

# TheReporter

Reprinted from Volume 14, No. 3, 1995

T295043

© 1999 Sigma-Aldrich Co.

For more information, or current prices, contact your nearest Supelco subsidiary listed below. To obtain further contact information, visit our website ([www.sigma-aldrich.com](http://www.sigma-aldrich.com)), see the Supelco catalog, or contact Supelco, Bellefonte, PA 16823-0048 USA.

**ARGENTINA** • Sigma-Aldrich de Argentina, S.A. • Av. Pueyrredon 2446/50 • Piso 5-B • Buenos Aires 1119  
**AUSTRALIA** • Sigma-Aldrich Pty. Ltd. • Unit #2, 14 Anella Avenue • Castle Hill NSW 2154  
**AUSTRIA** • Sigma-Aldrich Handels GmbH • Hebbelplatz 7 • A-1110 Wien  
**BELGIUM** • Sigma-Aldrich N.V./S.A. • K. Cardijnplein 8 • B-2880 Bornem  
**BRAZIL** • Sigma-Aldrich Quimica Brasil Ltda. • Rua Sabara, 566-Conj. 53 • 01239-010 São Paulo, SP  
**CANADA** • Sigma-Aldrich Canada, Ltd. • 2149 Winston Park Dr., Oakville, ON L6H 6J8  
**CZECH REPUBLIC** • Sigma-Aldrich s.r.o. • Pobrezni 46 • 186 21 Praha 8  
**DENMARK** • Sigma-Aldrich Denmark A/S • Vejlegaardsvej 65B • DK-2665 Vallensbaek Strand  
**FINLAND** • Sigma-Aldrich Finland/YA-Kemia Oy • Teerisuonkuja 4 • FIN-00700 Helsinki  
**FRANCE** • Sigma-Aldrich Chimie • Chromatographie Supelco • L'Isle d'Abeau Chesnes - B.P. 701 • 38297 Saint-Quentin Fallavier Cedex  
**GERMANY** • Sigma-Aldrich Chemie GmbH • Geschäftsbereich Supelco • Grünwalder Weg 30 • D-82041 Deisenhofen  
**GREECE** • Sigma-Aldrich (o.m.) Ltd. • 72 Argonafton Str. • 16346 Ilioupoli, Athens  
**HUNGARY** • Sigma-Aldrich Kft. • Nagy Diófa u. 7., IV fl. • H-1067 Budapest  
**INDIA** • Sigma-Aldrich Co. • Survey No. 31/1, Sitharamapalaya • Mahadevapura P.O. • Bangalore 560 048  
**IRELAND** • Sigma-Aldrich Ireland Ltd. • Airton Road • Tallaght • Dublin 24  
**ISRAEL** • Sigma Israel Chemicals Ltd. • Park Rabin • Rohovot 76100  
**ITALY** • Sigma-Aldrich s.r.l. • Via Gallarate, 154 • 20151 Milano  
**JAPAN** • Sigma-Aldrich Japan K.K. • Division Supelco • JL Nihonbashi Building • 1-10-15 Nihonbashi Horidome-cho, Chuo-ku • Tokyo 103  
**KOREA** • Sigma-Aldrich Korea • Samhan Camus Annex, 10<sup>th</sup> Floor • 17-26 Yoido-dong, Yungdeungpo-ku • Seoul  
**MALAYSIA** • Sigma-Aldrich (M) Sdn. Bhd. • 9-2, Jalan 2/128, Taman Gembira • Off Jalan Kuchai Lama • 58200 Kuala Lumpur • Selangor  
**MEXICO** • Sigma-Aldrich Quimica S.A. de C.V. • Calle 6 North No. 107 • Parque Industrial Toluca 2000 • 50200 Toluca  
**NETHERLANDS** • Sigma-Aldrich Chemie BV • Postbus 27 • 3330 AA Zwijndrecht  
**NORWAY** • Sigma-Aldrich Norway • Sandakerveien 102 • N-0483 Oslo  
**POLAND** • Sigma-Aldrich Sp. z o.o. • Szelagowska 30 • 61-626 Poznań  
**PORTUGAL** • Sigma-Aldrich Quimica, S.A. • P.O. Box 131 • Sintra 2710  
**RUSSIA** • Sigma-Aldrich Russia • TOO Techmedbiochem • Makarenko Str. 2/21 • Building 1, Flat 22 • Moscow 103062  
**SINGAPORE** • Sigma-Aldrich Pte. Ltd. • 102E Pasir Panjang Road • #08-01 Citilink Warehouse • Singapore 118529  
**SOUTH AFRICA** • Sigma-Aldrich (pty) Ltd. • CNR Kelly & Ackerman Streets • Southern Life Industrial Park Unit • Unit 16/17 • Jet Park 1459  
**SPAIN** • Sigma-Aldrich Quimica, S.A. • Apt. Correos 161 • 28100 Alcobendas, Madrid  
**SWEDEN** • Sigma-Aldrich Sweden AB • Solkraftsvägen 14C • 135 70 Stockholm  
**SWITZERLAND** • Supelco Switzerland • Industriestrasse 25 • P.O. Box 260 • CH-9471 Buchs  
**UNITED KINGDOM** • Sigma-Aldrich Company Ltd. • Supelco UK • Fancy Road, Poole • Dorset BH12 4QH  
**UNITED STATES** • Supelco • Supelco Park • Bellefonte, PA 16823-0048 • Phone 800-247-6628 or 814-359-3441 • Fax 800-447-3044 or 814-359-3044 • email:supelco@sial.com

H

This article is archived from a past issue of The Supelco Reporter. Information in the article was appropriate at the time of publication, but product specifications, catalog numbers, and availability may have changed over time.

If you have questions about applying methodology described in this article to a current application, please contact our technical service chemists.



Supelco is a member of the Sigma-Aldrich family. Supelco products are sold through Sigma-Aldrich, Inc. Sigma-Aldrich warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product for a particular use. Additional terms and conditions may apply. Please see the reverse side of the invoice or packing slip.

# Reliable Ion Exchange LC: Consistent Performance from MonoBeads® Support

B. Edlén, Amersham Pharmacia Biotech

*Mono Q and Mono S columns are highly efficient, pH-stable columns designed for high performance ion exchange separations of proteins, peptides, and polynucleotides, in applications including peptide mapping and monoclonal antibody purification. The unique properties of these columns are based on MonoBeads support – a beaded hydrophilic material with the narrowest particle size distribution of any chromatographic support:  $10 \pm 0.3 \mu\text{m}$ . This monodispersity permits high flow rates at relatively low backpressures. Stringent product testing ensures highly consistent performance from Mono Q and Mono S columns, prepared with these particles.*

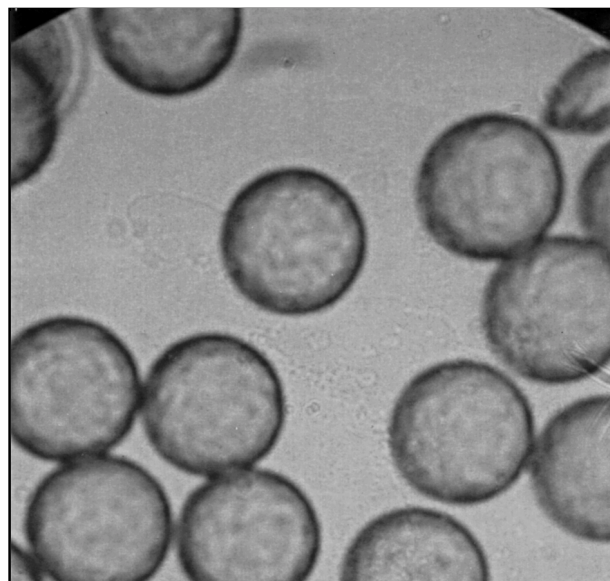
For any chromatographic medium, physical and chemical characteristics should be highly consistent over time, so that when a column is replaced, the user can obtain equivalent results with the replacement column. A quality product is one for which a column bought today has the same selectivity as one purchased a week, month, year, or years ago. Pharmacia® chromatographic media based on MonoBeads® support provide outstanding reproducibility that chromatographers can rely on.

For the user, quality means no worries about product consistency. In order to ensure consistency the manufacturer must begin with the raw materials, whose critical variables must be known and controlled. Amersham Pharmacia Biotech chemists test physical and chemical variables for the raw materials, the bulk gel, and the final column, to ensure that every column will behave as expected by the user (Table 1). The electron micrograph in Figure A and the particle size distribution plot in Figure B show the monodispersity of MonoBeads support (1). The extremely narrow particle size distribution permits high flow rates at relatively low backpressures. Protein separation tests are run on every batch of bulk gel, to ensure that retention and selectivity are within specified limits. Although chromatographers very rarely use the full capacity of an ion

exchange column, capacity is not allowed to fall outside specifications developed more than a decade ago, in order to maintain consistent performance from Mono Q® columns (strong anion exchanger; quaternary amino functional groups remain equally charged over the column's entire useful pH range) and Mono S® columns (strong cation exchanger; sulfonic acid functional groups). Figure C shows a typical batch test chromatogram for Mono Q packing material. Figure D shows the negligible variations in protein retention times and ion exchange capacity for Mono Q material, from lots produced in 1982 to lots produced in 1993. Lots of Mono S packing material are tested under conditions similar to those used for the Mono Q material.

Since their introduction, MonoBeads support-based columns have proven their reliability and reproducibility. Mono Q and Mono S columns are manufactured to close, carefully maintained

**Figure A. MonoBeads Particles Are Highly Uniform in Size**



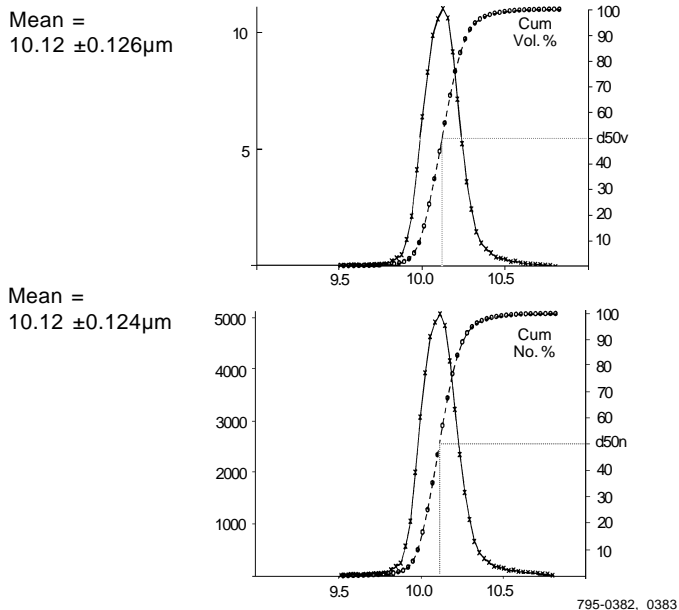
995-0053a

Reproduced with permission of Amersham Pharmacia Biotech.

**Table 1. Column Characteristics: Mono Q and Mono S Columns**

Dimensions:	50 x 5mm
Bed Volume:	1mL
Flow Rate:	0.5-2mL/min
Max. Backpressure:	750psi (5MPa)
Temperature:	4°-40°C
pH:	2-12
Max. Loading Capacity:	25mg
Protein Binding Capacity:	65mg human serum albumin (Mono Q) 75mg immunoglobulin G (Mono S)
Typical Separation Times:	5-20 min

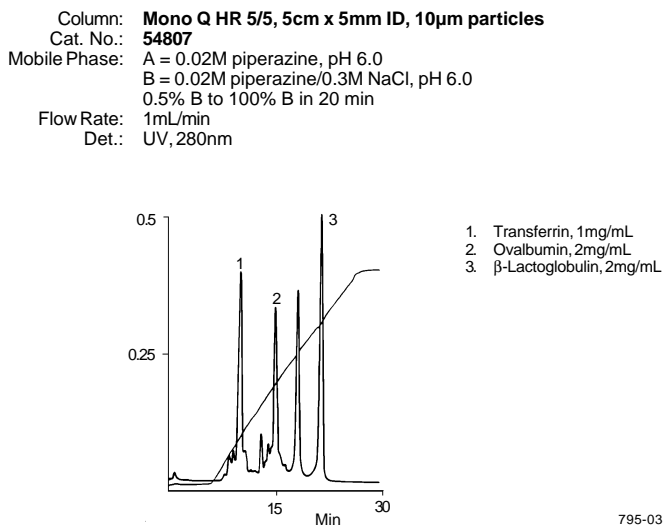
**Figure B. Narrow Particle Size Distribution for MonoBeads Particles (Coulter Counter technique)**



Reprinted from American Laboratory, Vol. 12, No. 12, page 40 (1994).  
Copyright 1994 by International Scientific Communications, Inc.  
Reproduced with permission of Amersham Pharmacia Biotech.

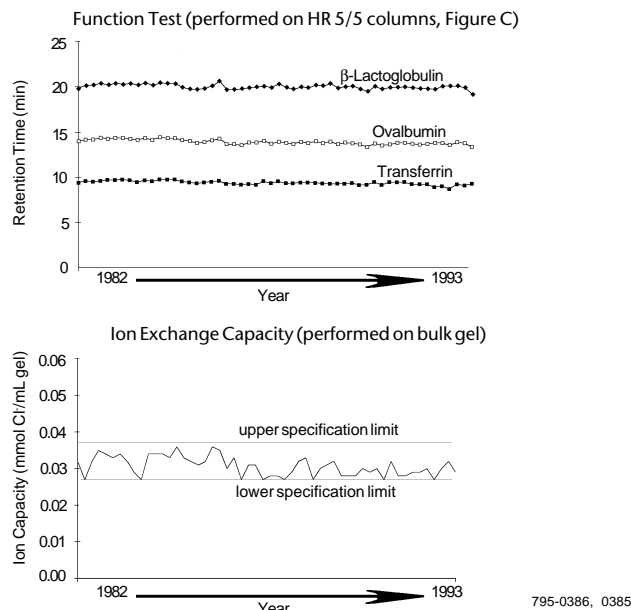
specifications, to make their routine use in preparative and analytical work highly reliable. Column stability, another important factor, also has been documented for Mono Q and Mono S columns (2). In the words of the Amersham Pharmacia Biotech chemists: "Quality assurance is an important part of the manufacturing process. Every step on the way to the final product is well documented. The exact

**Figure C. Typical Results: Function Test for Mono Q Columns**



Reproduced with permission of Amersham Pharmacia Biotech.

**Figure D. Mono Q Columns Are Highly Consistent**



Reprinted from American Laboratory, Vol. 12, No. 12, page 40 (1994).  
Copyright 1994 by International Scientific Communications, Inc.  
Reproduced with permission of Amersham Pharmacia Biotech.

result of those steps in the production that are subject to variation should be verified by tests. This will guarantee that a customer can always get media or columns with performance equal to those previously bought (3)."

If you are performing ion exchange separations of proteins, peptides, or polynucleotides, and wish to be sure of highly consistent performance from column to column, we highly recommend Mono Q and Mono S columns to you.

**Ordering Information:**

Description	Cat. No.
<b>Mono Q HR 5/5 Column</b> 5cm x 5mm, 10 μm particles	<b>54807</b>
<b>Mono S HR 5/5 Column</b> 5cm x 5mm, 10 μm particles	<b>54808</b>

**References**

1. Göransson, B., *Part. Part. Sys. Charact.* 7: 6 (1990).
  2. Johansson, B.-L. and N. Strafström, *J. Chromatogr.* 314: 396 (1984).
  3. Edlén, B., *Amer. Biotechnol. Lab.*, Nov. 1994 (pp 40-41).
- References not available from Supelco.

Mono Q, Mono S, MonoBeads, and Pharmacia are registered trademarks of Amersham Pharmacia Biotech.

