Genomic DNA from insects

User manual

NucleoSpin® DNA Insect

January 2018 / Rev. 02
## Genomic DNA from insects

### Protocol at a glance (Rev.02)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Prepare sample</strong></td>
<td>Place &lt; 40 mg insect material (wet weight) in NucleoSpin® Bead Tube Type D 100 μL Elution Buffer BE</td>
</tr>
<tr>
<td><strong>2 Lyse sample</strong></td>
<td>40 μL Buffer MG 10 μL Liquid Proteinase K Agitate on a swing mill or similar device 0.5–15 min 11,000 x g, 30 s</td>
</tr>
<tr>
<td><strong>3 Adjust binding conditions</strong></td>
<td>600 μL Buffer MG 11,000 x g, 30 s</td>
</tr>
<tr>
<td><strong>4 Bind DNA</strong></td>
<td>Load 500–600 μL sample on NucleoSpin® DNA Insect Column 11,000 x g, 30 s</td>
</tr>
<tr>
<td><strong>5 Wash silica membrane</strong></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 500 μL BW 11,000 x g, 30 s 2&lt;sup&gt;nd&lt;/sup&gt; 500 μL B5 11,000 x g, 30 s</td>
</tr>
<tr>
<td><strong>6 Dry silica membrane</strong></td>
<td>11,000 x g, 30 s</td>
</tr>
<tr>
<td><strong>7 Elute DNA</strong></td>
<td>100 μL Elution Buffer BE RT, 1 min 11,000 x g, 30 s</td>
</tr>
</tbody>
</table>
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# 1 Components

## 1.1 Kit contents

<table>
<thead>
<tr>
<th>REF</th>
<th>10 preps</th>
<th>50 preps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>740470.10</strong></td>
<td><strong>740470.50</strong></td>
</tr>
<tr>
<td>Lysis Buffer MG</td>
<td>10 mL</td>
<td>38 mL</td>
</tr>
<tr>
<td>Wash Buffer BW</td>
<td>6 mL</td>
<td>30 mL</td>
</tr>
<tr>
<td>Wash Buffer B5 (Concentrate)*</td>
<td>6 mL</td>
<td>6 mL</td>
</tr>
<tr>
<td>Elution Buffer BE**</td>
<td>13 mL</td>
<td>30 mL</td>
</tr>
<tr>
<td>Liquid Proteinase K</td>
<td>120 μL</td>
<td>600 μL</td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type D</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>NucleoSpin® DNA Insect Columns (light green rings)</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Collection Tubes (2 mL)</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>User manual</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* For preparation of working solutions and storage, see section 3.

**Composition of Elution Buffer BE: 5 mM Tris/HCl, pH 8.5
1.2 Reagents, consumables, and equipment to be supplied by user

Reagents
- 96–100 % ethanol (for preparation of Wash Buffer B5)

Consumables
- 1.5 mL or 2 mL microcentrifuge tubes for sample preparation and elution
- Disposable tips

Equipment
- Manual pipettors
- Centrifuge for microcentrifuge tubes
- Vortex mixer
- Personal protection equipment (lab coat, gloves, goggles)
- Sample disruption device:
  The MN Bead Tube Holder (REF 740469, see ordering information, section 6.2) is recommended to be used in combination with the Vortex-Genie® 2 for cost efficient and convenient disruption of lipid tissue samples. The Vortex Adapter (MoBio) for Vortex-Genie® 2 X is also suitable.
  Alternatively, a swing mill can be used considering precautions of section 2.4.3 (e.g., mixer mill MM200, MM300, MM400 (Retsch®)).

**WARNING:** The use of other disruption devices like FastPrep® System (MP-Biomedicals), Precellys® (Bertin Technologies), MagNA™ Lyser (Roche), TissueLyser (QIAGEN), Bullet Blender® (Next Advance), Mini-Beadbeater™ (Biospec Products), Speed Mill (Analytik Jena), or similar devices might cause bead tube destruction. Such devices can cause high mechanical stress on the bead tubes. Depending on bead tube type and content (beads like steel beads, liquid volume, sample type), especially high frequency of shaking and/or long shaking duration can cause destruction of the bead tubes. *If using such a disruption device, it is the responsibility of the user to perform initial stability tests to ensure stability of bead tubes during the individual experimental setup (e.g., intensity of agitation). See also section 2.4.3!*

1.3 About this user manual

It is strongly recommended for first time users to read the detailed protocol sections of the NucleoSpin® DNA Insect kit before using this product. Experienced users, however, may refer to the Protocol at a glance instead. The Protocol at a glance is designed to be used only as a supplemental tool for quick referencing while performing the purification procedure.

All technical literature is available online at [www.mn-net.com](http://www.mn-net.com).

Please contact Technical Service regarding information about any changes to the current user manual compared with previous revisions.
2 Product description

2.1 The basic principle

The NucleoSpin® DNA Insect kit is designed for efficient isolation of genomic DNA from insect samples. DNA can be isolated from a wide variety of samples, such as fresh, frozen, dried and ethanol preserved insects, e.g., fruit fly (Drosophila melanogaster), house cricket (Acheta domesticus), field cricket (Gryllus assimilis), mealworm (Tenebrio molitor), non-biting midge larvae (Chironomidae), and mosquito (Culicidae).

Insects can be difficult to lyse due to their strong, chitin reinforced cell walls. The NucleoSpin® DNA Insect kit combines enzymatic lysis by utilizing mechanical disruption of cell walls with the NucleoSpin® Bead Tubes. The NucleoSpin® Bead Tubes can be used in combination with the MN Bead Tube Holder (REF 740469) and the Vortex-Genie® 2. They are also compatible with other disruptive devices (see section 2.4.1). High DNA yields can be obtained with the NucleoSpin® Bead Tubes from a large variety of sample types – enabling the procedure to be convenient, fast, and easy. Alternative bead tube types can be ordered separately for selected sample types (see section 2.4.2 for recommendations).

2.2 Kit specifications

<table>
<thead>
<tr>
<th>Kit specifications at a glance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>Technology</td>
</tr>
<tr>
<td>Format</td>
</tr>
<tr>
<td>Sample material</td>
</tr>
<tr>
<td>Sample amount</td>
</tr>
<tr>
<td>Typical yield</td>
</tr>
<tr>
<td>$A_{260}/A_{280}$</td>
</tr>
<tr>
<td>Elution volume</td>
</tr>
<tr>
<td>Preparation time</td>
</tr>
<tr>
<td>Binding capacity</td>
</tr>
</tbody>
</table>

2.3 Handling, preparation, and storage of starting materials

Fresh, frozen, dried, and ethanol preserved insect samples can be used. Make sure not to use more than 40 mg starting material.
2.4 Lysis and disruption of sample material

In order to obtain optimal DNA yields, a complete disruption of the sample material is essential. The efficiency of sample disruption depends on the parameters listed below and suggestions for optimization are outlined in the subsequent sections.

2.4.1 Disruption device

The following devices are compatible with NucleoSpin® Bead Tubes. Please check whether NucleoSpin® Bead Tubes can be accommodated by the available tube adapters prior to starting the procedure.

- MN Bead Tube Holder in combination with the Vortex-Genie® 2 (recommended).
- Mixer mill MM200, MM300, MM400 (Retsch®) (suitable).

*If other disruption devices (section 1.2) are intended to be used, consider section 2.4.2 and WARNING note in section 2.4.3!*

2.4.2 Type of bead tube

Bead type, disruption time, and frequency / speed must be optimized for a given sample to obtain maximal DNA yield and quality.

**Type of bead tube**

- NucleoSpin® Bead Tubes Type D (3 mm steel beads; included in NucleoSpin® DNA Insect kits) Recommended for insect samples

Other types of bead tubes are available for other applications:

- NucleoSpin® Bead Tubes Type A (0.6–0.8 mm ceramic beads) Recommended for soil and sediment (included in NucleoSpin® Soil, see ordering information, section 6.2).
- NucleoSpin® Bead Tubes Type B (40–400 μm glass beads) Recommended for gram positive and -negative bacteria (included in NucleoSpin® Microbial DNA, see ordering information, section 6.2).
- NucleoSpin® Bead Tubes Type C (1–3 mm corundum) Recommended for yeast (see ordering information, section 6.2).
- NucleoSpin® Bead Tubes Type E (combination of 3 mm steel beads and 40–400 μm glass beads) Recommended for difficult to lyse tissue containing gram positive bacteria (see ordering information, section 6.2).
- NucleoSpin® Bead Tubes Type F (1-3 mm corundum and 3 mm steel beads) Use only with MN Bead Tube Holder! (see ordering information, section 6.2)
### 2.4.3 Time and frequency of disruption

The following recommendations have been established for the MN Bead Tube Holder in combination with a Vortex-Genie® 2 or a Retsch® Swingmill MM300 operating at highest frequency (30 Hertz). For using other disruption devices, and other sample materials, time and frequency have to be optimized.

<table>
<thead>
<tr>
<th>Sample material</th>
<th>Disruption device</th>
<th>Disruption time</th>
<th>Speed / intensity / frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh, frozen, dried, and ethanol preserved insects, e.g., <em>Drosophila melanogaster</em></td>
<td>MN Bead Tube Holder in conjunction with a Vortex-Genie® 2</td>
<td>approx. 20 min</td>
<td>full speed</td>
</tr>
<tr>
<td>Fresh, frozen, dried, and ethanol preserved insects, e.g., <em>Drosophila melanogaster</em></td>
<td>Mixer mill (Retsch®)</td>
<td>approx. 0.5–10 min</td>
<td>30 Hz</td>
</tr>
<tr>
<td>Fresh, frozen, dried, and ethanol preserved insects, e.g., <em>Drosophila melanogaster</em></td>
<td>other device</td>
<td>to be optimized by user</td>
<td>see recommendations below</td>
</tr>
</tbody>
</table>

**Note:** Stability testing has been conducted on the NucleoSpin® Bead Tubes Type D with the MN Bead Tube Holder on a Vortex-Genie® 2 and with a mixer mill MM300 (Retsch®) at highest frequency (30 Hertz). NucleoSpin® Bead Tubes Type D withstand shaking for several hours in the MN Bead Tube Holder on a Vortex-Genie® 2 and for up to 30 minutes on a mixer mill MM300 (Retsch®) at highest frequency (30 Hertz).

For optimal sample processing, avoidance of DNA fragmentation, and highest DNA yield see table above for recommendations of adequate disruption times. Other disruption devices (see section 2.4.1) will require different settings regarding frequency and duration for optimal performance with the selected sample material. Please note that the position of the tube within the machine (mischer mill, Retsch®) is important for optimal performance! Please refer to the instrument manual of the disruption device.

**WARNING:** Many disruption devices can cause high mechanical stress on the bead tubes. Depending on bead tube type and content (beads, liquid volume, sample type), especially high frequency of shaking and/or long shaking duration can cause breaking up of the bead tubes. **It is the responsibility of the user to perform initial stability tests to ensure stability of bead tubes during the individual experimental setup!**

These tests should be performed with water instead of lysis buffer in order to avoid spillage of chaotropic lysis buffer in case of tube breakage. Integrity and tightness of the tube need to be controlled after every run.
WARNING: In section 5 a certain liquid volume during disruption is recommended. The reduction of liquid content will severely increase the mechanical impact by the steel beads and can result in damage of DNA and tube.

2.5 Elution procedures

In addition to the standard method, several modifications are possible to increase yield, concentration, and convenience.

• Convenient elution (standard elution): Elution can be performed by a single addition of 100 μL Elution Buffer onto the column.

• High yield: Elution can be performed in two serial elutions of 100 μL each, resulting in a total volume of 200 μL.

• High concentration: Elution can be performed by application of 100 μL Elution Buffer, which is then re-used in a second elution step, resulting in 100 μL eluate with high DNA concentration. Alternatively, the elution volume can be reduced down to 25 μL.
3 Storage conditions and preparation of working solutions

Attention:

*Lysis Buffer MG and Wash Buffer BW contain chaotropic salts! Wear gloves and goggles!*

CAUTION: Buffers MG and BW contain chaotropic salts which can form highly reactive compounds when combined with bleach (sodium hypochlorite). DO NOT add bleach or acidic solutions directly to the sample-preparation waste!

All kit components can be stored at room temperature (18–25 °C) and are stable for at least one year.

Before starting any NucleoSpin® DNA Insect protocol, prepare the following:

- **Wash Buffer B5**: Add the indicated volume of ethanol (96–100 %) to *Wash Buffer B5 Concentrate*. Mark the label of the bottle to indicate that ethanol was added. Wash Buffer B5 can be stored at room temperature (18–25 °C) for at least one year.

- **Liquid Proteinase K** is ready to use. After first time use, store Liquid Proteinase K at 4 °C or -20 °C.

### NucleoSpin® DNA Insect

<table>
<thead>
<tr>
<th>REF</th>
<th>10 preps</th>
<th>50 preps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>740470.10</td>
<td>740470.50</td>
</tr>
<tr>
<td>Wash Buffer B5 (Concentrate)</td>
<td>6 mL Add 24 mL ethanol</td>
<td>6 mL Add 24 mL ethanol</td>
</tr>
</tbody>
</table>
## 4 Safety instructions

The following components of the NucleoSpin® DNA Insect kits contain hazardous contents.

Wear gloves and goggles and follow the safety instructions given in this section.

### GHS classification

Only harmful features do not need to be labeled with H and P phrases up to 125 mL or 125 g.

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazard contents</th>
<th>GHS symbol</th>
<th>Hazard phrases</th>
<th>Precaution phrases</th>
</tr>
</thead>
</table>
| MG         | Guanidinium thiocyanate 30–60 %  
Guanidinthiocyanat 30–60 %  
CAS 593-84-0 | ![ ] | 302, 412, EUH031 | 260, 273, 301+312, 330 |
| BW         | Guanidine hydrochloride 36–50 % + isopropanol 20–50 %  
Guanidinhydrochlorid 36–50 %  
+ Isopropanol 20–50 %  
| Liquid     | Proteinase K, liquid 1–3 %  
Proteinase K, flüssig 1–3 %  
CAS 39450-01-6 | ![ ] | 317 | 261, 272, 280, 302+352, 333+313, 363 |

### Hazard phrases

- **H 226** Flammable liquid and vapour.  
*Flüssigkeit und Dampf entzündbar.*

- **H 302** Harmful if swallowed.  
*Gesundheitsschädlich bei Verschlucken.*

- **H 317** May cause an allergic skin reaction.  
*Kann allergische Hautreaktionen verursachen.*

- **H 319** Causes serious eye irritation.  
*Verursacht schwere Augenreizung.*

- **H 336** May cause drowsiness or dizziness.  
*Kann Schlafigkeit und Benommenheit verursachen.*

- **H 412** Harmful to aquatic life with long lasting effects.  
*Schädlich für Wasserorganismen, mit langfristiger Wirkung.*

- **EUH031** Contact with acids liberates toxic gas.  
*Entwickelt bei Berührung mit Säure giftige Gase.*
Precaution phrases

P 210 Keep away from heat/sparks/open flames/hot surfaces – No smoking.
Von Hitze/Funken/ offener Flamme/ heißen Oberflächen fernhalten. Nicht rauchen.

P 233 Keep container tightly closed.
Behälter dicht verschlossen halten.

P 260 Do not breathe dust / fume / gas / mist / vapours / spray.
Staub/Rauch/Gas/Nebel/Dampf/Aerosol nicht einatmen.

P 261 Avoid breathing dust.
Einatmen von Staub vermeiden.

P 264 Wash … thoroughly after handling.
Nach Handhabung … gründlich waschen.

P 272 May intensify fire; oxidizer.
Kann Brand verstärken; Oxidationsmittel.

P 273 Avoid release to the environment.
Freisetzung in die Umwelt vermeiden.

P 280 Wear protective gloves / eye protection.
Schutzhandschuhe / Augenschutz tragen.

P 301+312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
BEI VERSCHLUCKEN: Bei Unwohlsein GIFTINFORMATIONSZENTRUM oder Arzt anrufen.

P 302+352 IF ON SKIN: Wash with plenty of water/…
BEI KONTAKT MIT DER HAUT: Mit viel Wasser/… waschen.

P 305+351+338 IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.

P 330 Rinse mouth.
Mund ausspülen.

P 333+313 IF skin irritation or a rash occurs: Get medical advice / attention.
Bei Hautreizung oder -ausschlag: Ärztlichen Rat einholen / ärztliche Hilfe hinzuziehen.

P 337+313 Get medical advice / attention.
Bei anhaltender Augenreizung: Ärztlichen Rat einholen / ärztliche Hilfe hinzuziehen.

P 363 Wash contaminated clothing before reuse.
Kontaminierte Kleidung vor erneutem Tragen waschen.

P 370+378 In case of fire: Use … to extinguish.
Bei Brand: … zum Löschen verwenden.

P 403+235 Store in a well ventilated place. Keep cool.
Kühl an einem gut belüfteten Ort aufbewahren.

For further information please see Material Safety Data Sheets (www.mn-net.com).
Weiterführende Informationen finden Sie in den Sicherheitsdatenblättern (www.mn-net.com).

⚠️ The symbol shown on labels refers to further safety information in this section.
Das auf Etiketten dargestellte Symbol weist auf weitere Sicherheitsinformationen dieses Kapitels hin.
5 Protocols

5.1 Protocol for fresh, frozen, dried, and ethanol preserved insect samples

Before starting the preparation:
- Check if Buffer B5 was prepared according to section 3.
- Check section 2.4 for lysis and disruption of sample material.

1 Prepare sample

Place the insect sample to a NucleoSpin® Bead Tube Type D (provided).

Up to approx. 40 mg of wet weight insect sample can be processed. Remove excess liquid (e.g., water, ethanol) from the sample, with a filter paper.

Add 100 μL Elution Buffer BE to the sample.

Alternatively, high quality grade water (not provided) can be used.

2 Lyse sample

Add 40 μL Buffer MG.

Then, add 10 μL Liquid Proteinase K and close the tube.

Agitate the NucleoSpin® Bead Tube in the MN Bead Tube Holder on a Vortex-Genie® 2. Alternatively a swing mill (Retsch®) can be used (see section 2.4.3).

Note: Optimal agitation duration, speed/frequency depends on the device used. For the MN Bead Tube Holder it is approximately 20 min; in a mixer mill MM200, MM300, MM400 (Retsch®), e.g., 0.5–5 min at maximal frequency (30 Hertz) is suitable (see section 2.4). On a swing mill, position of the tube in the mill can considerably influence the result. Please refer to the instruction manual of the device used. Respect warnings in section 1.2 and 2.4.3 if other devices are intended to be used!
NucleoSpin® DNA Insect

Centrifuge the NucleoSpin® Bead Tube 30 s at 11,000 x g to clean the lid.

*Note:* In this step foam is removed from the screw cap to allow clean opening of the tube.

*Attention:* Do neither centrifuge at higher g-force, nor longer because this might damage the NucleoSpin® Bead Tubes.

3  Adjust DNA binding conditions

Add 600 μL Buffer MG and mix (e.g., vortex for 3 s).

*Note:* Steel beads should be agitated in the tube; some residual pellet (cell debris) may remain on the bottom of the tube.

Centrifuge for 30 s at 11,000 x g.

*Note:* This centrifugation step is performed in order to clean the lid and sediment steel beads and cell debris.

*Attention:* Do neither centrifuge at higher g-force, nor longer because this might damage the NucleoSpin® Bead Tubes.

4  Bind DNA

Transfer the supernatant (~500–600 μL) onto the NucleoSpin® DNA Insect Column, placed in a 2 mL Collection Tube (provided).

Centrifuge for 30 s at 11,000 x g. Discard Collection Tube with flow through. Put column into a fresh Collection Tube (2 mL, provided).

5  Wash silica membrane

1\textsuperscript{st} wash

Add 500 μL Buffer BW. Centrifuge for 30 s at 11,000 x g. Discard flowthrough and place the column back into the Collection Tube.

2\textsuperscript{nd} wash

Add 500 μL Buffer B5 to the column and centrifuge for 30 s at 11,000 x g. Discard flowthrough and place the column back into the Collection Tube.
6 **Dry silica membrane**

Centrifuge the column for **30 s at 11,000 x g.**

*Note:* Residual wash buffer is removed in this step.

7 **Elute highly pure DNA**

Place the NucleoSpin® DNA Insect Column into a 1.5 mL nuclease-free tube (not provided) and add **100 μL Elution Buffer BE** onto the column. Incubate at **room temperature** for **1 min.** Centrifuge **30 s at 11,000 x g.**

*For alternative elution procedures see section 2.5*

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5.2 **Protocol for purification of DNA from hard to lyse bacteria in insect samples**

The purification of DNA from hard to lyse bacteria (e.g., gram positive bacteria) in insect samples can be challenging as disruption of the two organisms require individual mechanical forces.

MACHEREY-NAGEL has therefore developed the NucleoSpin® Bead Tubes Type E, which contain 40–400 μm glass beads as well as 3 mm steel beads. NucleoSpin® Bead Tubes Type E can be used according to the protocol described for NucleoSpin® Bead Tubes Type D in section 5.

However, the use of NucleoSpin® Bead Tubes Type E is a very harsh method in terms of sample disruption. Please note that processing time on a selected disruption device (e.g., MN Bead Tube Holder or mixer mill (Retsch®)) has to be optimized by the user with regard to sample type, amount, and downstream application. Long disruption duration on high impact machines (e.g., mixer mill (Retsch®)) can cause total DNA loss due to massive DNA fragmentation. Please contact the technical service for further information.

Respect warnings in section 1.2 and 2.4.3 when using NucleoSpin® Bead Tubes Type E.
## 6 Appendix

### 6.1 Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause and suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Damaged bead tubes</strong></td>
<td><em>Unsuitable disruption device or intensity</em></td>
</tr>
<tr>
<td></td>
<td>• High force disruption devices can damage NucleoSpin® Bead Tubes Type D and E. Respect warnings in section 1.2 and 2.4.3. Use the recommended MN Bead Tube Holder.</td>
</tr>
<tr>
<td><strong>Incomplete lysis</strong></td>
<td><em>Incomplete lysis</em></td>
</tr>
<tr>
<td></td>
<td>• Adjust lysis conditions (bead tube type, agitation device, duration, or frequency).</td>
</tr>
<tr>
<td><strong>Reagents not applied properly</strong></td>
<td><em>Reagents not applied properly</em></td>
</tr>
<tr>
<td></td>
<td>• Prepare Buffer B5 according to instructions (section 3).</td>
</tr>
<tr>
<td><strong>Suboptimal elution of DNA from the column</strong></td>
<td><em>Suboptimal elution of DNA from the column</em></td>
</tr>
<tr>
<td></td>
<td>• For certain sample types, preheat Buffer BE to 70 °C before elution. Apply Buffer BE directly onto the center of the silica membrane.</td>
</tr>
<tr>
<td></td>
<td>• Elution efficiencies decrease dramatically if elution is done with buffers with a pH &lt; 7.0. Use slightly alkaline elution buffers like Buffer BE (pH 8.5).</td>
</tr>
<tr>
<td></td>
<td>• Especially when expecting high yields from large amounts of material, we recommend elution with 200 μL Buffer BE and incubation of the closed columns in an incubator at 70 °C for 5 min before centrifugation.</td>
</tr>
<tr>
<td><strong>No or poor DNA yield</strong></td>
<td><em>High amount of sample material</em></td>
</tr>
<tr>
<td></td>
<td>• If using more than 20 mg of sample material, DNA yield can be increased by addition of 20 μL ethanol after the addition of 600 μL Buffer MG in step 3. However, ethanol addition slightly increases RNA copurification. In order to avoid RNA copurification due to ethanol addition, incubate lysate after disruption for 5 min at 70 °C, then add 600 μL Buffer MG and 20 μL ethanol, mix, and proceed with the transfer onto the NucleoSpin® DNA Insect Column.</td>
</tr>
</tbody>
</table>
## Problem: Poor DNA quality

**Possible cause and suggestions**

*High $A_{260}/A_{280}$ ratio*

- Ratios > 1.9 can be caused by RNA contamination. Usually, such RNA contamination does not interfere with downstream application. Depending on sample type, amount, and disruption procedure, preparations might contain small amounts of RNA. If it is necessary to reduce RNA contamination to the lowest possible level, incubate the lysate after the disruption step for 5 min at 70 °C in order to inactivate the Proteinase K. After cooling to room temperature, add 20 μL RNase A (20 mg/mL) and incubate 5 min. Continue with the application of the lysate onto the column.

*Reagents not applied properly*

- Prepare Buffer B5 according to instructions (see section 3).

*Too much sample material used*

- Make sure to centrifuge the lysate after cell disruption in order to sediment beads and cell debris. Only transfer cleared supernatant onto the column.

## Problem: Clogged columns

**Possible cause and suggestions**

*Carry-over of ethanol or salt*

- Make sure to centrifuge ≥ 1 min at 11,000 x $g$ in order to remove all of ethanolic Buffer B5 before eluting the DNA. If, for any reason, the level of Buffer B5 has reached the column outlet after drying, repeat the centrifugation.

- Do not chill Buffer B5 before use. Cold buffer will not remove salt effectively. Equilibrate Buffer B5 to room temperature before use.

*Contamination of DNA with inhibitory substances*

- Do not elute DNA with TE buffer. EDTA may inhibit enzymatic reactions. Repurify DNA and elute in Buffer BE.
# Genomic DNA from insects

## 6.2 Ordering information

<table>
<thead>
<tr>
<th>Product</th>
<th>REF</th>
<th>Pack of</th>
</tr>
</thead>
<tbody>
<tr>
<td>NucleoSpin® DNA Insect</td>
<td>740470.10 / .50</td>
<td>10 / 50 preps</td>
</tr>
<tr>
<td>MN Bead Tube Holder</td>
<td>740469</td>
<td>1 piece</td>
</tr>
<tr>
<td>NucleoSpin® Soil</td>
<td>740780.10 / .50 / .250</td>
<td>10 / 50 / 250 preps</td>
</tr>
<tr>
<td>NucleoSpin® DNA Lipid Tissue</td>
<td>740471.10 / .50</td>
<td>10 / 50 preps</td>
</tr>
<tr>
<td>NucleoSpin® Microbial DNA</td>
<td>740235.10 / .50</td>
<td>10 / 50 preps</td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type A</td>
<td>740786.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(0.6–0.8 mm ceramic beads,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>recommended for soil and sediments)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type B</td>
<td>740812.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(40–400 μm glass beads,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>recommended for bacteria)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type C</td>
<td>740813.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(1–3 mm corundum, recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for yeast)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type D</td>
<td>740814.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(3 mm steel beads, recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for insects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type E</td>
<td>740815.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(40–400 μm glass beads and 3 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>steel beads, recommended for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hard to lyse bacteria within insect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>samples)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type F</td>
<td>740816.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(1–3 mm corundum and 3 mm steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>beads, use only with MN Bead Tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holder!)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NucleoSpin® Bead Tubes Type G</td>
<td>740817.50</td>
<td>50 pieces</td>
</tr>
<tr>
<td>(5 mm steel beads, recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for plant material)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffer BE</td>
<td>740306.100</td>
<td>125 mL</td>
</tr>
<tr>
<td>Buffer B5 Concentrate</td>
<td>740921</td>
<td>25 mL</td>
</tr>
<tr>
<td>(for 125 mL Buffer B5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffer BW</td>
<td>740922</td>
<td>100 mL</td>
</tr>
</tbody>
</table>
### Product use restriction/warranty

**NucleoSpin® DNA Insect** kit components are intended, developed, designed, and sold FOR RESEARCH PURPOSES ONLY, except, however, any other function of the product being expressly described in original MACHEERY-NAGEL product leaflets.

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IF THERE IS NO IVD SIGN, THE PRODUCT SHALL NOT BE SUITABLE FOR IN VITRO-DIAGNOSTIC USE!

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Genomic DNA from insects

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NucleoSpin® DNA Insect

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tech-bio@mn-net.com

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