WorkBeads 40S
WorkBeads 40Q
WorkBeads 40 DEAE
BabyBio IEX Screening Kit
BabyBio S
BabyBio Q
BabyBio DEAE
BabyBio TREN
BabyBio Peptide Purification Kit

WorkBeads™ 40S, WorkBeads 40Q and WorkBeads 40 DEAE resins for ion exchange chromatography are designed for research and industrial scale purification of proteins, peptides and oligonucleotides by utilizing the difference in their surface charge. WorkBeads 40S resin is a strong cation exchanger derivatized with sulfonate ligands. WorkBeads 40Q resin is a strong anion exchanger derivatized with quaternary amine ligands. WorkBeads 40 DEAE is a weak anion exchanger with tertiary amine ligands. These resins demonstrate the property of high-resolution separation while giving low backpressure facilitate both capture and polishing purification applications in standard bioprocess columns.

These resins are also available in ready-to-use prepacked 1 ml and 5 ml columns. BabyBio™ S, BabyBio Q and BabyBio DEAE. BabyBio TREN prepacked with WorkBeads 40 TREN which is a multimodal anion exchanger with higher salt tolerance is presented here due to that it is included in the BabyBio IEX Screening kit, but the main Data Sheet for these products is DS 40 600 020.

BabyBio IEX Screening Kit for easy screening to find optimal running conditions includes one BabyBio 1 ml column of each of the four ion exchangers.

BabyBio Peptide Purification Kit is a bundle of BabyBio S 1 ml x 1 and BabyBio Q 1 ml x 1.

- High binding capacity, throughput and purity
- High chemical stability for easy cleaning-in-place and reproducible results
- BabyBio ready-to-use prepacked 1 ml and 5 ml columns
- BabyBio IEX Screening Kit for fast and easy screening of optimal selectivity

Resin description

WorkBeads are agarose-based chromatographic resins manufactured using a proprietary method that results in porous beads with a tight size distribution and exceptional mechanical stability. Agarose based matrices have been successfully used for decades in biotechnology purification, from research to production scale, due to their exceptional compatibility with biomolecules including proteins, peptides, nucleic acids and carbohydrates. WorkBeads resins are designed for separations requiring optimal capacity and purity.

WorkBeads 40S is a strong cation exchange resin derivatized with sulfonates as functional groups.

WorkBeads 40Q is a strong anion exchanger derivatized with quarternary amines as functional groups.

WorkBeads 40 DEAE is a weak anion exchange resin employing diethylaminoethyl (a tertiary amine) as functional groups. This weak ion exchanger resin should be used as an alternative to WorkBeads 40Q when looking for alternative selectivities. The density of positive charges in WorkBeads 40 DEAE will decrease gradually when the pH is increased above pH 6. This effect can be used to modulate the selectivity of the resin, although the binding capacity may be reduced at basic pH values.

The functional groups are coupled to the resins via chemically stable linkages. The structures of the ligands used in WorkBeads 40S, WorkBeads 40Q, WorkBeads 40 DEAE and WorkBeads 40 TREN (see more details about WorkBeads 40 TREN and BabyBio TREN in DS 40 600 020) can be seen in Figure 1.

The main characteristics of WorkBeads 40S, WorkBeads 40Q and WorkBeads 40 DEAE are shown in Table 1. For more details, see IN 40 100 010.

The main characteristics of BabyBio S, BabyBio Q and BabyBio DEAE are shown in Table 2. For more details, see instruction, IN 45 100 010.
The main characteristics of BabyBio TREN are shown in Table 3. For more details, see instruction, IN 45 655 03.

Column description

The BabyBio column is made from biocompatible polypropylene which does not significantly interact with biomolecules. The top and bottom filters are made from polyethylene. The ready-to-use BabyBio columns are delivered with a plug in the inlet, a cut-off outlet and a cap for storage. The columns can be connected to a syringe, pump or chromatography system using finger tight fittings (coned 10–32) for 1/16” o.d. tubing (standard HPLC PEEK tubing).

BabyBio IEX Screening Kit

BabyBio IEX Screening Kit includes four BabyBio 1 ml columns, one of each ion exchanger (S, Q, DEAE, and TREN). This kit enables easy and fast optimization of specific purification protocols using the best ion exchanger ligand and optimization of running conditions.

BabyBio Peptide Purification Kit

BabyBio Peptide Purification Kit is a bundle of one BabyBio S 1 ml x 1 and one BabyBio Q 1 ml x 1 for easy and fast testing for optimal peptide purifications.

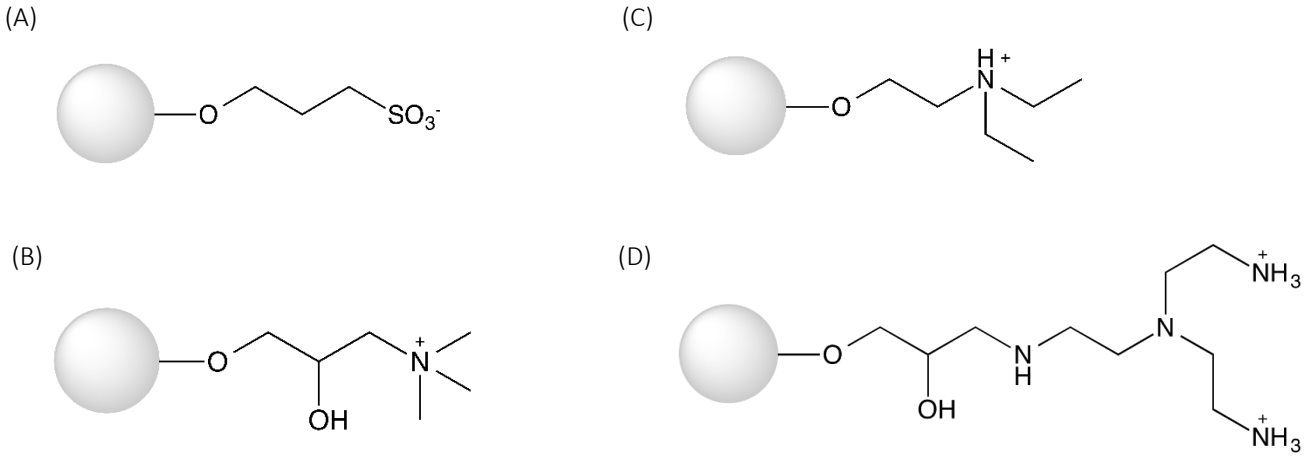

Figure 1. Structure of the ligand used in (A) WorkBeads 40S, (B) WorkBeads 40Q, (C) WorkBeads 40 DEAE and (D) WorkBeads 40 TREN

Table 1. Main characteristics of WorkBeads 40S, WorkBeads 40Q and WorkBeads 40 DEAE resins.

	WorkBeads 40S	WorkBeads 40Q	WorkBeads 40 DEAE
Target substance	Proteins, peptides	Protein, peptides, viruses, oligonucleotides	Protein, peptides, oligonucleotides
Matrix	Rigid, highly cross-linked agarose	Rigid, highly cross-linked agarose	Rigid, highly cross-linked agarose
Average particle size[1] (D_{V50})	45 µm	45 µm	45 µm
Ionic group (ligand)	Sulfonate ($-SO_3^-$)	Quaternary amine ($-N^+(CH_3)_3$)	Diethylaminoethyl ($-CH_2CH_2N^+H(CH_2CH_3)_2$)
Ion capacity	180 - 250 µmol H^+/ml resin	180 - 250 µmol Cl^-/ml resin	110 - 160 µmol Cl^-/ml resin
Dynamic binding capacity	130 mg BSA/ml resin[2]	50 mg BSA/ml resin[3]	40 mg BSA/ml resin[3]
Max. flow rate[4] (20 cm bed height and 5 bar)	600 cm/h	600 cm/h	600 cm/h
Chemical stability	Compatible with all standard aqueous buffers used for protein purification, 1 M NaOH, 30% isopropanol and 70% ethanol. Should not be stored at low pH for prolonged time.		
pH stability	2 - 13	2 - 13	3 - 9 (recommended pH) 3 - 13
Storage	2 to 25 °C in 20% ethanol with 0.2 M sodium acetate	2 to 25 °C in 20% ethanol	2 to 25 °C in 20% ethanol

1. The median particle size of the cumulative volume distribution.
2. Dynamic binding capacity determined at 4-minutes residence time in 20 mM sodium citrate, pH 4.0.
3. Dynamic binding capacity determined at 2.5-minutes residence time in 50 mM Tris-HCl, 50 mM NaCl, pH 8.0.
4. Optimal flow rate during binding is depending on the sample.

Table 2. Main characteristics of BabyBio S, BabyBio Q and BabyBio DEAE 1 ml and 5 ml columns.

	BabyBio S	BabyBio Q	BabyBio DEAE
Target substance	Proteins, peptides	Protein, peptides, oligonucleotides, viruses	Protein, peptides, oligonucleotides
Resin	WorkBeads 40S	WorkBeads 40Q	WorkBeads 40 DEAE
Matrix	Rigid, highly cross-linked agarose	Rigid, highly cross-linked agarose	Rigid, highly cross-linked agarose
Average particle size[1] (D_{V50})	45 µm	45 µm	45 µm
Ligand	Sulfonate ($-SO_3^-$)	Quaternary amine ($-N^+(CH_3)_3$)	Diethylaminoethyl ($-CH_2CH_2N^+H(CH_2CH_3)_2$)
Ion capacity	180 - 250 µmol H^+/ml resin	180 - 250 µmol Cl^-/ml resin	110 - 160 µmol Cl^-/ml resin
Dynamic binding capacity	130 mg BSA/ml resin[2]	50 mg BSA/ml resin[3]	40 mg BSA/ml resin[3]
Column volume	1 ml 5 ml	1 ml 5 ml	1 ml 5 ml
Column dimension	7 x 28 mm (1 ml) 13 x 38 mm (5 ml)	7 x 28 mm (1 ml) 13 x 38 mm (5 ml)	7 x 28 mm (1 ml) 13 x 38 mm (5 ml)
Recommended flow rate[4]			
BabyBio 1 ml	0.25 - 1 ml/min (37 - 150 cm/h)	0.25 - 1 ml/min (37 - 150 cm/h)	0.25 - 1 ml/min (37 - 150 cm/h)
BabyBio 5 ml	1.25 - 5 ml/min (56 - 225 cm/h)	1.25 - 5 ml/min (56 - 225 cm/h)	1.25 - 5 ml/min (56 - 225 cm/h)
Maximum flow rate[5]			
BabyBio 1 ml	5 ml/min (780 cm/h)	5 ml/min (780 cm/h)	5 ml/min (780 cm/h)
BabyBio 5 ml	20 ml/min (900 cm/h)	20 ml/min (900 cm/h)	20 ml/min (900 cm/h)
Maximum back pressure	0.3 MPa, 3 bar, 43 psi	0.3 MPa, 3 bar, 43 psi	0.3 MPa, 3 bar, 43 psi
Chemical stability	Compatible with all standard aqueous buffers used for protein purification. 1 M NaOH, 30% isopropanol and 70% ethanol. Should not be stored at low pH for prolonged time.		
pH stability	2 - 13	2 - 13	3 - 9 (recommended pH) 3 - 13
Storage	2 to 25 °C in 20% ethanol with 0.2 M sodium acetate	2 to 25 °C in 20% ethanol	2 to 25 °C in 20% ethanol

1. The median particle size of the cumulative volume distribution.
2. Dynamic binding capacity determined at 4 minutes residence time (0.25 ml/min in 1 ml column) in 20 mM sodium citrate, 60 mM NaCl, pH 4.0.
3. Dynamic binding capacity determined at 4 minutes residence time (0.25 ml/min in 1 ml column) in 50 mM Tris-HCl, pH 8.0.
4. Optimal flow rate during binding is depending on the sample. During column wash and elution, a flow rate of 1 ml/min and 5 ml/min can be used for 1 ml and 5 ml columns, respectively. Note: The maximum pressure the packed bed can withstand depends on the sample/liquid viscosity and chromatography resin characteristics. The pressure also depends on the tubing used to connect the column and the system restrictions after the column outlet.
5. Maximum flow rate for aqueous buffers at 20 °C. Decrease the maximum flow rate if the liquid has a higher viscosity. Higher viscosities can be caused by low temperature (use half of the maximum flow rate for 20% ethanol).

Table 3. Main characteristics of BabyBio TREN 1 ml and 5 ml columns.

	BabyBio TREN
Target substance	Proteins, peptides, oligonucleotides, viruses, chromatin fragments
Resin	WorkBeads 40 TREN
Matrix	Rigid, highly cross-linked agarose
Average particle size[1] (D_{v50})	45 µm
Ligand	Tris(2-aminoethyl)amine (TAEA)
Ionic capacity	130 - 200 µmol Cl^-/ml resin
Dynamic binding capacity	50 mg BSA/ml resin[2]
Column volume	1 ml 5 ml
Column dimension	7 x 28 mm (1 ml) 13 x 38 mm (5 ml)
Recommended flow rate[3]	
BabyBio 1 ml	0.25 - 1 ml/min (37 - 150 cm/h)
BabyBio 5 ml	1.25 - 5 ml/min (56 - 225 cm/h)
Maximum flow rate[4]	
BabyBio 1 ml	5 ml/min (780 cm/h)
BabyBio 5 ml	20 ml/min (900 cm/h)
Maximum back pressure	0.3 MPa, 3 bar, 43 psi
Chemical stability	Compatible with all standard aqueous buffers used for protein purification. Do not keep the column at low pH for prolonged time.
pH stability	2 - 13
Storage	2 to 25°C in 20% ethanol

1. The median particle size of the cumulative volume distribution.
2. Dynamic binding capacity determined at 4 minutes residence time (0.25 ml/min in 1 ml column) in 50 mM Tris-HCl, 50 mM NaCl, pH 8.0.
3. Optimal flow rate during binding is depending on the sample. During column wash and elution, a flow rate of 1 ml/min and 5 ml/min can be used for 1 ml and 5 ml columns, respectively. Note: The maximum pressure the packed bed can withstand depends on the sample/liquid viscosity and chromatography resin characteristics. The pressure also depends on the tubing used to connect the column and the system restrictions after the column outlet.
4. Aqueous buffers at 20°C. Decrease the maximum flow rate if the liquid has a higher viscosity. Higher viscosities can be caused by low temperature (use half of the maximum flow rate at 4°C), or by additives (e.g. use half of the maximum flow rate for 20% ethanol).

Principles

Ion exchange chromatography

Ion exchange chromatography separates biomolecules according to surface charge. For example, proteins interact with different affinities with opposite charged groups on the resin. This depends on the number of charges involved in the interaction and on the distribution of the charges on the protein. The surface charge of proteins depends on the pH of their environment. When the pH is equal to the isoelectric point (pI) of the protein the net charge is zero. At pH values below the pI the net charge will be positive, and at a pH above the pI the net charge will be negative.

It should be noted that the interaction of the protein depends on the presence and distribution of both positive and negative charged groups on the surface, the net charge.

A protein may therefore also interact with an ion exchange resin at the isoelectric point. The likelihood of binding to either the cation or the anion exchange resin will increase when the pH moves away from the pI. A strong ion exchanger, such as WorkBeads 40Q is ionized over abroad pH range (2-13), while a weak ion exchanger, such as WorkBeads 40 DEAE is ionized over a more limited pH range (3-9).

IEX is one of the most frequently used chromatography techniques because of its versatility and ability to separate proteins even with small differences in charge and it is a concentration step. It is also one of the more cost-efficient chromatography techniques and is therefore excellent for scale-up.

The resins can be used for research- and industrial-scale purification of proteins, peptides and oligonucleotides.
The particle size has been selected to enable high-resolution separations at moderate backpressure. The resins can therefore be used in capture step purification, as well as for polishing. For purification requiring exceptionally high flow rates to handle large sample volumes WorkBeads 100S and WorkBeads 100Q should be considered for the capture step.

Multimodal ion exchange chromatography

Multimodal ion exchange chromatography separates protein, peptides and other biomolecules via a ligand acting with more than one interaction site. The interaction utilizes two or more different properties, for example charge and hydrophobicity. Depending on the chromatographic conditions, the interactions differ and work either together or separately in the purification procedure. The TREN ligand is positively charged below pH 9. The use of WorkBeads 40 TREN in binding or flowthrough mode will efficiently facilitate removal of nucleic acids, endotoxins, viruses, host cell proteins and other cell-derived impurities. WorkBeads 40 TREN has a higher salt tolerance compared to "standard" IEX resins. For more information, see DS 40 600 020.

Applications

Protein selectivity

Below, some examples are presented. In Figure 2, the basic proteins, concanavalin A, ribonuclease A, lysozyme and α-chymotrypsinogen A are separated on BabyBio S columns.
In Figure 3, the acidic proteins apo-transferrin, α-lactalbumin and soybean trypsin inhibitor are separated on BabyBio Q, BabyBio DEAE and BabyBio TREN columns respectively and the selectivity differences are visible.

Columns:	(A) BabyBio S 1 ml
	(B) BabyBio S 5 ml
Binding buffer:	50 mM MES, pH 6.0
Elution buffer:	50 mM MES, 1 M NaCl, pH 6.0
Sample:	1.5 mg/ml concanavalin A, 1.5 mg/ml ribonuclease A, 0.5 mg/ml α-chymotrypsinogen A and 0.5 mg/ml lysozyme in binding buffer
Flow rate:	150 cm/h
	(1 ml/min BabyBio S 1 ml)
	(3.5 ml/min BabyBio S 5 ml)
Gradient:	0 - 50% elution buffer in 20 column volumes (CV)

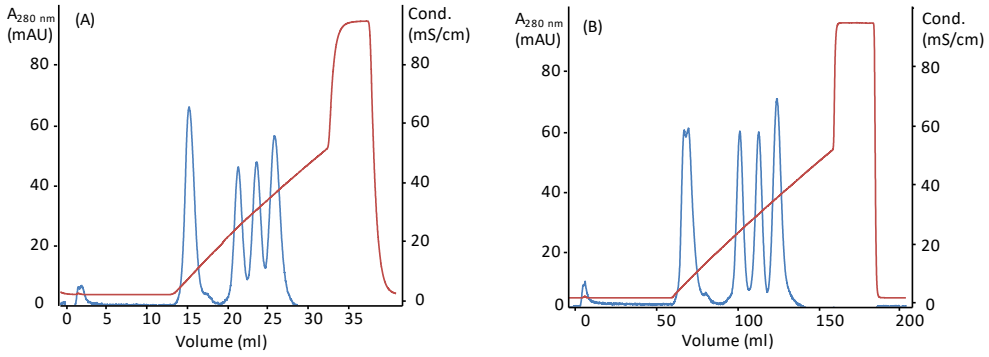

Figure 2. Separation using cation exchange chromatography. Peaks from left to right, concanavalin A, α-chymotrypsinogen A, ribonuclease A and lysozyme. (A) 0.25 ml sample applied onto a BabyBio S 1 ml and (B) 1.25 ml sample applied onto a BabyBio S 5 ml.
The blue line corresponds to absorbance at 280 nm and the red line to conductivity.

Column:	(A) BabyBio Q 1 ml (B) BabyBio DEAE 1 ml (C) BabyBio TREN 1 ml
Binding buffer:	50 mM Tris-HCl, pH 7.4
Elution buffer:	50 mM Tris-HCl, 1 M NaCl, pH 7.4
Sample:	2.5 ml, 0.3 mg/ml apo-transferrin, 0.2 mg/ml α-lactalbumin, 0.6 mg/ml soybean trypsin inhibitor in binding buffer
Flow rate:	150 cm/h (1 ml/min)
Gradient:	0 - 40% elution buffer in 20 CV

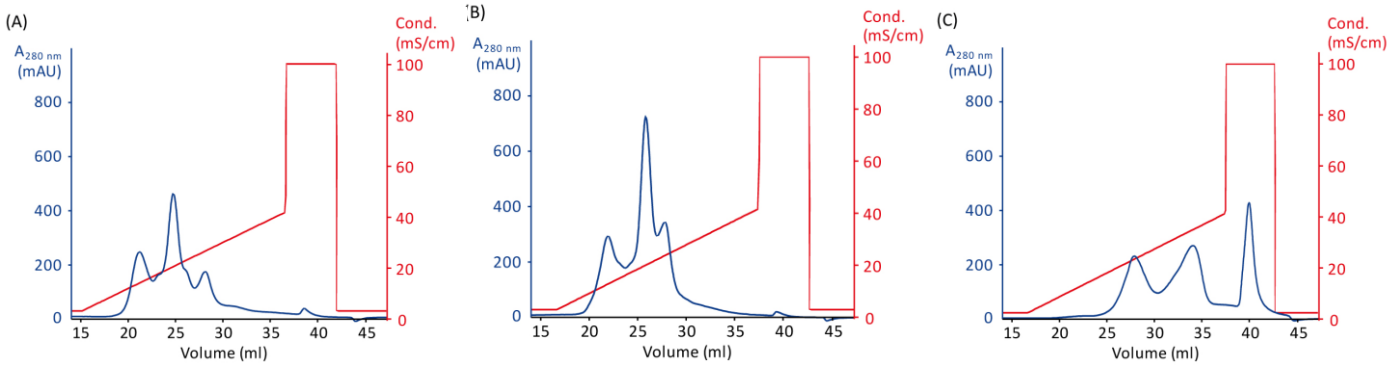

Figure 3. Separation using anion exchange chromatography. Peaks from left to right, apo-transferrin, α-lactalbumin and soybean trypsin inhibitor. (A) 2 ml sample on BabyBio Q, (B) 2.5 ml sample on BabyBio DEAE, (C) 2.5 ml sample on BabyBio TREN.
The blue line corresponds to absorbance at 280 nm and the red line to conductivity

Peptides

Peptides, constituted by a chain of amino acids, are commonly synthesized by solid-phase synthesis. Custom-made peptides are routinely synthesized up to 50-60 amino acids, but the longer the peptide sequence, the more abortive and erroneous sequences that must be removed in downstream purification processes. Therapeutic peptides represent a specialized niche between protein-based biopharmaceuticals and traditional small molecule therapies. The purity requirements are very high for these molecules. IEX is commonly used as a capture step to remove impurities and contaminants from a crude peptide batch. Both cation and anion exchangers have been used with success for peptide purifications. CIEX is more common than AIEX, but it ultimately depends on the peptide sequence.

WorkBeads IEX resins are exceptionally compatible with peptide purifications due to the smaller pore-sized bead with a very homogenous pore size distribution. These properties facilitate the mass transport of small molecules such as peptides resulting in improved selectivity and loading capacity.

Dynamic binding capacity

Depending on the nature and chemical properties of the peptide, such as isoelectric point, molecular weight, presence of disulfide bridges, modifications etc., different IEX resins may be optimal. To reach the required parameters, optimizations of purification conditions must be undertaken (pH, elution conditions, ionic strength, organic modifiers and resins). In Figures 4-6 the same peptide (pI 4.5, 39 aa) was loaded onto the four different BabyBio IEX columns using different running conditions.

Figure 4 shows the difference in loading capacities for the peptide, where BabyBio 40S stands out. Figures 5-6 show the difference in binding kinetics for BabyBio (Q/DEAE/TREN), the anion exchangers compared to BabyBio S, the cation exchanger. Whereas all the AIEX resins are insensitive to the flow rate/residence time, BabyBio 40S shows a more exceptional relationship between the flow rate and the dynamic binding capacity (DBC) value obtained where a longer residence time/lower flow rate result in a higher DBC value. This peptide had extremely fast binding kinetics to the AIEX resins.

Columns:	BabyBio S 1 ml BabyBio Q 1 ml BabyBio DEAE 1 ml BabyBio TREN 1 ml
Sample:	1 mg 39 aa-long peptide (pure)
Binding buffers:	5 mM NH_4Ac, 15% ACN, pH 4.1 (S) 20 mM Tris-HCl, 15% ACN, pH 8 (Q/DEAE/ TREN)
Elution buffers:	250 mM NH_4Ac, 15% ACN, pH 5.6 (S) 20 mM Tris-HCl, 15% ACN, 1 M NaCl, pH 8 (Q/DEAE/TREN)
Flow rates:	0.3, 0.6, 1 and 2 mL/min
Residence times:	4, 2, 1 and 0.5 minutes

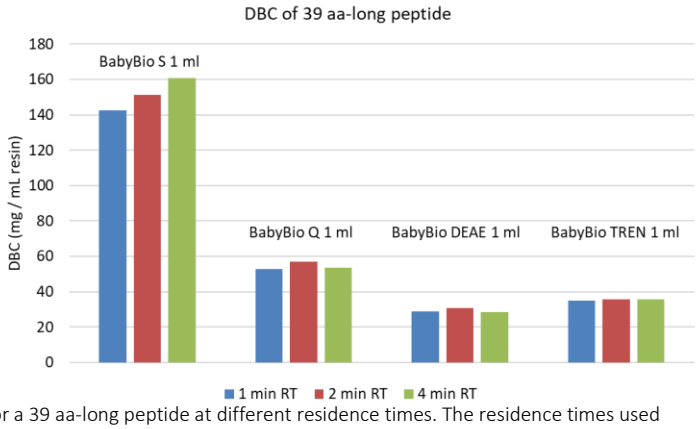

Figure 4. Dynamic binding capacity determined at 10% breakthrough for a 39 aa-long peptide at different residence times. The residence times used are specified in the graph.

Column:	BabyBio S 1 ml
Sample:	1 mg 39 aa-long peptide (pure)
Binding buffer:	5 mM NH_4Ac, 15% ACN, pH 4.1
Elution buffer:	250 mM NH_4Ac, 15% ACN, pH 5.6
Flow rates:	0.3, 0.6, 1 and 2 mL/min
Residence times:	4, 2, 1 and 0.5 minutes

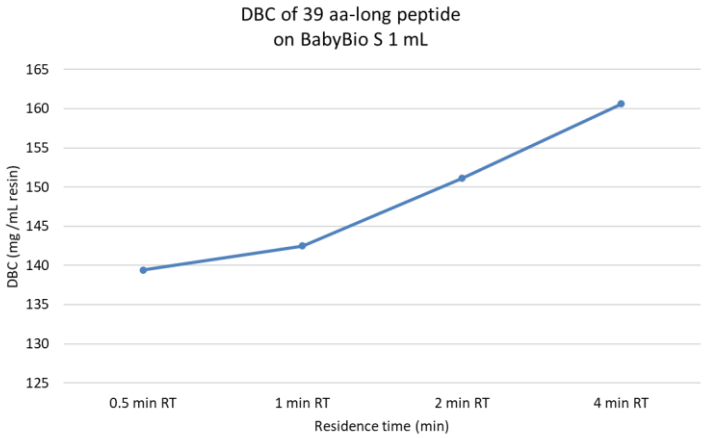

Figure 5. Relationship between DBC and residence time for a 39 aa-long peptide on BabyBio 40S (cation exchanger).

Columns:	BabyBio Q 1 ml BabyBio DEAE 1 ml BabyBio TREN 1 ml
Sample:	1 mg 39 aa-long peptide (pure)
Binding buffer:	20 mM Tris-HCl, 15% ACN, pH 8
Elution buffer:	20 mM Tris-HCl, 15% ACN, 1 M NaCl, pH 8
Flow rates:	0.3, 0.6 and 1 mL/min
Residence times:	4, 2 and 1 minutes

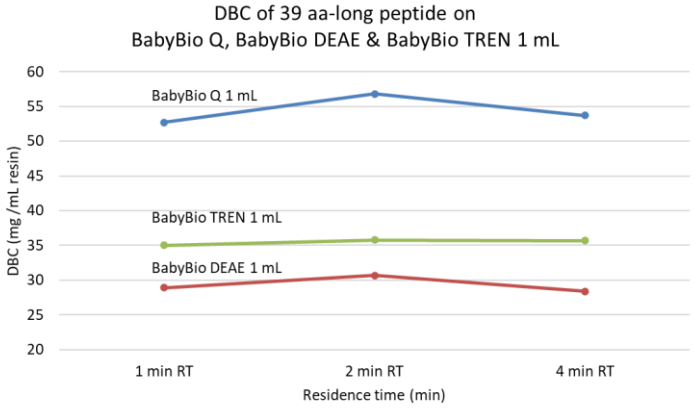

Figure 6. Relationship between DBC and residence time for a 39 aa-long peptide on BabyBio Q, BabyBio DEAE and BabyBio TREN (anion exchangers).

Flow properties

WorkBeads 40S and WorkBeads 40Q ion exchange chromatography resins are designed for high throughput protein separations under a variety of conditions. The high resolution that can be obtained at high protein loadings and high flow rates makes it ideal for process applications. Pressure/flow properties for WorkBeads 40S is shown in Figure 7. The measurements were carried out with an open bed (adaptor not pushed against the bed).

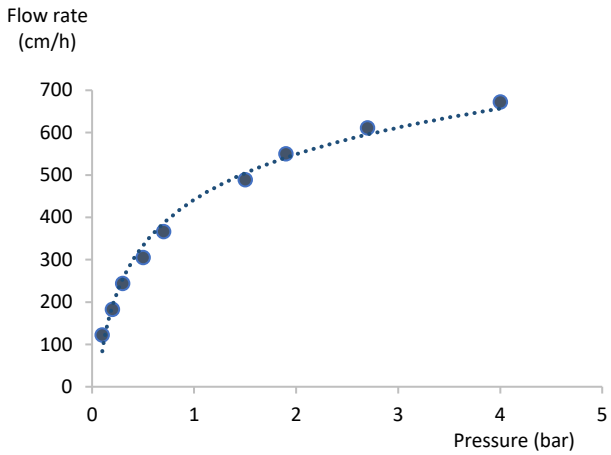

Figure 7. Pressure to flow rate properties of WorkBeads 40S determined with deionized water, 25 x 200 mm glass column.

Choice of resin

Which resin to choose ultimately depends on the target sequence and the nature of the impurities and contaminants to be removed. The choice between a cation exchanger or an anion exchanger is more straightforward than the choice between the different anion exchangers. A strong anion exchanger is easiest to optimizes since there is a broader pH range to use, but the selectivity may differ between the target molecule and the contaminants. Sometimes a weak exchanger is better at separating some contaminants from the target molecules. A weak and a strong anion exchanger are sometimes used as two orthogonal steps in purifications due to the difference in selectivity.

The same principle is true for the multimodal IEX resin WorkBeads 40 TREN. The ligand in this resin has two amines that are positively charged below pH 9, which means that it can bind molecules relatively firmly even in the presence of higher ionic concentrations, *i.e.* it is salt tolerant. This resin therefore has the advantage of binding molecules in higher ionic buffers and solutions. For example, some supernatants with higher ionic strength may interfere with the binding abilities of the target molecules to a standard ion exchanger, but it can still interact with WorkBeads 40 TREN. To conclude, many parameters determine which ion exchanger is most optimal to use and it all depends on the properties of the target molecule, the impurities and its surrounding conditions/buffers.

Scale-up

Scale-up can conveniently be carried out from a 1 ml BabyBio column to a 5 ml BabyBio column. If increased capacity is required, several columns can be coupled in series (column stacking). Note that the backpressure will increase proportionally to the resin bed height (up to a maximum of 5 columns).

Packing bulk resin of WorkBeads 40S, WorkBeads 40Q, WorkBeads 40 DEAE and WorkBeads 40 TREN into larger column volumes is another convenient choice. (see *Related products*).

Cleaning-in-place

During purification, impurities such as cell debris, lipids, nucleic acids and protein precipitates from the samples may gradually build up in the resin. Fouling is typical even for well-clarified samples. The severity of this process depends on the composition of sample applied to the column. The impurities adsorbed will reduce the performance of the packed column over time. Regular cleaning (Cleaning-in-place, CIP) keeps the resin clean, reduces the rate of further fouling, and maintains the capacity, resolution and flow properties of the column. Cleaning with 1 M NaOH applied by a low reversed flow for 2 hours or overnight, is often sufficient.

Sanitization (reduction of microorganisms) can be carried out using combinations of NaOH and ethanol (e.g., incubation with a mixture of 0.5 M NaOH and 40% ethanol for 3 hours). The sanitization procedure and its effectiveness will depend on the microorganisms to be removed and must be evaluated for each case.

Equipment

Prepacked BabyBio S, BabyBio Q, BabyBio DEAE and BabyBio TREN columns can be used with most standard liquid chromatography equipment. Purification can also be carried out using a syringe connected to the column by a luer or a standard HPLC connector.

Storage

Store at 2 to 25°C in 20% ethanol. For WorkBeads 40S it is recommended to include 0.2 M sodium acetate in the storage solution.

Equilibrate the prepacked BabyBio columns in 20% ethanol and close it securely using the included plug and cap. For BabyBio S column it is recommended to include 0.2 M sodium acetate in the storage solution. Store at 2 to 25°C.

Related products

Product name	Pack size[1]	Article number
Prepacked columns		
BabyBio Dsalt 1 ml	1 ml x 5	45 360 103
BabyBio Dsalt 5 ml	5 ml x 5	45 360 107
Bulk resins		
WorkBeads 100S	25 ml	10 200 001
	200 ml	10 200 002
WorkBeads 100Q	25 ml	10 100 001
	200 ml	10 100 002
WorkBeads 40 TREN	25 ml	40 603 001
	150 ml	40 603 003
WorkBeads Dsalt	300 ml	40 360 003
Accessories		
Column plug male 1/16”	10	70 100 010
Column cap female 1/16”	10	70 100 020

1. All different pack sizes are available on www.bio-works.com

Ordering information

Product name	Pack size	Article number
BabyBio IEX Screening Kit[1]	1 ml x 4	45 900 001
BabyBio Peptide Purification Kit[2]	1 ml x 2	45 300 102
BabyBio S 1 ml	1 ml x 1	45 200 101
	1 ml x 2	45 200 102
	1 ml x 5	45 200 103
	1 ml x 10	45 200 104
BabyBio S 5 ml	5 ml x 1	45 200 105
	5 ml x 2	45 200 106
	5 ml x 5	45 200 107
	5 ml x 10	45 200 108
BabyBio Q 1 ml	1 ml x 1	45 100 101
	1 ml x 2	45 100 102
	1 ml x 5	45 100 103
	1 ml x 10	45 100 104
BabyBio Q 5 ml	5 ml x 1	45 100 105
	5 ml x 2	45 100 106
	5 ml x 5	45 100 107
	5 ml x 10	45 100 108
BabyBio DEAE 1 ml	1 ml x 1	45 150 101
	1 ml x 2	45 150 102
	1 ml x 5	45 150 103
	1 ml x 10	45 150 104
BabyBio DEAE 5 ml	5 ml x 1	45 150 105
	5 ml x 2	45 150 106
	5 ml x 5	45 150 107
	5 ml x 10	45 150 108
BabyBio TREN 1 ml	1 ml x 1	45 655 211
	1 ml x 2	45 655 212
	1 ml x 5	45 655 213
	1 ml x 10	45 655 214
BabyBio TREN 5 ml	5 ml x 1	45 655 215
	5 ml x 2	45 655 216
	5 ml x 5	45 655 217
	5 ml x 10	45 655 218

1. BabyBio IEX Screening Kit includes one of each: BabyBio S 1 ml, BabyBio Q 1 ml, BabyBio DEAE 1 ml and BabyBio TREN 1 ml.
2. BabyBio Peptide Purification Kit is a bundle of: BabyBio S 1 ml x 1 and BabyBio Q 1 ml x 1.

Ordering information

Product name	Pack size	Article number
WorkBeads 40S	25 ml	40 200 001
	200 ml	40 200 002
	1 L	40 200 010
	5 L	40 200 050
	10 L	40 200 060
WorkBeads 40Q	25 ml	40 100 001
	200 ml	40 100 002
	1 L	40 100 010
	5 L	40 100 050
	10 L	40 100 060
WorkBeads 40 DEAE	25 ml	40 150 001
	200 ml	40 150 002
	1 L	40 150 010
	5 L	40 150 050
	10 L	40 150 060

Orders: sales@bio-works.com or contact your local distributor.

For more information about local distributor and products please visit www.bio-works.com or contact us at info@bio-works.com

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