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Effectively Use Picus[®] Pipettes with Vivaspin[®] Concentrators

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Introduction

Use of centrifugal concentrators for buffer exchange or sample concentration requires optimization of the protocol and correct handling of the device in conjunction with a pipette to ensure:

- Determination of the concentrated sample volume for accurate yield measurement
- Retrieve the full volume of sample in a tall concentrator tube while avoiding sample-to-pipette and pipette-to-sample contamination
- Proper rinsing so that the preservatives used to maintain membrane stability do not elute into the sample leading to anomalous peaks in concentrate analysis

In this practical guide, we provide guidance on the efficient use of Picus[®] pipettes and extended length pipette tips with centrifugal concentrators.



Use of Manual Mode to Measure Yield

An electronic pipette's manual mode allows the user to control aspiration and dispensing with the adjustment wheel allowing for determination of unknown sample volumes. The pipette measures the aspirated volume based on the piston movement, allowing for accurate measurement of an unknown volume by visually controlling aspiration of the sample with the final volume displayed on the pipette. As the concentrate volume is needed to define the protein yield, use of the manual mode ensures the volume is measured accurately when emptying the vessel.

The main factors affecting accuracy of this method are the attentiveness of the user and resolution of the pipette, defined as the smallest volume that can be adjusted; for the resolution of the Sartorius Picus® 1000 µl pipette is 1 µl. Inaccuracy can be introduced by accidentally aspirating air, by not aspirating close to the liquid surface, and small amounts of residual sample left in the sample tube. Step-by-step instructions for using this mode are provided below.

Select Suitable Pipette Tips

Reaching liquid inside a tall tube can be challenging while simultaneously avoiding contamination. As such, use of the correct type of pipette tips and concentrators with angular dead stops will ensure complete recovery of the concentrate. If the pipette shaft enters the tube, there is a risk of contamination. Extended length pipette tips are therefore recommended as their length eliminates the need for the pipette to be brought into the concentrator.

Use of low retention tips can help maximize sample recovery with liquids with low surface tension which tend to leave a film of liquid on the inner surface of a standard length pipette tip.

Pipetting Speed

In applications where air bubbles or foam generation are an issue, the low surface tension of low retention pipette tips can help prevent formation of bubbles or foam. Foam and bubbles can also be prevented by adjusting the speed setting of the pipette to a slow speed.

Figure 1. Pipetting BSA solution (1 mg/ml) with slow speed (Picus® setting 1)



Figure 2. Pipetting BSA solution (1 mg/ml) with fast speed (Picus® setting 9).



Basic Steps for Centrifugal Concentration

1. Prepare Vivaspin® concentrator
 - a. For membrane rinsing: in pipetting mode, pipette up and down three to five times to rinse the membrane and remove preservative
 - b. For device passivation: pipette the passivation solution up and down three to five times over the membrane and concentrator insert housing and remove the solution (rinsing the membrane and device housing with passivation buffer solutions can reduce any non-specific binding between molecule of interest and membrane or device surface)
2. Perform concentration with centrifuge. Concentration time depends upon desired concentration factor and Relative Centrifugal Force (RCF)
3. Measure volumetric yield with Picus® manual mode

Use of Manual Mode with Picus® Pipettes to Measure Volumetric Yield

1. Set the pipette to manual mode
2. Adjust speed settings to 3 for aspiration and 3 for dispensing; accurate control of the aspiration is easier at a slow speed setting
3. Ensure the tip is below the liquid surface when aspirating while avoiding the tip being placed too close to the bottom as this may interfere with liquid flow and distort results
4. Use the adjustment wheel to aspirate liquid into the tip in a controlled manner; the force with which the wheel is turned determines the aspiration speed (see above for setting the maximum speed)
5. As the liquid is drawn into the tip, ensure the end of tip is close to the bottom of the vessel; the angular dead stop of the Vivaspin® assists with this
6. Release the wheel as soon as all liquid is aspirated into the tip and observe if any residual liquid gathers at the bottom of the vessel; if so, continue aspiration by turning the wheel
7. Read the total volume aspirated from the pipette's display
8. Empty the tip completely by pressing QUIT and double-clicking the operating button

Vivaspin®, Picus®, and Pipette Tip Compatibility

The table below lists the pipette tips that fit various Vivaspin® concentrator tubes allowing for complete aspiration of liquid.

Table 1. Vivaspin® Compatibility to Tips and Picus® Pipettes

Vivaspin®	Tip	Picus®
Vivaspin® Turbo 15 RC 5-120 µl	LH-X781000,	735081
	LH-X781001	LH-745081
	LH-XF781001	
Vivaspin® Turbo 15 PES	LH-X781000	735081
	LH-X781001	LH-745081
	LH-XF781001	
Vivaspin® Turbo 4 RC	LH-X781000	735081
	LH-X781001	LH-745081
	LH-XF781001	
	If concentrate volume is below 100 µl use:	
	LH-X780200	735041
	LH-X780201	LH-74504
	LH-XF780201	
Vivaspin® 20	LH-X781000,	735081
	LH-X781001	LH-745081
	LH-XF781001	
Vivaspin® 6	LH-X781000	735081
	LH-X781001	LH-745081
	LH-XF781001	

Summary

Sartorius Picus® and extended length pipette tips enable collection of concentrated samples from Vivaspin® concentrators. Use of the Picus® pipette manual mode enables convenient measure of sample volume and extended length pipette tips ensure that the entire sample can be reached in tall vessels while protecting the sample and pipette from contamination.




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