**

1. Oxytetracycline
2. Tetracycline
3. Demeclocycline
4. Chlortetracycline
5. Doxycycline

---

**Tocopherols**

**Conditions**
- Column: ACE 5 SIL, 250 x 4.6mm
- Part Number: ACE-127-2546
- Mobile Phase: 98:2 Hexane/IPA
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV/VIS, 450nm
- Injection Volume: 1μl

**Compounds**

1. gamma-Tocopherol
2. alpha-Tocopherol
3. beta-Tocopherol
4. delta-Tocopherol

---

**Tryptic Digest of BSA**

**Conditions**
- Column: ACE 5 C18-300, 150 x 4.6mm
- Part Number: ACE-221-1546
- Mobile Phase: A. 1% TFA in H$_2$O
  
  B. 50:50 1% TFA in MeCN/H$_2$O
- Flow Rate: 1.0ml/min
- Gradient:
  
  T(mins) 0 5 25 45 75 95 115 120
  
  %A 96 96 80 80 60 35 30 96
  
  %B 4 4 20 20 40 65 70 4
- Temperature: Ambient
- Detection: UV, 214nm

**Compounds**

1. gamma-Tocopherol
2. alpha-Tocopherol
3. beta-Tocopherol
4. delta-Tocopherol

---
Tricyclic Antidepressants – Bonded Phase Effects

Conditions
- Columns: ACE 5 C18, ACE 5 C8, ACE 5 C4, ACE 5 CN and ACE 5 Phenyl
- Column Dimensions: 250 x 4.6mm
- Mobile Phase: 80:20 MeOH/25mM KH2PO4 (pH 6.0)
- Flow Rate: 1.0ml/min
- Temperature: 22°C
- Detection: UV, 215nm

Compounds
1. Norephedrine
2. Nortriptyline
3. Toluene
4. Imipramine
5. Amitriptyline

Vitamins – Fat Soluble

Conditions
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: MeOH
- Flow Rate: 1.5ml/min
- Temperature: 30°C
- Detection: UV, 280nm

Compounds
1. Vitamin K3
2. Vitamin A
3. Vitamin A acetate
4. Vitamin D2
5. Vitamin D3
6. Vitamin E
7. Vitamin E acetate
8. Vitamin K1

FREE HPLC Technical Guides
- HPLC Column Comparison Guide
- HPLC Protein and Peptide Guide
- HPLC & LC-MS Buffer Selection Guide
- HPLC Troubleshooting Guide

To receive your FREE copies of these guides or the latest ACE HPLC Columns Catalogue contact your local distributor or email: info@ace-hplc.com
Vitamins – Water Soluble (Isocratic)

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-121-2546
- Mobile Phase: 3.97 MeOH/50mM KH\(_2\)PO\(_4\) (pH 3.0)
- Flow Rate: 1.0ml/min
- Temperature: Ambient
- Detection: UV, 205nm

**Compounds**
1. Pyridoxamine
2. Thiamine (Vitamin B1)
3. L-Ascorbic acid (Vitamin C)
4. Nicotinic acid
5. Pyridoxal
6. Impurity
7. Pyridoxine

---

Vitamins – Water Soluble (Gradient)

**Conditions**
- Column: ACE 5 C18, 250 x 4.6mm
- Part Number: ACE-122-2546
- Mobile Phase: A. 50mM KH\(_2\)PO\(_4\) (pH 2.5)
  - B. MeOH
- Flow Rate: 1.0ml/min
- Gradient:
  - T(mins) %A %B
  - 0 100 0
  - 3 100 55
  - 16.5 55 45
  - 19.5 20 80
- Temperature: Ambient
- Detection: UV, 205nm

**Compounds**
1. Pyridoxamine
2. Thiamine (Vitamin B1)
3. L-Ascorbic acid (Vitamin C)
4. Nicotinic acid
5. Pyridoxal
6. Impurity
7. Pyridoxine
8. p-Aminobenzoic acid
9. Pantothenic acid (Vitamin B5)
10. Folic acid (Vitamin M)
11. Cyanocobalamin (Vitamin B12)
12. d-Biotin (Vitamin H)
13. Riboflavin (Vitamin B2)
14. Thioctic acid
**Vitamins - Water Soluble (Phase Selectivity)**

**Conditions**
- **Columns:**
  - ACE 5 C18, ACE 5 C8, ACE 5 C4, ACE 5 CN
  - ACE 5 Phenyl, ACE 5 AQ, ACE 5 C18-HL
- **Column Dimensions:** 150 x 4.6mm
- **Mobile Phase:**
  - A: 20mM KH$_2$PO$_4$ (pH 3.0)
  - B: MeOH
- **Flow Rate:** 1.5mL/min
- **Gradient:** T(mins) %A %B
  - 0 95 5
  - 20 5 95
- **Temperature:** Ambient
- **Detection:** UV, 205nm

**Compounds**
- 1. Pyridoxine
- 2. p-Aminobenzoic acid
- 3. Pantothenic acid
- 4. Cyanocobalamin
- 5. Folic acid
- 6. d-Biotin
- 7. Riboflavin

**Vitamins - Water Soluble (Rapid Analysis)**

**Conditions (a)**
- **Columns:** ACE 5 C18, 250 x 4.6mm
- **Part Number:** ACE-121-2546
- **Mobile Phase:** A: 20mM KH$_2$PO$_4$ (pH 2.9)
- **Flow Rate:** 1.0mL/min
- **Gradient:** T(mins) %A %B
  - 0 97 3
  - 5 97 3
  - 45 55 45
  - 50 20 80
- **Temperature:** Ambient
- **Detection:** UV, 205nm

**Rapid Analysis Conditions (b)**
- **Columns:** ACE 3 Phenyl, 20 x 4.6mm
- **Part Number:** ACE-115-0246
- **Mobile Phase:** A: 20mM KH$_2$PO$_4$ (pH 3.0)
- **Flow Rate:** 1.5mL/min
- **Gradient:** T(mins) %A %B
  - 0 81 19
  - 3 32 68
- **Temperature:** Ambient
- **Detection:** UV, 205nm
### Water Soluble Artificial Colours

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Column:</strong></td>
<td>ACE 3 C18, 100 x 4.6mm</td>
</tr>
<tr>
<td><strong>Part Number:</strong></td>
<td>ACE-111-1046</td>
</tr>
<tr>
<td><strong>Mobile Phase:</strong></td>
<td>A. 3mM TBAB and 5mM KH_2PO_4 in H_2O</td>
</tr>
<tr>
<td></td>
<td>B. 5mM TBAB in MeCN</td>
</tr>
<tr>
<td><strong>Flow Rate:</strong></td>
<td>0.8ml/min</td>
</tr>
<tr>
<td><strong>Gradient:</strong></td>
<td>T(min) %A %B</td>
</tr>
<tr>
<td></td>
<td>0 55 45</td>
</tr>
<tr>
<td></td>
<td>20 30 70</td>
</tr>
<tr>
<td></td>
<td>30 55 45</td>
</tr>
<tr>
<td></td>
<td>40 55 45</td>
</tr>
<tr>
<td><strong>Temperature:</strong></td>
<td>Ambient</td>
</tr>
<tr>
<td><strong>Detection:</strong></td>
<td>UV/VIS, 420nm, 520nm and 600nm</td>
</tr>
<tr>
<td><strong>Injection Volume:</strong></td>
<td>10μl</td>
</tr>
</tbody>
</table>

1. Amaranth
2. Sunset Yellow
3. Allura Red
4. Red 2G
5. Ponceau 4R
6. Carmoisine
7. Erythrosine

**Tetrabutylammonium bromide**

### Whey Proteins from Whole Milk

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Column:</strong></td>
<td>ACE 3 C4-300, 150 x 2.1mm</td>
</tr>
<tr>
<td><strong>Part Number:</strong></td>
<td>ACE-213-1502</td>
</tr>
<tr>
<td><strong>Mobile Phase:</strong></td>
<td>A: 0.5% HCO_2H in H_2O</td>
</tr>
<tr>
<td></td>
<td>B: 0.5% HCO_2H in MeCN</td>
</tr>
<tr>
<td><strong>Flow Rate:</strong></td>
<td>0.4ml/min</td>
</tr>
<tr>
<td><strong>Gradient:</strong></td>
<td>T(min) %A %B</td>
</tr>
<tr>
<td></td>
<td>0 65 35</td>
</tr>
<tr>
<td></td>
<td>16 57 43</td>
</tr>
<tr>
<td></td>
<td>17 20 80</td>
</tr>
<tr>
<td></td>
<td>20 65 80</td>
</tr>
<tr>
<td></td>
<td>21 65 35</td>
</tr>
<tr>
<td></td>
<td>31</td>
</tr>
<tr>
<td><strong>Temperature:</strong></td>
<td>40°C</td>
</tr>
<tr>
<td><strong>Detection:</strong></td>
<td>ESI-MS (+ve)</td>
</tr>
<tr>
<td><strong>Injection Volume:</strong></td>
<td>10μl</td>
</tr>
</tbody>
</table>

1. α-Lactalbumin
2. β-Lactoglobulin B
3. β-Lactoglobulin A

---

Send us your application and receive a FREE ACE HPLC Column

Send us your ACE HPLC application and help us extend our applications database. Your proven method will enable your chromatography colleagues to benefit and if we select your application for publication we’ll send you a FREE ACE HPLC column.

To submit your application contact your local ACE distributor or email us at:

info@act-hplc.com

---

Reproduced with kind permission of Lincoln Sutton & Wood, Norwich, UK

Reproduced with kind permission of University of Vienna, Austria
ACE® - Product Availability

ACE HPLC columns are available in a wide range of dimensions from capillary to preparative scale. For column dimensions not listed and further assistance in selecting the optimum ACE phase for your application, please contact your local distributor.

ACE 3μm HPLC Columns

When ordering replace "X" with the appropriate material code:

<table>
<thead>
<tr>
<th>PORE SIZE REQUIRED</th>
<th>3μm C18</th>
<th>3μm C8</th>
<th>3μm C4</th>
<th>3μm CN</th>
<th>3μm Phenyl</th>
<th>3μm AQ</th>
<th>3μm SIL</th>
<th>3μm C18-HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>100Å</td>
<td>ACE-111</td>
<td>ACE-112</td>
<td>ACE-113</td>
<td>ACE-114</td>
<td>ACE-115</td>
<td>ACE-116</td>
<td>-</td>
<td>ACE-311</td>
</tr>
<tr>
<td>300Å</td>
<td>ACE-211</td>
<td>ACE-212</td>
<td>ACE-213</td>
<td>ACE-214</td>
<td>ACE-215</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**COLUMN DIAMETER**

<table>
<thead>
<tr>
<th>20 mm</th>
<th>30 mm</th>
<th>35 mm</th>
<th>50 mm</th>
<th>75 mm</th>
<th>100 mm</th>
<th>125 mm</th>
<th>150 mm</th>
<th>250 mm</th>
<th>300 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>75μm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-1000075</td>
<td>-</td>
<td>X-1500075</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>100μm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-10001</td>
<td>-</td>
<td>X-15001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>300μm</td>
<td>- X-0303</td>
<td>- X-0503</td>
<td>- X-0503</td>
<td>- X-10003</td>
<td>- X-15003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>500μm</td>
<td>- X-0305</td>
<td>- X-0505</td>
<td>- X-0505</td>
<td>- X-10005</td>
<td>- X-15005</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.0mm</td>
<td>X-0201</td>
<td>X-0301</td>
<td>X-3501</td>
<td>X-7501</td>
<td>X-1201</td>
<td>X-1501</td>
<td>X-2501</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>2.1mm</td>
<td>X-0202</td>
<td>X-0302</td>
<td>X-3502</td>
<td>X-7502</td>
<td>X-1202</td>
<td>X-1502</td>
<td>X-2502</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>3.0mm</td>
<td>X-0203</td>
<td>X-0303</td>
<td>X-3503</td>
<td>X-7503</td>
<td>X-1203</td>
<td>X-1503</td>
<td>X-2503</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>4.0mm</td>
<td>X-0204</td>
<td>X-0304</td>
<td>X-3504</td>
<td>X-7504</td>
<td>X-1204</td>
<td>X-1504</td>
<td>X-2504</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>4.6mm</td>
<td>X-0246</td>
<td>X-0346</td>
<td>X-3546</td>
<td>X-7546</td>
<td>X-1246</td>
<td>X-1546</td>
<td>X-2546</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>7.75mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0508</td>
<td>X-7508</td>
<td>X-1208</td>
<td>X-1508</td>
<td>X-2508</td>
</tr>
<tr>
<td>10.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0510</td>
<td>X-7510</td>
<td>X-1210</td>
<td>X-1510</td>
<td>X-2510</td>
</tr>
<tr>
<td>12.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0520</td>
<td>X-7520</td>
<td>X-1220</td>
<td>X-1520</td>
<td>X-2520</td>
</tr>
<tr>
<td>30.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0530</td>
<td>X-7530</td>
<td>X-1230</td>
<td>X-1530</td>
<td>X-2530</td>
</tr>
</tbody>
</table>

ACE 5μm HPLC Columns

When ordering replace "X" with the appropriate material code:

<table>
<thead>
<tr>
<th>PORE SIZE REQUIRED</th>
<th>5μm C18</th>
<th>5μm C8</th>
<th>5μm C4</th>
<th>5μm CN</th>
<th>5μm Phenyl</th>
<th>5μm AQ</th>
<th>5μm SIL</th>
<th>5μm C18-HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>100Å</td>
<td>ACE-121</td>
<td>ACE-122</td>
<td>ACE-123</td>
<td>ACE-124</td>
<td>ACE-125</td>
<td>ACE-126</td>
<td>ACE-127</td>
<td>ACE-321</td>
</tr>
<tr>
<td>300Å</td>
<td>ACE-221</td>
<td>ACE-222</td>
<td>ACE-223</td>
<td>ACE-224</td>
<td>ACE-225</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**COLUMN DIAMETER**

<table>
<thead>
<tr>
<th>20 mm</th>
<th>30 mm</th>
<th>35 mm</th>
<th>50 mm</th>
<th>75 mm</th>
<th>100 mm</th>
<th>125 mm</th>
<th>150 mm</th>
<th>250 mm</th>
<th>300 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>75μm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-1000075</td>
<td>-</td>
<td>X-1500075</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>100μm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-10001</td>
<td>-</td>
<td>X-15001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>300μm</td>
<td>- X-0303</td>
<td>- X-0503</td>
<td>- X-0503</td>
<td>- X-10003</td>
<td>- X-15003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>500μm</td>
<td>- X-0305</td>
<td>- X-0505</td>
<td>- X-0505</td>
<td>- X-10005</td>
<td>- X-15005</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.0mm</td>
<td>X-0201</td>
<td>X-0301</td>
<td>X-3501</td>
<td>X-7501</td>
<td>X-1201</td>
<td>X-1501</td>
<td>X-2501</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>2.1mm</td>
<td>X-0202</td>
<td>X-0302</td>
<td>X-3502</td>
<td>X-7502</td>
<td>X-1202</td>
<td>X-1502</td>
<td>X-2502</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>3.0mm</td>
<td>X-0203</td>
<td>X-0303</td>
<td>X-3503</td>
<td>X-7503</td>
<td>X-1203</td>
<td>X-1503</td>
<td>X-2503</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>4.0mm</td>
<td>X-0204</td>
<td>X-0304</td>
<td>X-3504</td>
<td>X-7504</td>
<td>X-1204</td>
<td>X-1504</td>
<td>X-2504</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>4.6mm</td>
<td>X-0246</td>
<td>X-0346</td>
<td>X-3546</td>
<td>X-7546</td>
<td>X-1246</td>
<td>X-1546</td>
<td>X-2546</td>
<td>-</td>
<td>- XO10GCD</td>
</tr>
<tr>
<td>7.75mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0508</td>
<td>X-7508</td>
<td>X-1208</td>
<td>X-1508</td>
<td>X-2508</td>
</tr>
<tr>
<td>10.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0510</td>
<td>X-7510</td>
<td>X-1210</td>
<td>X-1510</td>
<td>X-2510</td>
</tr>
<tr>
<td>12.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0520</td>
<td>X-7520</td>
<td>X-1220</td>
<td>X-1520</td>
<td>X-2520</td>
</tr>
<tr>
<td>30.0mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X-0530</td>
<td>X-7530</td>
<td>X-1230</td>
<td>X-1530</td>
<td>X-2530</td>
</tr>
</tbody>
</table>

1. 5 pack - use with cartridge holder H0001 and column coupler C0001
2. 5 pack - use with integral microbore cartridge holder H0004
3. 5 pack - use with integral analytical cartridge holder H0005
4. 3 pack - use with semi-prep cartridge holder H0002 and column coupler C0001
5. 1 pack - use with prep cartridge holder H0006 and prep column coupler C0002
6. available to special order (not 300Å columns) - consider operating pressure limitations for maximum column lifetime
7. not available with 300Å columns
ACE 10μm HPLC Columns

When ordering replace "X" with the appropriate material code:

<table>
<thead>
<tr>
<th>PORE SIZE REQUIRED</th>
<th>10μm C18</th>
<th>10μm C8</th>
<th>10μm C4</th>
<th>10μm CN</th>
<th>10μm Phenyl</th>
<th>10μm AQ</th>
<th>10μm SIL</th>
<th>10μm C18-HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>100Å</td>
<td>ACE-131</td>
<td>ACE-132</td>
<td>ACE-133</td>
<td>ACE-134</td>
<td>ACE-135</td>
<td>ACE-136</td>
<td>ACE-137</td>
<td>ACE-331</td>
</tr>
<tr>
<td>300Å</td>
<td>ACE-231</td>
<td>ACE-232</td>
<td>ACE-233</td>
<td>ACE-234</td>
<td>ACE-235</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLUMN DIAMETER</th>
<th>20 mm</th>
<th>30 mm</th>
<th>35 mm</th>
<th>50 mm</th>
<th>75 mm</th>
<th>100 mm</th>
<th>125 mm</th>
<th>150 mm</th>
<th>250 mm</th>
<th>300 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6mm</td>
<td>X-0246</td>
<td>X-0346</td>
<td>X-3546</td>
<td>X-0546</td>
<td>X-7546</td>
<td>X-1046</td>
<td>X-1246</td>
<td>X-1546</td>
<td>X-2546</td>
<td>X-3046</td>
</tr>
<tr>
<td>7.75mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.2mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.0mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.0mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Custom Packed Columns

For column dimensions not listed and further assistance in selecting the optimum ACE phase for your application, please contact your local distributor. We routinely manufacture columns of unique dimensions that are required for a particular application. Additional column hardware geometries (including bio-inert PEEK) are also available on request. Please contact your local distributor for further details about Custom Packed Columns.

FREE Batch Reservation Service

ACE materials are recognised to offer outstanding reproducibility and have the most stringent batch specifications of any chromatographic silica. However, for particularly challenging applications we also offer a FREE Batch Reservation Service, which completely eliminates batch related reproducibility concerns. Based on your projected column usage, we will reserve the quantity of silica you need and pack columns as and when they are required. Please contact your local distributor for further details about this FREE Batch Reservation Service.

Method Development and Method Validation Column Kits

ACE Method Development Kits contain columns of the same dimensions packed with different bonded phases, allowing the optimum phase to be selected for a specific application. ACE Method Validation Kits are available for all phases and column dimensions and contain three columns of the same bonded phase and dimensions packed from three different batches, enabling a rapid confirmation of separation reproducibility. Please contact your local distributor for further details about ACE Method Development Kits and ACE Method Validation Kits.

Product Specifications

<table>
<thead>
<tr>
<th>PHASE</th>
<th>FUNCTIONAL GROUP</th>
<th>ENDCAPPED</th>
<th>PARTICLE SIZE (μm)</th>
<th>PORE SIZE (Å)</th>
<th>SURFACE AREA (m²/g)</th>
<th>CARBON LOAD (%)</th>
<th>USP CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C18</td>
<td>Octadecyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>15.5</td>
<td>L1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>9.0</td>
<td>L1</td>
</tr>
<tr>
<td>C8</td>
<td>Octyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>9.0</td>
<td>L7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>5.0</td>
<td>L7</td>
</tr>
<tr>
<td>C4</td>
<td>Butyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>5.5</td>
<td>L26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>2.6</td>
<td>L26</td>
</tr>
<tr>
<td>CN</td>
<td>Cyano</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>5.5</td>
<td>L10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>2.6</td>
<td>L10</td>
</tr>
<tr>
<td>Phenyl</td>
<td>Phenyl</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>9.5</td>
<td>L11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>100</td>
<td>5.3</td>
<td>L11</td>
</tr>
<tr>
<td>AQ</td>
<td>Proprietary</td>
<td>Yes</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>14.0</td>
<td>L1</td>
</tr>
<tr>
<td>SIL</td>
<td>Unbonded</td>
<td>-</td>
<td>3, 5, 10</td>
<td>100</td>
<td>300</td>
<td>-</td>
<td>L3</td>
</tr>
<tr>
<td>C18-HL</td>
<td>Octadecyl</td>
<td>Yes</td>
<td>3, 5, 10, 15</td>
<td>90</td>
<td>400</td>
<td>20.0</td>
<td>L1</td>
</tr>
</tbody>
</table>
Your decision has lasting effects.

Ultra Inert Base-Deactivated HPLC Columns

For Performance, Selectivity and Guaranteed Reproducibility

ACE performance guarantee

If ACE does not outperform the column you are currently using, simply contact us for a full refund and keep the ACE column FREE OF CHARGE.
ACE® products are available through our international network of distributors