

Thermo Scientific Dionex ASE Prep MAP

Moisture Absorbing Polymer 200 g

Thermo Scientific™ Dionex™ ASE™ Prep MAP, a proprietary polymer designed to remove moisture and increase extraction efficiencies from wet samples including soils, tissues and food products. This unique formulation allows moisture removal under a variety of ionic strength conditions and accelerated solvent extraction conditions. The polymer is a free flowing white granular material that can be easily mixed with Thermo Scientific Dionex ASE Prep DE (diatomaceous earth) in a 1:1 ratio and used for the moisture removal under accelerated solvent extraction conditions.



Analyses of organic compounds are becoming increasingly important, and often with the need to isolate and analyze trace levels of compounds from a variety of matrices such as soil, sediment, animal tissue, fruits, and vegetables. Sample pretreatment constitutes an important step prior to analysis. The purpose of the sample pretreatment step is to selectively isolate the analytes of interest from matrix components and present a sample suited for routine analysis by established analytical techniques such as gas chromatography (GC) or high-pressure liquid chromatography (HPLC). Typical sample pretreatment steps include techniques such as solid-phase extraction, liquid-liquid extraction, solid-liquid extraction, dilution, evaporation, distillation, etc.

In samples containing moisture an additional pre or post extraction step is needed to remove moisture. Sample drying can be accomplished by air drying or oven drying prior to extraction. However, these approaches are not suited when analyzing volatile or semi-volatile components.

Another common method for moisture removal is by using inorganic salts such as sodium sulfate, calcium chloride, magnesium sulfate, calcium sulfate, etc. These salts tend to associate to water molecules to forming hydrated salts. Sodium sulfate for example tends to clump together when water is present.

Additionally, sodium sulfate is not suitable for in-cell moisture removal and accelerated solvent extraction, as it can dissolve in hot solvent and precipitate downstream clogging the outlet frit, tubes and valves. Sodium sulfate also aggregates hard lump upon water absorption, making post extraction cleanup difficult.

The water absorbing ability of the Dionex ASE Prep MAP is independent of the ionic strength of the sample matrix making it more suitable for sample preparation applications. The Dionex ASE Prep MAP has a high-capacity for water removal and does not suffer from the limitations as outlined above for sodium sulfate salt.

Thermo
SCIENTIFIC

Moisture Removal Modes:

The Dionex ASE Prep MAP by itself can remove up to 5 g of water per gram of the polymer at room temperature. Addition of Dionex ASE Prep DE for in-cell extractions results in improved removal of water under accelerated solvent extraction conditions. The water absorbing ability of the polymer increases with decreasing temperature. For example, at 100 °C, 4 gm of Dionex ASE Prep MAP and 4 gm of Dionex ASE Prep DE can remove roughly 10 gm of water where as at room temperature, about 2 gm of the polymer is adequate for this application.

Three Modes of Usage

In-Cell Moisture Removal Mode

This mode is designed for inline moisture removal with the Thermo Scientific™ Dionex™ ASE™ Accelerated Solvent Extractor system. The Dionex ASE Prep MAP should be combined with the Dionex ASE Prep DE preferably in a 1:1 ratio to aid in moisture removal. The addition of DE is recommended and results in improved flow and moisture removal. In this mode after the extraction is complete the collected solvent is expected to be free of moisture. The amount of Dionex ASE Prep MAP required can be estimated based on the expected moisture content of the sample. Typically this mode is recommended for all samples where the extraction method is run at 125 °C and below. The benefit of this mode is there is no need to remove the moisture post extraction.

In-Vial Moisture Removal Mode

This mode is designed for offline moisture removal of the collected solvent extract after accelerated solvent extraction. The Dionex ASE Prep MAP is added in this mode to the extract for moisture removal. The amount of polymer required can be calculated based on the estimated amount of moisture in the extract container. The amount of moisture absorbing polymer needed is 0.20 ± 0.05 g for absorbing one gram of water at room temperature. The extract can also be dried by passing it through a bed of Dionex ASE Prep MAP placed on a filter paper. This in-vial mode is of drying is temperature independent.

Combination Mode

In this mode, the in-cell moisture removal is followed by in-vial moisture removal. If some breakthrough of moisture is observed in the extract during extraction then the addition of a small amount of polymer in the collection bottle can result in complete moisture removal. This mode is particularly useful for samples with unknown moisture content and for extractions occurring above 125 °C. The mode is also recommended for use with water containing solvents.

Application Example

In-cell moisture removal showing improved organochloride pesticide recoveries from oyster samples

Sample preparation is challenging for a wet animal tissue sample such as an oyster sample. The presence of water in such a sample can result in poor recoveries of the analyte of interest. A drying step is therefore needed before the extraction. In the current method a mixture of six organochlorine pesticides were spiked into a wet oyster sample. The spike levels were 500 ng/g of sample. The spiked oyster samples were either treated with Dionex ASE Prep MAP and Dionex ASE Prep DE as per the present method or by using sodium sulfate pursuing an in-cell extraction. The extraction was pursued at 100 °C using hexane:acetone (1:1) as solvents (following Thermo Scientific Application Note 320). The extracts were analyzed by GC with Electron Capture Detector (ECD). The results indicated that the Dionex ASE Prep MAP and Dionex ASE Prep DE were effective as a drying agent for a very wet animal tissue sample such as an oyster and excellent recoveries were achieved for the six organochlorine pesticides. In contrast, the sodium sulfate treated sample showed poorer recoveries.

Table 1*. In-cell moisture removal of an oyster sample by Dionex ASE Prep MAP and Dionex ASE Prep DE, and sodium sulfate at 100 °C in accelerated solvent extraction using hexane:acetone (1:1) as an extracting solvent

Compound	Oyster (n = 3) dried with Dionex ASE Prep MAP and Dionex ASE Prep DE		Oyster (n = 3) dried with sodium sulfate**	
	Recovery %	Std error	Recovery %	Std error
Lindane	91	5.6	81	3.1
Heptachlor	93	8.5	64	1.5
Aldrin	94	4.7	66	2.8
Dieldrin	105	2.7	75	4.6
Endrin	106	4.7	70	5.0
DDT	114	5.6	69	2.4
Overall	101	5.3	71	3.2

* Data is courtesy of Department of Toxicology, Texas Tech University, Lubbock, TX, USA

** In-cell drying with sodium sulfate is not recommended using accelerated solvent extraction

Ordering Information

To order in the U.S., call 1-800-346-6390, or contact the Thermo Fisher Scientific office nearest you. Outside the U.S., order through your local Thermo Fisher Scientific office or distributor. Refer to the following part numbers

Description	Part Number
Dionex ASE Prep MAP, Moisture Absorbing Polymer 200 g	083475
Dionex ASE Prep DE (diatomaceous earth) dispersant, 1 kg bottle	062819
Dionex ASE Prep CR, Na Form, Mineral Acid Neutralizer, 500 g	080024
Dionex ASE Prep CR H ⁺ , Qty 1 bottle, 400 g	071397
Filters, Cellulose for 34, 66 or 100 mL Cells, Pkg of 100	056780
Filters, Glass Fiber, for 34, 66, or 100 mL Cell, Pkg Of 100	056781
Filter, 10 mL Cell	060941
Glass Fiber Filters for 1, 5, 10 or 22 mL Cells, 27 mm Type D28, Pkg of 100	068092
Cellulose Filters for 1, 5, 10 or 22 mL cells, 27 mm Type D28, Pkg of 100	068093
Filter, 10 mL Cell	060941
Filters, Cellulose for 11, 22, or 33 mL Cell, Pkg of 100	049458
Filters, Glass Fiber, for 11, 22, or 33 mL Cell, Pkg of 100	047017
Filters, Cellulose, for 1 mL Extraction Cell, Pkg of 100	055398
Filters, Cellulose for 5 mL Extraction Cell, Pkg of 100	055399
Thimbles, Cellulose, 11 mL Cell Bodies, Pkg of 25	055708
Thimbles, Cellulose, 22 mL Cell Bodies, Pkg of 25	055999

www.thermoscientific.com/samplepreparation

©2013 Thermo Fisher Scientific Inc. All rights reserved. ISO is a trademark of the International Standards Organization. All other trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries. This information is presented as an example of the capabilities of Thermo Fisher Scientific Inc. products. It is not intended to encourage use of these products in any manners that might infringe the intellectual property rights of others. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.

Australia +61 3 9757 4486
Austria +43 1 333 50 34 0
Belgium +32 53 73 42 41
Brazil +55 11 3731 5140
China +852 2428 3282

Denmark +45 70 23 62 60
France +33 1 60 92 48 00
Germany +49 6126 991 0
India +91 22 2764 9494
Italy +39 02 51 62 1267

Japan +81 6 6885 1213
Korea +82 2 3420 8600
Netherlands +31 76 579 55 55
Singapore +65 6289 1190
Sweden +46 8 473 3380



Thermo Fisher Scientific, Sunnyvale, CA
 USA is ISO 9001:2008 Certified.

Switzerland +41 62 205 9966
Taiwan +886 2 8751 6655
UK/Ireland +44 1442 233555
USA and Canada +847 295 7500

Thermo
 SCIENTIFIC

Part of Thermo Fisher Scientific