

Bio-Rex[®] Sample Preparation Discs

**25 mm Disc with Bio-Beads[®] SM-2
Adsorbent Resin**

Catalog number: 343-0040

Bio-Rad Laboratories, 1414 Harbour Way South, Richmond, CA 94804

589 89-0489 LIT-190



Introduction

Bio-Rex sample preparation discs with Bio-Beads SM-2 adsorbent consist of an extremely flexible, strong membrane composed of resin beads permanently enmeshed in a polytetrafluoroethylene (PTFE) membrane. The membrane, which functions as an adsorbent, is used to adsorb organics from aqueous solutions.

These 25 mm sample preparation discs offer a fast and convenient alternative to column and batch adsorption methods. The Bio-Rex discs provide a smaller format than batch or packed column for small sample sizes and yet have the efficiency of packed column configurations. Because the membranes are composed of 80% resin in a polytetrafluoroethylene matrix, they offer a very high capacity. The discs are also porous, to allow simultaneous separation and filtration.

Technical Description

The 25 mm sample preparation discs contain a ready-to-use Bio-Beads adsorbent membrane within a polypropylene housing. To facilitate sample preparation, the sample preparation disc has a female Luer fitting with locking tab for easy connection to a syringe and a tapered male Luer outlet fitting for connection to other Luer devices. A variety of liquid samples can be processed with minimum sample handling.

The Bio-Beads SM-2 beads within the membrane are neutral, macroporous polymeric beads of high surface area. Each bead is composed of a large number of highly crosslinked microspheres. This macroporous structure gives it high surface area and uniform pores. The Bio-Rex adsorbent membranes can be used with a variety of solvents, including alcohols. Applications include concentration or separation of trace organics in water, steroids, bile acids, drugs, pesticides, metals, and detergents. The physical properties of the membrane and resin are listed in Table 1.

Table 1. Description of Bio-Rex Sample Preparation Discs with Bio-Beads SM-2 Adsorbent

Composition (nominal)	80% Bio-Beads SM-2 adsorbent 20% PTFE
Pore size	0.45 μm (nominal)
Water flow at 10 psi	>1.0 ml/min/cm ²
Triton® X-100 concentration	Less than 0.35%
Retains	Hydrophobic compounds
Resin matrix	Styrene divinylbenzene
Resistance	Autoclavable, pH 1-14, 1 N NaOH, methanol, 1 N HCl, not compatible with chloroform or methylene chloride
Resin bed dimensions	22 mm \times 0.4 mm
Capacity (nominal)	Triton X-100: 6 mg/25 mm sample preparation disc

General Precautions

The disc contains less than 0.35% Triton X-100 detergent. To remove the Triton X-100 detergent, rinse the disc thoroughly with methanol prior to use until the UV absorbance is 0.

The flow should be unidirectional; in through the female Luer and out through the male taper.

Applications

Bio-Rex membranes with Bio-Beads SM-2 adsorbent can be used for the adsorption of nonpolar substances or surface active agents from substances, or surface active agents from aqueous solutions. Holloway used Bio-Beads SM-2 beads to remove Triton X-100 detergent.¹ Others have since used the adsorbent for removing Triton,²⁻⁵ as well as non-ionic detergents such as deoxycholate,⁶⁻⁸ NP-40,⁹ and Emulgen 911.¹⁰⁻¹² Bio-Beads SM-2 beads have been used to separate water soluble steroids,^{13,14} drugs,¹⁵⁻¹⁸ pesticides,¹⁹⁻²² trace organics,²³⁻²⁶ metals,²⁷⁻²⁹ and rhodamine.³⁰

For a complete applications bibliography, request Bulletin 1461.

References

1. Holloway, P. W., *Anal. Chem.*, **53**, 304-308 (1973).
2. Drexler, G., Eichinger, A., Wolf, C. and Seighart, W., *J. Immun. Methods*, **95**, 117-122 (1986).
3. Bonomi, F. and Kurtz, D. M., Jr., *Anal. Biochem.*, **142**, 226-231 (1984).
4. Welling, G. W., et al., *J. Chromatogr.*, **297**, 101 (1984).
5. Metsikko, K., van Meer, G. and Simons, K., *The EMBO Journal*, **5** (13), 3429-3435 (1986).
6. Horigome, T. and Sugano, H., *Anal. Biochem.*, **130**, 393-396 (1983).
7. Lorusso, D. J. and Green, F. A., *Science*, **188**, 66 (1974).
8. Shechter, I. and Bloch, K., *J. Biol. Chem.*, **246** (24), 7690-7696 (1971).
9. Momoi, T., *Biochem. Biophys. Res. Commun.*, **87**, 541-549 (1979).
10. Gibson, G. G. and Schenkman, F. B., *J. Biol. Chem.*, **253**, 5957-5963 (1978).
11. Warner, M., *J. Biol. Chem.*, **257** (21), 12995-13000 (1982).
12. Brunch, R. C., Thotakura, N. R. and Bahl, O. P., *J. Biol. Chem.*, **261** (20), 9450-9460 (1986).
13. Shackleton, C. H. L., Sjovall, J. and Wisen, O., *Clin. Chim. Acta*, **27**, 354-356 (1970).
14. Bradlow, H. L., *Steroids*, **11**, 265 (1968).
15. Bastos, M. L., Jukofsky, D. and Mule, S. J., *J. Chromatogr.*, **81**, 93 (1973).
16. Robinson, J. L., Marshall, M. A., Draganjac, M. E. and Noggle, L. C., *Anal. Chim. Acta*, **115**, 229-238 (1980).
17. Digregorio, G. J., *J. Chromatogr.*, **101**, 424-427 (1974).
18. Dieterie, W., Faigle, J. W. and Mory, H., *J. Chromatogr.*, **168**, 27-34 (1979).
19. Levesque, D. and Mallet, V. N., *Intern. J. Environ. Anal. Chem.*, **16**, 139-147 (1983).

Instructions for Use

Bio-Rex membranes with Bio-Beads SM-2 adsorbent are fast and easy to use.

Optional Prerinsing Step

The membrane contains less than 0.35% Triton X-100 detergent. If this interferes with your application, rinse the membrane with 10-15 ml of methanol or hot water prior to use.

1. Fill a 10 ml syringe with distilled deionized water.
2. Secure the Bio-Beads SM-2 sample preparation disc inlet to the syringe by locking the syringe into the female Luer.
3. Apply moderate pressure to the syringe plunger to begin filtration.
4. Fill a syringe with the sample to be processed.
5. Again, secure the Bio-Beads SM-2 sample preparation disc inlet to the syringe by locking the syringe into the female Luer.
6. Apply moderate pressure to the syringe plunger to begin filtration.
7. If you are removing hydrophobic contaminants from your sample, collect the effluent. If you are concentrating a hydrophobic sample on the membrane, allow all of the sample to pass through the syringe filter, then elute the compound from the adsorbent using a more polar solvent such as methanol.

Note: The flow must be unidirectional due to the structure of the disc.

Sample Protocol

Removal of free fluorescein from FITC labeled antibodies.

1. Wash the sample preparation disc with 10-15 ml of methanol or hot water to remove the Triton X-100 detergent.
2. Wash the sample preparation disc with 10-15 ml distilled deionized water.
3. Equilibrate the sample preparation disc with PBS buffer. Pass the sample containing the FITC labeled antibodies through the sample preparation disc. Collect the effluent.

The sample preparation disc can be regenerated up to 5 times by washing in 10-15 ml of methanol, followed by rinsing in deionized water.

Storage

The sample preparation discs should be stored in their original packaging at room temperature, away from excess heat or light.

20. Sundaram, K. M. S., Szeto, S. Y. and Hindle, R., *J. Chromatogr.*, **177**, 29-34 (1979).
21. McNeil, E. E. and Otsen, R., *J. Chromatogr.*, **132**, 277-286 (1977).
22. Paschal, D. C., Bicknell, R. and Dresbach, D., *Anal. Chem.*, **49** (11), 1551-1554 (1977).
23. Wigilius, B., Boren, H., Carlberg, G. E., Grimvall, A., Lundgren, B. V. and Savenhed, R., *J. Chromatogr.*, **391**, 169-182 (1987).
24. Jahangir, L. M. and Samuelson, O., *J. Chromatogr.*, **193**, 197-206 (1980).
25. Moore, R. A. and Karasek, F. W., *Inter. J. Environ. Anal. Chem.*, **17**, 187-202 (1984).
26. Picer, N. and Picer, M., *J. Chromatogr.*, **193**, 357-369 (1980).
27. Mackey, D. J., *J. Chromatogr.*, **242**, 275-287 (1982).
28. Brajter, K., Olbrych-Sleszynska, E. and Staskiewicz, M., *Talanta*, **35** (1), 65-67 (1988).
29. Green, L. W., Elliot, N. L. and Longhurst, T. H., *Anal. Chem.*, **55**, 2394-2398 (1983).
30. Spack, E. G., Jr., Packard, B., Wier, M. L. and Edidin, M., *Anal. Biochem.*, **158**, 233-237 (1986).

Product Information

Catalog Number	Description	Ionic Form	Capacity/Membrane	Pkg. Size
343-0040	Bio-Beads SM-2 25 mm Sample Preparation Disc	—	6 mg*	20
343-0042	Bio-Beads SM-2 47 mm Membrane	—	21 mg*	20
343-0045	Bio-Beads SM-2 12" x 12" Membrane Sheets	—	1.1 gm*	2
343-0016	AG 1-X8 25 mm Sample Prep Disc	Carbonate	0.25 meq	20
343-0017	AG 1-X8 47 mm Membrane	Carbonate	1.12 meq	20
343-0031	AG 1-X8 12" x 12" Membrane Sheets	Carbonate	59.5 meq	2
343-0019	AG 50W-X8 25 mm Sample Prep Disc	Hydrogen	0.58 meq	20
343-0020	AG 50W-X8 47 mm Membrane	Hydrogen	2.63 meq	20

*Triton X-100 capacity (nominal)

Product Information (continued)

Catalog Number	Description	Ionic Form	Capacity/ Membrane	Pkg. Size
343-0034	AG 50W-X8 12" x 12" Membrane Sheets	Hydrogen	142 meq	2
343-0022	Chelex 25 mm Sample Prep Disc	Sodium	0.11 meq	20
343-0023	Chelex 47 mm Membrane	Sodium	0.50 meq	20
343-0037	Chelex 12" x 12" Membrane Sheet	Sodium	27.9 meq	2

Technical Information

For additional technical information or assistance in developing an application, contact your local Bio-Rad representative.

Triton X-100 is a registered trademark of Rohm & Haas Co.