

## Analyze Acidic and Basic Pharmaceuticals, Using a Deactivated SUPELCOSIL LC-ABZ HPLC Column

SUPELCOSIL LC-ABZ HPLC columns are prepared by a unique surface deactivation process that eliminates silanol-analyte interaction. Using these columns, you can analyze a wide variety of compounds without mobile phase modifications or additives. We analyzed acetylsalicylic acid and dextromethorphan (a base), using a SUPELCOSIL LC-ABZ column and identical mobile phase conditions, and achieved excellent peak shape, efficiency, and linearity of detection for both compounds.

### Key Words:

• acids • bases • zwitterions • deactivated HPLC phases

Although an estimated 75% of pharmaceutical compounds are basic or possess basic character, precursors in their synthesis, their metabolites, and contaminants associated with them often are acidic. Samples containing mixes of acidic and basic compounds can be particularly difficult to analyze by HPLC on silica-based packings. Basic compounds can interact with residual silanols on the silica surface and thus exhibit excessive peak tailing. Analysis of acidic compounds on silica-based C18 columns often produces poor peak shape, retention time drift, and poor column-to-column reproducibility, also attributed to analyte-silica interactions.

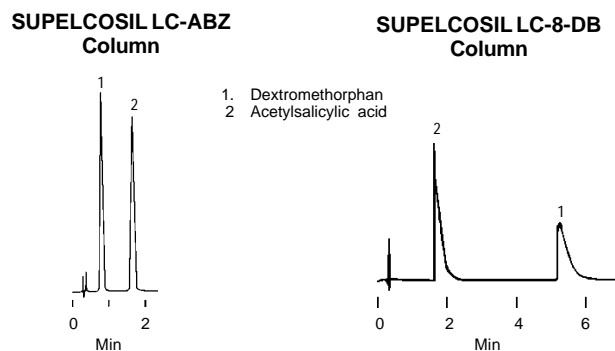
Undesirable mobile phase conditions and additives often are used to improve the chromatography of acids and bases. However, a mobile phase that is optimized for analysis of a base is frequently unsuitable for an acid, and vice versa. Also, techniques used to suppress silanol-analyte interactions often require the use of dedicated columns.

Silica-based SUPELCOSIL™ LC-ABZ reversed phase columns allow analyses of organic acids, bases, zwitterions, and neutral compounds under simple mobile phase conditions. Depending on the ionization states of the analytes, the same mobile phase often can be used for compounds of each type. Through electrostatic shielding, a polar group embedded in the phase prevents silanol interaction with acids or bases.

We compared the analysis of acetylsalicylic acid and dextromethorphan (a basic drug) on two reversed phase columns (Figure A). Under the conditions used, acetylsalicylic acid eluted before dextromethorphan from the SUPELCOSIL LC-8-DB column, and both peaks tailed. On the SUPELCOSIL LC-ABZ column, the basic compound eluted before the acid, and both compounds showed symmetrical peak shape and good column efficiency. Retention time was stable.

**Figure A. Acetylsalicylic Acid and Dextromethorphan on Deactivated HPLC Columns**

Columns: 5cm x 4.6mm, 5µm particles  
Cat. No.: 59141  
Mobile Phase: acetonitrile:25mM KP<sub>i</sub> (pH 2.3), 20:80  
Flow Rate: 2mL/min  
Det.: UV, 230nm  
Inj.: 5µL water containing 100µg/mL dextromethorphan, 50µg/mL acetylsalicylic acid



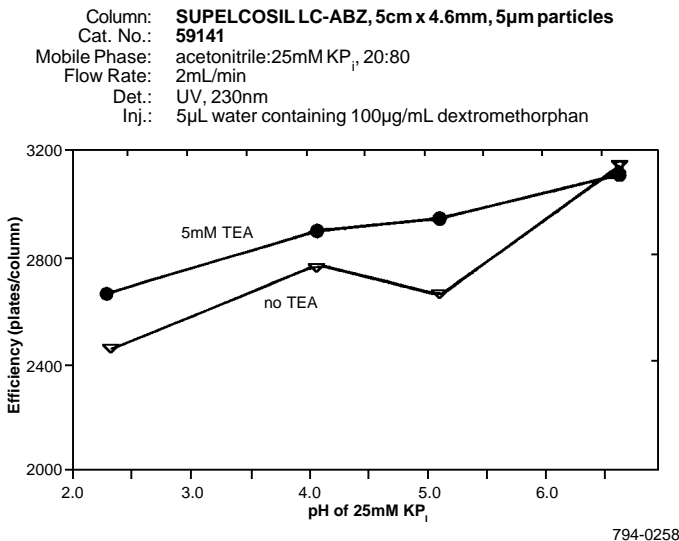
713-0178,0189

An amine modifier, triethylamine (TEA), is often added to the mobile phase to reduce peak tailing. The absence of silanol-analyte interactions on SUPELCOSIL LC-ABZ columns eliminates the need for TEA. When analyses of dextromethorphan and acetylsalicylic acid on a SUPELCOSIL LC-ABZ column with and without TEA are compared, it is apparent that TEA has virtually no effect on efficiency (Figures B and C).

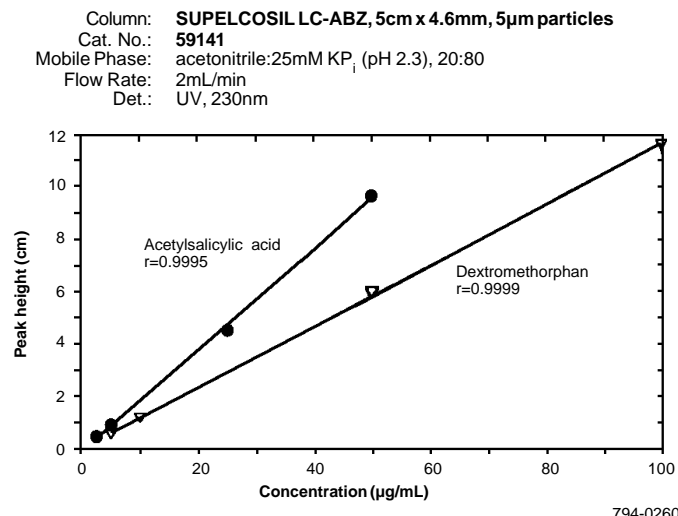
The excellent peak shape of analytes on SUPELCOSIL LC-ABZ columns allows analysts to monitor very low levels of silanophilic compounds. Acetylsalicylic acid and dextromethorphan show excellent linearity down to the limit (2µg/mL) of our detector (Figure D).

SUPELCOSIL LC-ABZ columns offer the benefits of reversed phase HPLC on silica, while eliminating the need for silanol-suppressing mobile phase conditions in analyses of acidic or basic compounds. Samples containing acid/base mixes and/or zwitterions can be analyzed using a single column, without changing mobile phase conditions, and often with different selectivity than conventional reversed phase columns. SUPELCOSIL LC-ABZ columns are effective for analyzing a broad spectrum of acidic, basic, and polar compounds. If you are using a conventional reversed phase column to analyze these difficult compounds, we recommend you try a SUPELCOSIL LC-ABZ column.

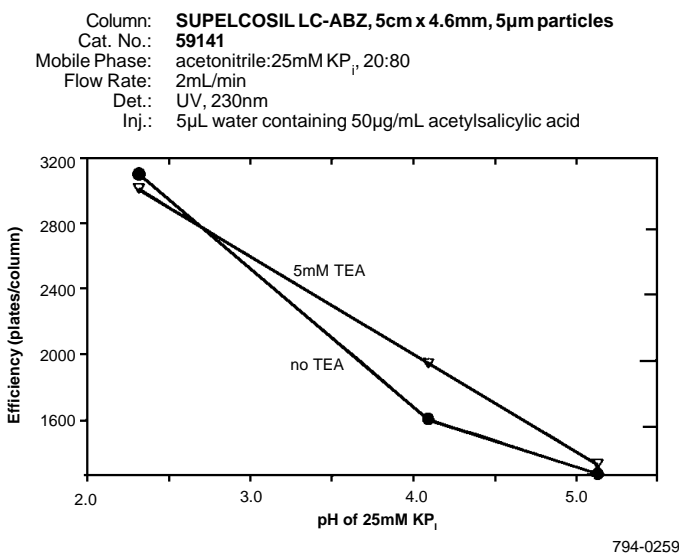
**Figure B. Efficiency vs. pH for Dextromethorphan**



**Figure D. Linear Response for Acidic and Basic Drugs on a SUPELCOSIL LC-ABZ Column**



**Figure C. Efficiency vs. pH for Acetylsalicylic Acid**



**Ordering Information:**

**SUPELCOSIL LC-ABZ Columns**

5µm packing, 100Å pores

5cm x 4.6mm	<b>59141</b>
15cm x 4.6mm	<b>59140-U</b>
25cm x 4.6mm	<b>59142</b>
25cm x 10mm	<b>59170</b>

**Supelguard™ LC-ABZ Guard Column Kit**

2cm x 4.6mm cartridge-type column, column holder, hardware for connecting to 1/16" tubing **59544-U**

**Supelguard LC-ABZ Guard Columns**

pk. of 2 **59545-U**

**SUPELCOSIL LC-ABZ Cartridge Columns**

5µm packing, 100Å pores

15cm x 4.6mm, column only	<b>59140C46</b>
25cm x 4.6mm, column only	<b>59142C46</b>
Column End Fittings, pk. of 2	<b>55200-U</b>

**Cartridge Guard Columns**

Supelguard LC-ABZ Columns, 2cm x 4.6mm, pk. of 2 **59545-U**

Supelguard Cartridge Column Holder **55205**

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