MicroSpin™ G-50 Columns

Instructions for Use

cytiva.com

27533001PL AC

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1 Introduction

Product codes

27533001 (50 purifications)

27533002 (250 purifications)

About

For rapid buffer exchange or desalting, dye terminator or primer removal and removal of labeled nucleotides from labeling reactions.

Important

Read these instructions carefully before using the products.

Intended use

The products are intended for research use only, and shall not be used in any clinical or *in vitro* procedures for diagnostic purposes.

It is the responsibility of the user to verify the use of the MicroSpin™ G-50 Columns for a specific application, as the performance characteristics of this product have not been verified for any specific organism.

Safety

All chemicals should be considered as potentially hazardous. For use and handling of the products in a safe way, refer to the Safety Data Sheets.

Storage

All kit components should be stored at room temperature (20°C to 25°C). Do not freeze.

Expiry

For expiry date, refer to outer packaging label.

2 Components

Kit contents

Identification	Component	Pack size
	MicroSpin G-50 Columns	50 or 250
	Collection tubes	50 or 250

Refer to the *Certificate of Analysis* for a complete list of kit components.

Materials to be supplied by user

Disposables:

1.5 mL DNase-free microcentrifuge tubes.

Equipment to be supplied by user

- Microcentrifuge that accomodates 1.5 mL microcentrifuge tubes
- Vortex mixer

3 Description

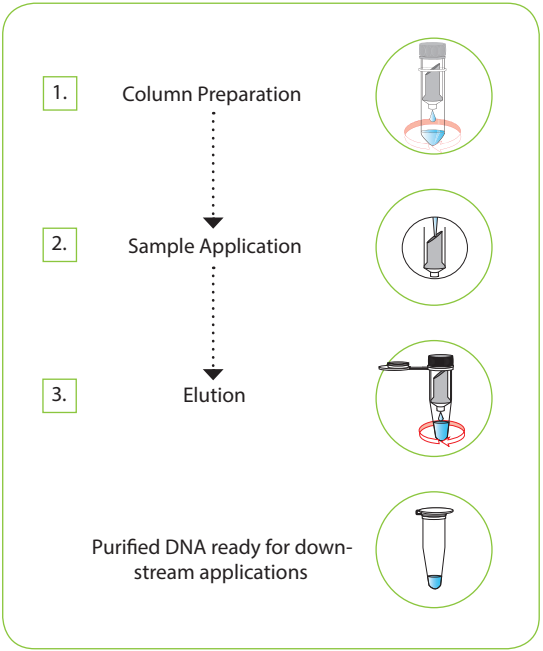
Background

MicroSpin G-50 Columns contain Sephadex™ G-50 DNA grade resin. They allow DNA purification by the process of gel filtration. Molecules larger than the largest pores in the Sephadex are excluded from the gel and elute first. Intermediate size molecules penetrate the matrix to varying extents, depending on their size and the resin used. Penetration of the matrix retards progress through the column; very small molecules elute last. The volume required to elute these small molecules is dependent on the volume available both inside and outside the pores, i.e., the bed volume.

Gel filtration resins do not exhibit a fixed exclusion limit when used in a spin-column format. Exclusion limits of gel filtration resins are only meaningful in continuous flow processes where the molecules being purified have sufficient time to reach equilibrium between the time spent in the gel filtration medium and the time spent in the eluent stream. In spin-column chromatography, the observed exclusion properties that allow the product to pass through the gel while the smaller impurities are retained depends on experimental factors, such as: the resin used, sample volume, product size, and the g-forces used in the purification process.

The basic principle

Illustration



Step procedure

Step	Comments	Component
Column Preparation	The resin is re-suspended and excess storage buffer removed by centrifugation.	MicroSpin G-50 Columns 
Sample Application	The sample is applied to the column.	
Elution	Purified sample is eluted by centrifugation.	

Product specifications

Parameter	Specification
Sample type	Automated sequencing reactions
Principle	Gel filtration
Column matrix	Sephadex G-50 DNA grade F
Column storage buffer	TE buffer (10 mM Tris/HCl, 1 mM EDTA) containing 0.05% Kathon CG/ICP Biocide as preservative.
Input sample volume	12 to 50 µL
Percent sample recovery	Variable-depends on input sample
Maximum column loading capacity	10 µg
Length of labeled DNA recovered	> 20 bases (NB There is no maximum length of probe that can be purified.)
Nuclease testing	Column components are tested in nickase, single and double-stranded exonuclease and DNase assays.

Parameter	Specification
Major subsequent applications	Dependent on input sample, but includes blotting and sequencing applications.

When to use MicroSpin G-50 Columns

The MicroSpin G-50 Columns are designed for the rapid purification of DNA for use in a wide range of applications, including desalting, buffer exchange, removal of dye terminators from cycle sequencing reactions and removal of labeled nucleotides from DNA labeling reactions. Good product yield and purity is obtained with sample volumes from 12 to 50 µL. The products are suitable for any DNA greater than 20 bases in length and will not remove or denature enzyme. For guidelines to consider for use of MicroSpin G-50 Columns, see *Guidelines for the use of MicroSpin G-50 Columns, on page 14*.

Cytiva provides a wide range of nucleic acid purification products, some of which might be better suited to your application. These products and the application for which they have been optimized are summarized in the table shown below. AutoSeq™ G-50 Columns and ProbeQuant™ G-50 Micro Columns are provided pre-equilibrated in the optimal buffer for the application for which they are designed.

Application	Product	Product code	Pack size
PCR reaction and **enzymatic DNA reaction purification** 50 bp–10 kbp size range Extraction of DNA from agarose gels	GFX™ PCR DNA and Gel Band Purification Kit	28903470	100 purifications
		28903471	250 purifications

Application	Product	Product code	Pack size
Dye terminator removal	AutoSeq G-50	27534001	50 purifications
from automated sequencing reactions		27534002	250 purifications
		27534003	1000 purifications
Unincorporated labeled nucleotide removal	ProbeQuant G-50 Micro Columns	28903408	50 purifications
from a DNA labeling reaction (> 20 mers)			
Purification of oligonucleotides	NAP™-5 Columns	17085301	20 purifications
following synthesis, buffer exchange and desalting. Gravity format, 500 mL loading volume			
Spin column format, 150 µL loading volume	MicroSpin G-25 Columns	27532501	50 purifications

4 Protocol

Note: *Columns are not transferable between Cytiva kits. For example, the composition of the MicroSpin G-50 Columns is not the same as the composition of the ProbeQuant G-50 Micro Columns.*

For materials and equipment to be supplied by the user, see *Materials to be supplied by user, on page 4* and *Equipment to be supplied by user, on page 5*.

Protocol for purification of a range of sample types

Column Preparation

Step	Action
1	Re-suspend the resin in the column by vortexing.
2	Loosen the cap one-quarter turn and twist off the bottom closure.
3	Place the column in the supplied Collection tube for support.
4	For removal of labeled nucleotides from DNA labeling reactions, spin for 1 minute at 735 × g. For removal of dye terminators following cycle sequencing reactions, spin for 1 minute at 2000 × g. ***Note:*** *See RPM calculation from RCF, on page 12 for RPM calculation from RCF.*

Step	Action

NOTICE

Use columns immediately after preparation to avoid drying out of the resin. If the column resin appears dry, displaced, or cracked after the first spin, this is usually indicative of over-centrifugation (too fast or too long). Re-hydrate the column with 250 µL of TE buffer, vortex and re-centrifuge, checking the settings. Spin speed can be reduced by 20% if necessary. Do not use the pulse button on the microcentrifuge as this might override the speed setting.

5	Proceed immediately to the next part of the protocol.

Sample Application

Step	Action
1	Place the column into a fresh DNase-free 1.5 mL microcentrifuge tube (user supplied).

Step	Action
2	Slowly apply 12–50 µL sample to the top-center of the resin, being careful not to disturb the resin bed. ***Note:*** *The resin will have come away from the column slightly to form a pillar. It is essential that the sample being purified is applied slowly and is not allowed to run down the sides of the resin bed. Avoid touching the resin bed with the pipette tip.*
3	Proceed to the next part of the protocol.

Elution

Step	Action
1	For removal of labeled nucleotides from DNA labeling reactions, spin for 2 minutes at 735 × g. For removal of dye terminators following cycle sequencing reactions spin for 2 minutes at 2000 × g.The purified sample is collected in the bottom of the 1.5 mL microcentrifuge tube.
2	Cap the microcentrifuge tube.
3	Store the purified probe at -20°C.

5 Appendices

RPM calculation from RCF

The appropriate centrifugation speed for a specific rotor can be calculated from the following formula:

RPM = 1000 × √(RCF/1.12r)

Where RCF = relative centrifugal force; r = radius in mm measured from the center of the spindle to the bottom of the rotor bucket; and RPM = revolutions per minute.

For example, if an RCF of 735 × g is required using a rotor with a radius of 73 mm, the corresponding RPM would be 3000.

The table below shows the appropriate RPM for various microcentrifuges.

Microcentrifuge	Appropriate RPM for an RCF of 735 × g	Appropriate RPM for an RCF of 2000 × g
Heraeus Biofuge 15	2800	4600
Beckman GS15R	2100	3600
Hettich Mikro 24–48	2630	4300
Hettich Mikro EBA12	2700	4400
Eppendorf® Centrifuge 5415C	3000	4900
Eppendorf Centrifuge 5417C	2700	4400

Guidelines for the use of MicroSpin G-50 Columns

MicroSpin G-50 Columns can be used for a wide variety of DNA purification applications. The DNA to be purified must be at least 20 bases in length. When using these columns, consider the following guidelines:

20× rule The best results will be obtained when the product being purified is at least 20 times larger than the largest impurity. If the difference in size is less than 20-fold, either purity or yield might be compromised.

Purity versus yield In general, purity is inversely proportional to yield. Larger sample volumes will provide higher yield but lower purity, and vice-versa.

Non-specific binding The non-specific binding exhibited by the MicroSpin G-50 Columns is relatively insignificant, allowing purification of samples in the nanogram range. There will be a uniform proportional loss of sample which is due to the nature of spin column chromatography.

Retention For a given sample volume, product retention is relative to molecular size. As the size of the product increases, its relative retention decreases.

Loading volumes Load 12–25 µL onto a column for dye terminator removal. We recommend use of AutoSeq G-50 columns for this application as they have been optimized for sequencing reaction clean-up, and for salt-sensitive analyzers that utilize capillary loading.

Load 50 µL for removal of unincorporated labeled nucleotides from DNA labeling reactions. We recommend the use of ProbeQuant G-50 Micro Columns for this application, especially when handling small (ng range) quantities of DNA. Recovery of DNA from MicroSpin G-50 Columns is at least 10% less than that from ProbeQuant G-50 Micro Columns.

For larger sample volumes, either use more than one column or reduce the sample volume by drying or precipitation. For smaller sample volumes, dilute the sample to improve product recovery.

Enzyme removal For purification of DNA fragments 50 bp–10 kbp in length, following an enzymatic reaction, we recommend using the GFX PCR DNA and Gel Band Purification Kit, as the enzyme will be removed during the spin column process. If using MicroSpin G-50 Columns, you must Phenol Chloroform extract prior to loading onto the column to ensure enzyme removal.

Troubleshooting guide

This guide might be helpful in the first instance. However, if problems persist or for further information, please contact Cytiva technical services.

Alternatively, log onto *cytiva.com*

Possible cause	Suggestions
Poor sample purity	• Make sure the sample volume was within acceptable range prior to loading (see *Guidelines for the use of MicroSpin G-50 Columns, on page 14*). • Make sure the sample is CAREFULLY pipetted into the center of resin. Do not disturb the column. Do not allow the sample to run into the sides of the resin bed. • Use the column immediately after completing the Column Preparation step. Do not allow the resin to become dried out or cracked.

6 Ordering information

For ordering information, visit *cytiva.com*.

7 Quick Reference Protocol Card

Quick Reference Protocol Card

MicroSpin G-50 Columns

27533001 (50 purifications)
27533002 (250 purifications)

A.Protocol for purification of a range of sample types

:Add :Spin

1. Column preparation

- Re-suspend the resin in the column by vortexing
- Loosen the cap one-quarter turn and twist off the bottom closure
- Place the column in the supplied Collection tube

1 minute 735 × g for removal of labeled nucleotides from DNA labeling reactions OR

1 minute 2000 x g for removal of dye terminators from cycle sequencing reactions

2. Sample application

- Place the column into a fresh DNase-free 1.5 mL microcentrifuge tube (user supplied)

12–50 µL of sample to the top-center of the resin with care

3. Elution

2 minutes 735 x g for removal of labeled nucleotides from DNA labeling reactions OR

Spin 2 minutes 2000 × g for removal of dye terminators from cycle sequencing reactions

- Retain eluate
- Store the purified sample at -20°C

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