Vivaspin™ sample concentrators

SAMPLE CONCENTRATION

Vivaspin™ sample concentrators (Fig 1) are designed for fast, nondenaturing concentration of biological samples using membrane ultrafiltration. You can achieve up to 30-fold concentration of your sample with around 95% target molecule recovery. The sample concentrator performs the entire process in a single tube with an upper compartment containing sample, and a lower compartment separated by a semipermeable membrane with a molecular weight cutoff (MWCO) you select. Centrifugation is applied to force solvent through the membrane, leaving a more concentrated sample in the upper chamber.

Vivaspin™ sample concentrators work with sample volumes from 100 µL to 20 mL, with a range of molecular weight cutoff values from M_r 3000 to 100 000.

Vivaspin™ sample concentrator features:

- One-step sample concentration in a single tube for minimal sample handling and reduced sample loss
- Patented dead-stop technology, which ensures that samples cannot be concentrated to dryness and enables direct concentrate recovery
- Vertical polyethersulfone membrane, which minimizes membrane blockage and tolerates high flow rates
- Easy, contact-free storage by reverse spinning the concentrate into the recovery cap (Vivaspin™ 2)
- Compatible pH range from pH 1 to 9

Vivaspin™ sample concentrators are a member of the Trap platform, which addresses the need for flexible, small-scale preparation of biological samples before downstream analyses such as gel electrophoresis, liquid chromatography (LC), mass spectrometry (MS), and LC-MS.

Fig 1. From left to right: Vivaspin™ 500, Vivaspin™ 2, Vivaspin™ 6, and Vivaspin™ 20.

Choice of membranes with MWCOs from 3000 to 100 000

Vivaspin™ sample concentrators work with a range of membranes to cover your ultrafiltration requirements (Table 1). You can concentrate up to 30-fold with over 95% recovery yields. For maximum recovery, select a MWCO value at least 50% smaller than the molecular size of the species of interest.

Table 1. Select the appropriate Vivaspin™ product from the intersection of the MWCO value and the volume range for your sample.

		MWCO value					
Volume range	**Product**	**3000**	**5000**	**10 000**	**30 000**	**50 000**	**100 000**
100–500 µL	Vivaspin™ 500	28932218	28932223	28932225	28932235	28932236	28932237
400 µL to 2 mL	Vivaspin™ 2	28932240	28932245	28932247	28932248	28932257	28932258
2–6 mL	Vivaspin™ 6	28932293	28932294	28932296	28932317	28932318	28932319
5–20 mL	Vivaspin™ 20	28932358	28932359	28932360	28932361	28932362	28932363

Features

Vivaspin™ 500

You can use Vivaspin™ 500 in a benchtop fixed angle rotor that accepts 2.2 mL centrifuge tubes.

Vivaspin™ 2

You can use Vivaspin™ 2 in a swing bucket or a fixed angle rotor accepting 15 mL centrifuge tubes.

Vivaspin™ 2 is specifically designed with low internal surface and membrane areas to achieve superior recoveries from very diluted solutions.

Vivaspin™ 2 offers the choice of either directly pipetting the concentrate from the dead-stop pocket built into the bottom of the concentrator, or reverse spinning the concentrate into the recovery cap, which you can then seal to store the sample.

Vivaspin™ 6

You can use Vivaspin™ 6 in a swing bucket or a fixed angle rotor accepting 15 mL centrifuge tubes.

Vivaspin™ 6 features twin vertical membranes for higher processing speed.

Vivaspin™ 20

Vivaspin™ 20 features twin vertical membranes for higher processing speed.

Characteristics

Table 2. Characteristics of Vivaspin™ sample concentrators

Membrane	Polyethersulfone (PES)
Body	Polycarbonate
Filtrate vessel	Polycarbonate

Vivaspin™ 500	**500**	**2**	**6**	**20**
Concentrator capacity, swing bucket rotor	Do not use	3 mL	6 mL	20 mL
Concentrator capacity, fixed angle rotor	500 µL	2 mL	6 mL	14 mL
Length	50 mm	126 mm	122 mm	116 mm
Width	11 mm	17 mm	17 mm	30 mm
Active membrane area	0.5 cm^2	1.2 cm^2	2.5 cm^2	6.0 cm^2
Hold-up volume of membrane	< 5 µL	< 10 µL	< 10 µL	< 20 µL
Dead-stop volume	5 µL	8 µL	30 µL	50 µL

Performance characteristics

Vivaspin™ 500

Table 3. Performance characteristics of Vivaspin™ 500

Protein Filter		**Up to 30-fold sample concentration[1]**	**Recovery**
Aprotinin 0.25 mg/mL (M_r = 6500)			
MWCO	3000	30 min	96%
BSA 1.0 mg/mL (M_r = 66 000)			
MWCO	5000	15 min	96%
MWCO	10 000	5 min	96%
MWCO	30 000	5 min	95%
IgG 0.25 mg/mL (M_r = 160 000)			
MWCO	30 000	10 min	96%
MWCO	50 000	10 min	96%
MWCO	100 000	10 min	96%

[1] Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 500 µL at 20°C (fixed angle 25° rotor).

Vivaspin™ 2

Table 4. Performance characteristics of Vivaspin™ 2

Protein Filter		**Up to 30-fold sample concentration[1]**	**Recovery**
Aprotinin 0.25 mg/mL (M_r = 6500)			
MWCO	3000	50 min	96%
BSA 1.0 mg/mL (M_r = 66 000)			
MWCO	5000	12 min	98%
MWCO	10 000	8 min	98%
MWCO	30 000	8 min	97%
IgG 0.25 mg/mL (M_r = 160 000)			
MWCO	30 000	10 min	96%
MWCO	50 000	10 min	96%
MWCO	100 000	8 min	95%

[1] Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 2 mL at 20°C (fixed angle 25° rotor).

Vivaspin™ 6

Table 5. Performance characteristics of Vivaspin™ 6

		Up to 30-fold sample concentration[1]			
Protein Filter		Swing bucket rotor	Recovery	25° Fixed angle rotor	Recovery
Cytochrome C 0.25 mg/mL (M_r = 12 400)					
MWCO	3000	-	-	90 min	97%
BSA 1.0 mg/mL (M_r = 66 000)					
MWCO	5000	20 min	98%	12 min	98%
MWCO	10 000	13 min	98%	10 min	98%
MWCO	30 000	12 min	98%	9 min	97%
IgG 0.25 mg/mL (M_r = 160 000)					
MWCO	30 000	18 min	96%	15 min	95%
MWCO	50 000	17 min	96%	14 min	95%
MWCO	100 000	15 min	91%	12 min	91%

[1] Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 6 mL at 20°C.

Vivaspin™ 20

Table 6. Performance characteristics of Vivaspin™ 20

		Up to 30-fold sample concentration[1]			
Protein Filter		Swing bucket rotor	Recovery	25° Fixed angle rotor	Recovery
Cytochrome C 0.25 mg/mL (M_r = 12 400)					
MWCO	3000	110 min	97%	180 min	96%
BSA 1.0 mg/mL (M_r = 66 000)					
MWCO	5000	23 min	99%	29 min	99%
MWCO	10 000	16 min	98%	17 min	98%
MWCO	30 000	13 min	98%	15 min	98%
IgG 0.25 mg/mL (M_r = 160 000)					
MWCO	30 000	27 min	97%	20 min	95%
MWCO	50 000	27 min	96%	22 min	95%
MWCO	100 000	25 min	91%	20 min	90%

[1] Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 20 mL (swing bucket rotor) or 14 mL (fixed angle 25° rotor) at 20°C.

Chemical compatibility

Vivaspin™ concentrators are designed for use with biological fluids and aqueous solutions. Compatible pH range is from pH 1 to 9. For chemical compatibility, see Table 7.

Table 7. Vivaspin™ chemical compatibility (2 h contact time)

Solution	Compatibility[1]	Solution	Compatibility[1]
Acetic acid (25%)	Yes	Lactic acid (5%)	Yes
Acetone (10%)	No	Mercaptoethanol (1 M)	No
Acetonitrile (10%)	No	Nitric acid (10%)	Yes
Ammonium sulfate (saturated)	Yes	Phosphate buffer (1 M)	Yes
Benzene (100%)	No	Polyethylene glycol (10%)	Yes
Chloroform (1%)	No	Pyridine (100%)	No
Dimethyl sulfoxide (5%)	Yes	Sodium carbonate (20%)	Yes
Ethanol (70%)	Yes	Sodium deoxycholate (5%)	Yes
Ethyl acetate (100%)	No	Sodium deoxycholate (0.1 M)	Yes
Formaldehyde (30%)	Yes	Sodium hydroxide (2.5 M)	No
Formic acid (5%)	Yes	Sodium hydroxide (200 ppm)	Yes
Glycerine (70%)	Yes	Sodium nitrate (1%)	Yes
Guanidine HCl (6 M)	Yes	Sulfamic acid (5%)	Yes
Hydrocarbons, aromatic	No	Tetrahydrofuran (5%)	No
Hydrocarbons, chlorinated	No	Toluene (1%)	No
Hydrochloric acid (1 M)	Yes	Trifluoroacetic acid (10%)	Yes
Imidazole (300 mM)	Yes	Tween™ 20 (0.1%)	Yes
Isopropanol (70%)	Yes	Triton™ X-100 (0.1%)	Yes
		Urea (8 M)	Yes

[1] Yes indicates chemical compatibility and No indicates chemical incompatibility and that the solution is not recommended.

Ordering information

Product			Pack size	Product code
Vivaspin™ 500	MWCO	3 000	25	28932218
Vivaspin™ 500	MWCO	5 000	25	28932223
Vivaspin™ 500	MWCO	10 000	25	28932225
Vivaspin™ 500	MWCO	30 000	25	28932235
Vivaspin™ 500	MWCO	50 000	25	28932236
Vivaspin™ 500	MWCO	100 000	25	28932237
Vivaspin™ 2	MWCO	3 000	25	28932240
Vivaspin™ 2	MWCO	5 000	25	28932245
Vivaspin™ 2	MWCO	10 000	25	28932247
Vivaspin™ 2	MWCO	30 000	25	28932248
Vivaspin™ 2	MWCO	50 000	25	28932257
Vivaspin™ 2	MWCO	100 000	25	28932258
Vivaspin™ 6	MWCO	3 000	25	28932293
Vivaspin™ 6	MWCO	5 000	25	28932294
Vivaspin™ 6	MWCO	10 000	25	28932296
Vivaspin™ 6	MWCO	30 000	25	28932317
Vivaspin™ 6	MWCO	50 000	25	28932318
Vivaspin™ 6	MWCO	100 000	25	28932319
Vivaspin™ 20	MWCO	3 000	12	28932358
Vivaspin™ 20	MWCO	5 000	12	28932359
Vivaspin™ 20	MWCO	10 000	12	28932360
Vivaspin™ 20	MWCO	30 000	12	28932361
Vivaspin™ 20	MWCO	50 000	12	28932362
Vivaspin™ 20	MWCO	100 000	12	28932363

Related products	Pack size	Product code
PD-10 Desalting Columns	30	17085101
PD SpinTrap™ G-25	50	28918004
PD MultiTrap™ G-25	4 × 96-well filter plates	28918006
PD MiniTrap™ G-25	50	28918007
PD MidiTrap™ G-25	50	28918008
PD MiniTrap™ G-10	50	28918010
PD MidiTrap™ G-10	50	28918011

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CY17357-06Jan22-DF