

January 15, 2018

Keywords or phrases:

Concentration ratio, final volume adjustment

Concentration to a Defined Final Volume with Vivaspin[®] Turbo 15 PES, Vivaspin[®] Turbo 4 PES and Vivaspin[®] 500 PES

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Abstract

This short Application Note describes how you can use Vivaspin[®] Turbo 15 PES, Vivaspin[®] Turbo 4 PES and Vivaspin[®] 500 PES to concentrate samples to defined final volumes. By adding a particular volume of water or buffer to the filtrate vessel prior to concentration, the dead-stop of the device is effectively increased, enabling accurate control of the final concentrate volume.

Introduction

It is sometimes desirable to be able to preselect a defined final volume for a concentration step, especially when parallel concentrations are being performed. Vivaspin® centrifugal concentrators have a built-in dead-stop feature, which prevents concentration to dryness. Due to the fast concentration rates possible with the patented vertical membrane design in the Vivaspin®, the drying out of the sample would otherwise be a possibility.

Here, we describe a method for achieving reproducible defined final volumes using Vivaspin® Turbo 15 PES, Vivaspin® Turbo 4 PES and Vivaspin® 500 PES centrifugal concentrators. The method does not rely on the dead-stop pocket but instead increases the retentate volume by adding liquid to the filtrate vessel prior to centrifugation.

Equipment

- Vivaspin® Turbo 15 PES 10 kDa MWCO
- Vivaspin® Turbo 4 PES 10 kDa MWCO
- Vivaspin® 500 PES 10 kDa MWCO
- Tacta® 5 mL mechanical pipette and Optifit pipette tips
- Tacta® 1000 µL mechanical pipette and Optifit pipette tips
- Tacta® 200 µL mechanical pipette and Optifit pipette tips
- Arium® Pro ultrapure water system
- Sartorius Precision Lab Balance
- Centrisart® D-16C Centrifuge with swing out rotor for 50 mL and 15 mL falcon tubes
- Centrisart® A-14C Centrifuge with fixed angle rotor for 24 1.5 | 2.2 mL tubes

Reagents

1 mg/mL Bovine Serum Albumin labelled with Bromophenol blue

Methods

1. Add defined amount of water to the filtrate tube (see table).
2. Assemble concentrator insert into the filtrate tube and add sample solution.
3. Close the concentrator screw cap (for Vivaspin® Turbo 15 PES or Vivaspin® Turbo 4 PES) or close the cap (Vivaspin® 500 PES) and place in the centrifuge.
4. Centrifuge to concentrate the sample.
5. Remove the concentrator and recover the concentrated sample with a pipette.

Results

Results for Vivaspin® Turbo 15 PES

Volume of water added to the filtrate tube	Volume of sample added to the concentrator insert	Spin conditions	Final concentrate volume (average of 8 devices)
11.5 mL	15 mL	20 min @ 4,000 g	1.50 ± 0.02 mL
9.5 mL	15 mL	20 min @ 4,000 g	0.96 ± 0.01 mL
7.5 mL	15 mL	20 min @ 4,000 g	0.53 ± 0.02 mL

Results for Vivaspin® Turbo 4 PES

Volume of water added to the filtrate tube	Volume of sample added to the concentrator insert	Spin conditions	Final concentrate volume (average of 8 devices)
2.0 mL	4 mL	20 min @ 4,000 g	0.34 ± 0.03 mL
1.5 mL	4 mL	20 min @ 4,000 g	0.15 ± 0.02 mL
1.2 mL	4 mL	20 min @ 4,000 g	80 ± 10 µL

Results for Vivaspin® 500 PES in 40° fixed angle rotor

Volume of water added to the filtrate tube	Volume of sample added to the concentrator insert	Spin conditions	Final concentrate volume (average of 8 devices)
500 µL	500 µL	15 min @ 15,000 g	103 ± 13 µL
380 µL	500 µL	15 min @ 15,000 g	51 ± 11 µL
250 µL	500 µL	15 min @ 15,000 g	30 ± 5 µL
200 µL	500 µL	15 min @ 15,000 g	23 ± 7 µL

Conclusion


Reproducible, defined final concentrate volumes can be quickly and easily achieved with Vivaspin® Turbo 15 PES, Vivaspin® Turbo 4 PES, and Vivaspin® 500 PES.

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