One-Step SDS Removal Kit

Introduction

Sodium dodecyl sulfate is one of the most used detergents for solubilizing biological materials. Still, excess unbound detergent interferes with many downstream applications like mass spectrometry (MS) and amino acid sequencing, antigen-antibody binding, immunoprecipitation assay, and ELISA. Several SDS removal protocols, such as prolonged dialysis, anion exchange chromatography, spin column, and acetone precipitation, are routinely used. However, these procedures are either laborious or suffer from sample losses and are challenging for low volume samples and high thorough-put automation. We developed a novel, efficient SDS removal system to overcome these limitations.

BcMag™ **One-Step SDS Removal Kit** uses magnetic beads modified with proprietary chemistry to remove SDS detergent. The resin can quickly and efficiently remove free SDS (sodium dodecyl sulfate) from ultra-low volumes of protein/ peptide or DNA/RNA solutions. The beads enable 96 samples to be processed simultaneously in less than 10 minutes.

The beads allow rapid and efficient removal of free SDS from the sample. The procedure is straightforward (Fig.1). 1. Add the beads directly to the sample. 2. Pipette or vortex to capture the free SDS detergent. 3. Magnetic separation of the beads from the protein, or DNA/RNA solution, while the protein or DNA/RNA remains in the solution. The easy-to-use magnetic beads significantly improve results over the standard drip column and batch methodologies with minimum protein loss (<10%). Since only a small volume of magnetic beads is used, the final protein concentration of the sample is not significantly decreased.

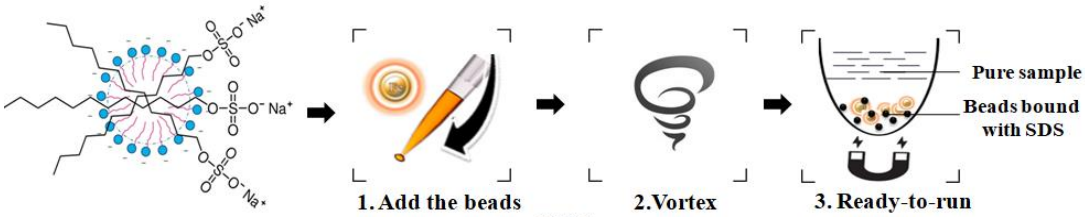

FIG.1

Features and Advantages

- Simple protocol: No liquid transfer, One-tube, One-step, and one-minute protocol.
- Easy to use.
- Reliable and reproducible results with exceptional >90% recovery for protein (>6 kDa, aprotinin) or DNA/RNA (>25mer dsDNA)
- Effective Cleanup: Remove 95% free SDS detergent.
- Cost-effective: Eliminates columns, filters, and laborious repeat pipetting.
- High throughput: Compatible with many different automated liquid handling systems

Specification	
Composition	Silica-enclosed magnetic beads are modified with our proprietary chemistry.
Stability	Short Term (<1 hour): pH 4-11; Long-Term: pH 4-10 Temperature: 4°C -140°C; Most organic solvents
Magnetization	~40-45 EMU/g
Type of Magnetization	Superparamagnetic
Formulation	100 mg / ml in d_2H_2O
Binding Capacity	48 µg/mg beads
Storage	Ship at room temperature, Store at 4°C upon receipt.

PROTOCOL

Phone: +1-858-909-0079 **Bioclone Inc**. Fax: +1-858-909-0057

Materials Required by the User

Item	Source
Magnetic rack for centrifuge tube ** Based on sample volume, the user can choose one of the following magnetic Racks	• BcMag rack-2 for holding two individual 1.5 ml centrifuge tubes (Bioclone, Cat. # MS-01) • BcMag rack-6 for holding six individual 1.5 ml centrifuge tubes (Bioclone, Cat. # MS-02) • BcMag rack-24 for holding twenty-four individual 1.5-2.0 ml centrifuge tubes (Bioclone, Cat. # MS-03) • BcMag rack-50 for holding one 50 ml centrifuge tube, one 15 ml centrifuge tube, and four individual 1.5 ml centrifuge tubes (Bioclone, Cat. # MS-04)
BcMag 96-well Plate Magnetic Rack.	• BcMag 96-well Plate Magnetic Rack (side-pull) compatible with 96-well PCR plate and 96-well Microplate or other compatible racks (Blioclone, Cat#: MS-06)
Adjustable Single and Multichannel pipettes	
Centrifuge with swinging bucket	
Addition items are required if using 96-well PCR plates/tubes	
Vortex Mixer ** The user can also use other compatible vortex mixers. However, the time and speed should be optimized, and the mixer should be Orbit ≥1.5 mm-4 mm, Speed ≥ 2000 rpm	
Eppendorf™ MixMate™	Eppendorf, Cat#:5353000529
Tube Holder PCR 96	Eppendorf, Cat#: 022674005
Tube Holder 1.5/2.0 mL, for 24 × 1.5 mL or 2.0 mL	Eppendorf, Cat#: 022674048
Smart Mixer, Multi Shaker	BenchTop Lab Systems, Cat#:5353000529
1.5/2.0 mL centrifuge tube	
96-well PCR Plates or 8-Strip PCR Tubes	
PCR plates/tubes ** ***IMPORTANT!*** If using other tubes or PCR plates, ensure that the well diameter at the bottom of the conical section of PCR Tubes or PCR plates must be ≥2.5mm.	
Addition items are required if using 96-well microplates	
Fisher Scientific™ Microplate Advanced Vortex Mixers	Fisher, Cat#:02-216-101
OHAUS Microplate Vortex Mixers	OHAUS, Cat#:30392160
Vortex Mixer ** The user can also use other compatible vortex mixers. However, the time and speed should be optimized, and the mixer should be Orbit ≥1.5 mm-4 mm, speed ≥ 800 rpm	
Clear Flat-bottom Non-Binding Assay Microplates	

Procedure

The following protocol is an example. The beads and sample volume can be rational *Scale-up* (or *down*). Do not use buffers containing organic solvents.

1. Shake the bottle to resuspend the Magnetic beads until it is homogeneous entirely.

   IMPORTANT! ***It is essential to mix the beads before dispensing. Do not allow the beads to sit for more than 2 minutes before dispensing. Resuspend the magnetic beads every 2 minutes.***

2. Add an appropriate amount of the magnetic beads to the sample containing free detergent.

   IMPORTANT! ***Users need to optimize the beads and free detergents ratio based on the binding capacity (48 µg/mg beads**).***

   ***** Binding capacity assay condition: Mix with 10 µl magnetic beads (100 mg/ml) with 100 µl protein sample (1:400 dilution of Human serum) containing detergents in 0.1M Sodium phosphate, 0.15M NaCl, pH7.5 buffer, and vortex at 2000 rpm for 5 minutes)***

3. Mix the sample with beads for 1-2 minutes by slowly pipetting up and down 20-25 times *or* vortex for 5 minutes at 2000 rpm for PCR plates or 800 rpm for microplate**s.**

   IMPORTANT! ***Users should optimize the speed and time if using a vortex mixer.***

4. Place the sample plate or tube on the magnetic separation plate for 30 seconds or until the solution is clear.
5. Transfer the supernatant to a clean plate /tube while the sample plate remains on the magnetic separation plate. The sample is ready for downstream applications.

C. Troubleshooting

Problem	Probable cause	Suggestion
Low Protein Recovery	Vortexing time is too long.	• If using other digital vortex mixers, the vortex condition such as speed and time must be optimized.
	Using too many magnetic beads	Completely resuspend the magnetic beads and reduce the amounts of the beads.
Failure to remove detergent.	Used inappropriate tubes or plates	Ensure that the well diameter at the bottom of the conical section of the Tubes or well of the plate is ≥2.5mm.
	Vortex speed is too slow, or vortex time is too short. Containing too much SDS in the sample	• Increasing either the speed or time • If using other digital vortex mixers, the vortex condition such as speed and time must be optimized. • Repeat the procedure using more beads

Related Products	
Product Name	Product Name
One-Step Lipids Removal Kit	Quick Albumin Removal Kit
One-Step Deproteinizing Kit	Quick HSA and IgG Depletion Kit
One-Step SDS Removal Kit	One-Step Dye Removal Kit
One-Step Detergent Removal Kit	Quick Endotoxin Removal Kit
EDTA Metal Ion removal Kit	Immobilized TCEP Disulfide Reducing Kit
EGTA Metal Ion removal Kit	One-Step PCR Inhibitor Removal Kit
One-Step DNA and RNA Cleanup Kit	One-Step DNA and RNA Removal Kit
One-Step Sequencing Cleanup Kit	One-Step Single-Stranded DNA Removal Kit
One-Step Fluorescent Labeling Cleanup Kit	One-Step RNA Removal Kit
One-Step NGS Cleanup Kit	One-Step PCR Cleanup Kit

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