Just the Right Size for Small Sample Dialysis!
Now available: Trial-size packages of our versatile Slide-A-Lyzer® MINI Dialysis Units

Slide-A-Lyzer® Mini Tubes

Slide-A-Lyzer® Mini Tubes
Slide-A-Lyzer® Mini Units & Float

For small-sample preparation (5-100 µl), nothing is more versatile than Pierce Slide-A-Lyzer® MINI Dialysis Units. Now you can test these handy devices in your next application when you purchase one of the new trial-size kit packages. And, unlike other small sample separation devices on the market, there is no need for a microcentrifuge, no need for syringe adaptors, or no laborious steps necessary to manipulate the small volume. Simply pipette the sample into the MINI unit, cap and dialyze. Two new formats allow you to test the Slide-A-Lyzer® MINI Units as a single sample (microtube format) or with multiple samples (25-array float format).

Features/Corresponding Benefits

- Low-binding plastic and membrane
- Small surface area minimizes sample loss compared to filtration and resin systems
- Excellent protein and nucleic acid recovery
- (> 95%)
- Simple small-volume sample addition and removal with a standard pipette
- Easy high-volume recovery (>95%) for 5-100 µl samples
- Single sample (tube) or multiple sample dialysis (25-array float)
- Simple and flexible sample preparation formats
- One-step dialysis
- No laborious procedures or expensive equipment required
- Rapidly remove salt from nucleic acids and proteins
- Salt reduction in <15 minutes, improving sample resolution, quantitation and conjugation

Applications & Guides available on (www.piercenet.com)

1 How to use the MINI
2 MINI materials and removal of trace components in membranes
3 MINI Sterilization
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5 Protein and nucleic acid conjugation
6 Compatibility Guide- Dialyze samples in organics, weak acids and weak bases
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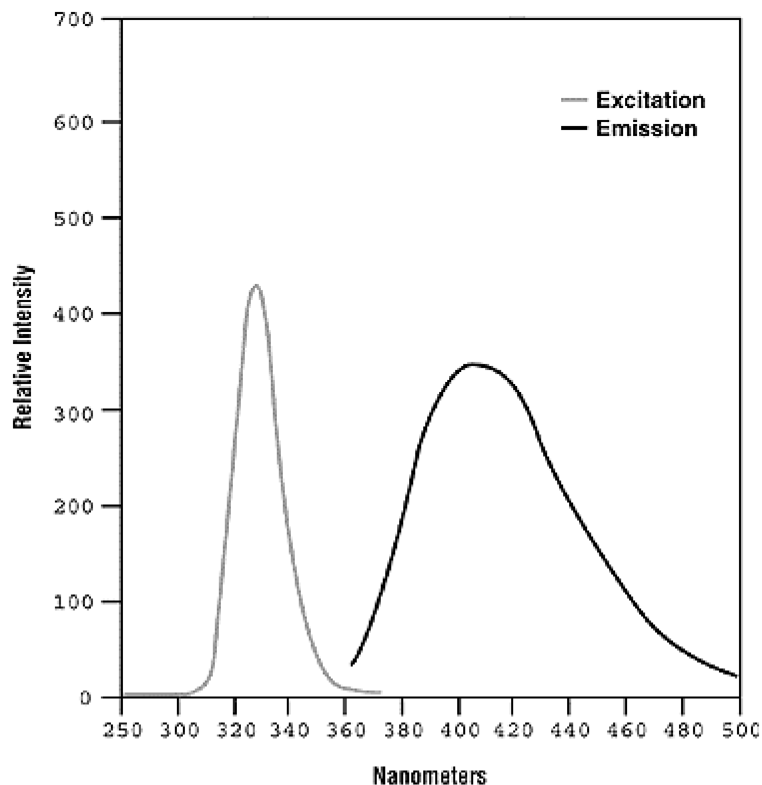
10 Small molecular weight component removal
11 Protein concentration
12 Equilibrium dialysis in 48-well microplates
13 Scavenger dialysis using capture resins in the dialysate

Figure 1. Effect of Salt Removal on Resolution of Nucleic Acid Analysis



Product No.	Description	Size	Price
69554	Slide-A-Lyzer® MINI Dialysis Units Plus Microtubes, 3,500 MWCO, 10-100 µl	10 units	$40
69558	Slide-A-Lyzer® MINI Dialysis Units Plus Float, 3,500 MWCO, 10-100 µl (10 units, 10 caps and 1 float that holds 25 units)	Kit	$45
69564	Slide-A-Lyzer® MINI Dialysis Units Plus Microtubes, 7,000 MWCO, 10-100 µl	10 units	$40
69566	Slide-A-Lyzer® MINI Dialysis Units Plus Float, 7,000 MWCO, 10-100 µl (10 units, 10 caps and 1 float that holds 25 units)	Kit	$45
69574	Slide-A-Lyzer® MINI Dialysis Units Plus Microtubes, 10,000 MWCO, 10-100 µl	10 units	$40
69576	Slide-A-Lyzer® MINI Dialysis Units Plus Float, 10,000 MWCO, 10-100 µl (10 units, 10 caps and 1 float that holds 25 units)	Kit	$45
69715	Handee Microcentrifuge Tubes Compatible with Slide-A-Lyzer® MINI Dialysis Units	72 tubes	$30
66526	Slide-A-Lyzer® Concentrating Solution Use as dialysate to remove water and concentrate samples.	10 x 15 ml hypovials	$65

The Slide-A-Lyzer® MINI Dialysis Unit is covered under U.S. Patent # 6,039,871.
The Slide-A-Lyzer® Dialysis Cassette is covered under U.S. Patent # 5,503,741.

To order this product or for more information, contact Customer Service.

How to Use the Slide-A-Lyzer® MINI Dialysis Unit

- Do not touch with ungloved hands
- If desired, soak the MINI to remove trace contaminants
- Add the sample (0.01-0.1 ml) with a standard pipette
- Place the MINI in a float (alternatively, a microtube or 48-well plate may be used); cap or cover to prevent evaporation
- Place the MINI unit's membrane in contact with dialysis buffer in a beaker, microtube or plate format
- Dialyze with no or low mixing
- Collect the sample in the corner of the MINI with a standard pipette

See how easy it works! link to video already on site. www.piercenet.com/dialysis

Formats for Microdialysis

Format	Material	Product #	# MINI Units	Dialysate Volume
Microtube	Polypropylene	69715	1	~1.3 ml
8-hole float	Polypropylene	69595	8	>250 ml beaker
20-hole float	Polypropylene	69597	20	>500 ml beaker
25-array float	Foam*	69588	25	>500 ml beaker
48-well plate	Polystyrene**		48	~0.3-0.5 ml

*Non-leaching, non-interfering foam that cannot withstand heating
**48-well polystyrene plate by Falcon #1178 or Costar#3548 (Packard's Fusion™ Universal Microplate Analyzer has 48-well plate read capability)

Of What Materials is the MINI Manufactured?

- The membrane is regenerated cellulose
- The plastic is a polypropylene copolymer (both materials have very low protein- and nucleic acid-binding properties

To Remove Trace Contaminants

- Glycerol - dialyze 15 minutes against 1 L DI water (glycerol content: <3% in 3K, ~15% in 7K and ~23% in 10K MINI)
- Metals - dialyze 15 minutes against 1 L 1 mM EDTA (metals present in a 3K, 7K or 10K MINI; 2 ppb iron, 5 ppb magnesium, 1.5 ppb nickel, 0.2 ppb zinc, 0.2 ppb copper, 0.5 ppb chromium and 0.3 ppb cadmium)

MINI Sterilization

Manufacturing

- The MINI is never touched during manufacturing or packaging, it is auto-bagged
- Manufacturing takes place in a hepa/clean room environment
- Most microorganisms cannot grow on polypropylene or regenerated cellulose
- Gamma Irradiation
- Other Treatment Options (15 minutes)
- Boil (D14% dialysis rate)
- Autoclave 121°C @ 15 psig (D25% dialysis rate; check integrity as damage has occurred from some autoclaves)
- 70% Ethanol
- 30% Hydrogen Peroxide
- 1,500 ppm Peracetic Acid
- 0.1N NaOH

Volume-to-surface Area of Slide-A-Lyzer® Dialysis Devices and Competitor Products

The smaller the number, the greater the loss of protein to the device surface

SAL MINI (0.01-0.1 ml)	0.3 µl/mm^2
SAL (0.1-0.5 ml)	0.4 µl/mm^2
SAL (0.5-3 ml)	0.3 µl/mm^2
SAL (3-12 ml)	0.5 µl/mm^2
SAL (3-15 ml)	0.9 µl/mm^2
Resin (0.5 ml/5 ml bv)	0.1 µl/mm^3
Micro filtration (100 µl)	0.05 µl/mm^2

Samples and Sample Device Issues

- Filtration Devices
- Special equipment needed
- Time-consuming hands-on time
- Damages proteins that are sensitive to g force
- Disrupts weak protein-protein interactions Desalting Resins
- Dilutes samples 2X
- Has the greatest surface area, thus the greatest protein loss; not very useful for dilute samples or small volumes
- Sample clean up is dependent on sample, desalt compound, column resin and techniques applied
- Fast processing time, but it is tedious to locate sample and analyte peaks and to determine purity and recovery
- Preferred method for removal of "short-life" compounds (i.e., maleimides, sulfhydryls, etc.) Dialysis
- No special equipment required
- No sample dilution
- Small surface-to-volume ratio minimizes sample loss
- Extended dialysis requires no handling
- No damage of proteins due to g force

Slide-A-Lyzer® MINI Dialysis Unit Chemical Compatibility List

Legend
G= Good chemical resistance
F= Fair chemical resistant (pore swelling may occur in membrane or polypropylene may be effected by short term exposure
N= Not recommended

Reagent		**Reagent**	
Acetic Acid, 25%	G	Hydrofluoric Acid, 25%	F
Acetone	G	Hydrogen peroxide, 30%	G
Ammonium hydroxide, 1N	F	Isopropanol	G
Reagent	F	Methanol, 98%	G
Amyl acetate	G	Methyl acetate	G
Benzene	N	Methyl ethyl ketone	G
Benzyl alcohol	N	Methylene chloride	G
Butanol	G	Nitric Acid, 25%	N
Butyl acetate	G	Nitric Acid, 65%	N
Carbon tetrachloride	G	Perchloric Acid, 25%	N
Chloroform	N	Phosphoric Acid, 25%	F
Dimethyl formamide	F	Potassium hydroxide, 1N	N
Dioxane	G	Propylene glycol	G
Ethanol, 70%	G	Sodium hydroxide, 1N	F
Ethanol, 98%	G	Sulfuric Acid, 25%	F
Ethyl acetate	G	Sulfuric Acid, 96%	N
Ethylene glycol	G	Tetrahydrofuran	G
Formaldehyde solution, 30%	G	Toluene	G

Formic Acid, 100%	G	Trichloroacetic Acid, 10%	F
Formic Acid, 25%	G	Trichloroacetic Acid, 25%	N
Hexane	G	Trichloroethylene	N
Hydrochloric Acid, 25%	N	Xylene	F
Hydrochloric Acid, 30%	N		

Sample Recovery from Slide-A-Lyzer® MINI Dialysis Unit

Sample Recovery from Slide-A-Lyzer® MINI Dialysis Unit					
Protocol: Proteins were diluted to 0.01 mg/ml and 0.1 mg/ml in glycine pH 2.8, PBS pH 7.2 or sodium bicarb pH 9.2. 50 µl of each protein solution was added to a 10K MINI unit and dialyzed overnight against PBS, pH 7.2. The recovered sample (~50 µl) was put in a microwell plate and mixed with 100 µl of Micro BCA™ Protein Assay Reagent.					
Sample	**% Recovery pH (2.8-9.4)**	**pI**	**M.W. (kD)**	**Extinction A(280) 1 mg/ml**	**Other Information**
Aldolase	99%*	6.1	150	0.94	7-28 sulfhydryls
Avidin	94%*	10	67	1.5	79.6 x 83.4 x 79.6Å
Biotin-BSA	95%	4.7	67	0.68	biotinylated
BSA	96%	4.7	67	0.68	-
Cationized BSA	94%	11	67	0.68	high amine content
Chymotrypsinogen A	96%	-	25	-	-
CIAP	97%	4.4	140	0.99	-
Cytochrome C (equine)	98%	9	12.4	-	25 x 25 x 37 Å
Goat anti-Mouse IgG	95%	7-8	150	1.4	-
Histone type IIIS	91%*	-	12-20	-	high amine content
HRP	98%	8	40	0.6	-
Lysozyme (hen)	93%*	11	14.4	2.6	45 x 30 x 30 Å
Mouse IgG	99%	7-8	150	1.4	-
Myglobin	95%	6.8	16.9	1.7	44 x 44 x 25Å

NeutrAvidin® Biotin-BindingProtein	98%	6.3	60	-	-
Ribonuclease A (bovine)	94%	9.5	13.7	0.73	38 x 28 x 22Å
Streptavidin	95%	5	60	-	98.4 x 98.4 x 125.8Å
SBP	97%	4.1	40	0.6	-
Phosvitin	96%	-	40	-	10% phosphorylation
Casein	98%*	4.7	16 & 23.6	-	1% phos, high carboxy

*Avidin and Lysozyme exhibited a 15% sample loss @ 0.01 mg/ml @ pH 7.
*Aldolase, Lysozyme, Histone and Casein exhibited a 24% protein loss @ 0.01 mg/ml @ pH 2.8. SBP, phosvitin, and casein had low protein reactivity with Micro-BCA™ Reagent or Coomassie® Reagent. This made accurrate detection difficult @ 0.01 mg/ml.
Samples in PBS, TBS, or Bicarb (20-100 µl) were dialyzed 2-24 hours against water or TE. Recovery was determined by Molecular Probes Fluorescent Detection Reagents. Nucleic Acid (g) is representative of experimental, not indicative of sample limit.

Sample	**Recovery**	**Assay**	**M.W. kD**	**A(260) = 1**	**Nucleic Acid (g)**
Oligo, 25 bases (3K, 7K)	100%	OliGreen®	8.3	1 260 = ~37µg	20 µg
Oligo, 60 bases (10K)	100%	OliGreen®	19.8	1 260 = ~37µg	2 µg and 0.2µg
Salmon Sperm DNA	100%	PicoGreen®		1 260 = ~50µg	8 ng
Yeast RNA	100%	RiboGreen®	>2000	1 260 = ~40µg	4 ng

*To estimate molecular weight for nucleic acids, use an average of 330 daltons/base or 660 daltons/base pair. OliGreen, PicoGreen, and RiboGreen are registered trademarks of Molecular Probes, Inc.

Salt Reduction per Time
Pull from dialysis brochure page 5 Figure 1. Varied volumes of 1 M NaCl measured for residual NaCl after 10 minutes Pull from dialysis brochure page 5 Figure 2. Time course of desalting 100 µl samples of 5 M NaCl

Salt Reduction for Nucleic Acids

- Improved electrophoretic resolution
- Agarose electrophoresis Previews (2001.) New Slide-A-Lyzer® MINI Dialysis Unit trial sizes. 5(3), 6.

- Capillary electrophoresis Sykaluk, L., Brennan, T., King-Spengler, T. and McKibben, S. (1998). Slide-A-Lyzer® MINI Dialysis Units for microliter samples, Previews 2(4), 13.
- Improved conjugation link to bandshift assay in Northern/Southern Blotting with North2South Direct
- Improved quantitation link to nucleic acid quantitation in Northern/Southern Blotting with North2South Direct

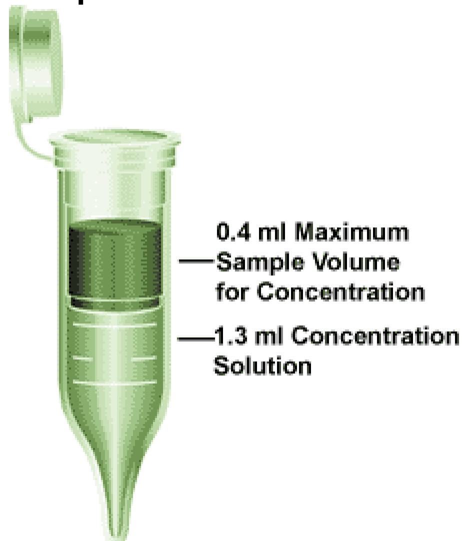
Reference:

1. Brown, T.A., ed. (1991). Molecular Biology LabFax, BIOS Scientific Publishers Limited: Oxford, UK, p. 116.

Salt Reduction and Buffer Exchange for Proteins

- Improved electrophoretic resolution
- Too much salt in sample
- Buffer capacity too high New Figure for PhastGels
- Improved conjugation pH 7 vs. pH 9 conjugation link to Previews v2n4 p13 fig 8
- Improved quantitation link to protein assay compatibility chart
- Improved protein digest (i.e., salt, organics, detergents, pH and denaturants alter protein folding and thus cleavage with reductants, enzymes and other chemical cleaving agents)

Sample Concentration



1. Add ~1.3 ml concentrating solution #66526 to a microfuge (Product # 69715)
2. Add sample to a MINI unit and place membrane in contact with the concentrating solution in the microtube; cap
3. The sample will concentrate at 35-45 µl/hour