艾科瑞生物
Accurate Biology

Instruction for Use

MagSpherix DNA Beads

AG12548
Version.V1E1

Research Use Only
Not For Diagnosis Procedures

1. Description

This product employs superparamagnetic beads coupled with an optimized buffer system to achieve size selection of DNA fragments ranging from 100 bp to 1000 bp and recovery of fragments between 50 bp and 30 kb by adjusting the bead-to-sample ratio. The procedure is simple and rapid - after nucleic acid binding to the magnetic beads, an external magnetic field enables efficient separation from various solution impurities including enzymes, primers, and salt ions. Through subsequent washing and elution steps, highly purified DNA is obtained. The resulting DNA exhibits excellent purity and is suitable for various molecular biology applications such as next-generation sequencing (NGS), qPCR/ddPCR/PCR, and gene microarray analysis.

2. Kit Information

Kit Name	Cat. No	Specification
MagSpherix DNA Beads	AG 12548	100 mL

3. Transportation and Storage

Storage	Store at 4°C
Transportation	Transport at 4°C / Ice Bag

4. Precautions

1) The magnetic beads should be stored at 4°C to prevent damage to surface group modifications caused by freezing or prolonged high temperatures, which may affect performance. Avoid storage below 0°C (e.g., -20°C) or extended periods at room temperature. After use, promptly return the beads to 4°C storage.
2) During prolonged standing, the magnetic beads will separate from the buffer and settle at the bottom of the tube. Before use, gently invert the tube to resuspend the settled beads, followed by vortex mixing to obtain a homogeneous bead suspension.
3) For first-time use, it is recommended to aliquot the beads into 1.5 mL centrifuge tubes for storage at 4°C.
4) Prior to each use, equilibrate the beads to room temperature (15-25°C) (approximately 30 minutes at room temperature) and vortex mix thoroughly (about 5 minutes).
5) The 80% ethanol wash solution should be prepared fresh before each use to ensure optimal recovery efficiency.
6) For size selection, the initial sample volume should be ≥100μl. If the volume is insufficient, supplement with RNase-free water to minimize pipetting errors and ensure accurate fragment selection.

5. Experimental Preparation

Reagents: Freshly prepared 80% ethanol solution; Elution buffer: RNase-free water or TE Buffer (10 mM Tris-Acetate pH 8.0, 1 mM EDTA) may be used.

Consumables: 0.2 mL PCR tubes, 1.5 mL centrifuge tubes, etc.

Equipment: Pipettes, vortex mixer, mini centrifuge, magnetic stand, etc.

Note: All listed items are essential for the procedure. The ethanol solution must be prepared fresh, and either RNase-free water or TE buffer can be selected for elution based on experimental requirements.

6. Protocol

6.1 DNA Purification

Prior to use, equilibrate the magnetic beads to room temperature (15-25°C) by standing for approximately 30 minutes, then vortex thoroughly for about 5 minutes to ensure homogeneous suspension.

1) Bead-Sample Mixing:

Add the equilibrated magnetic beads (15-25°C) to the DNA sample at the recommended ratio (refer to Table 1 for bead-to-sample proportions). Mix gently by: Vortexing for 5-10 seconds, or Pipetting up and down 10 times with slow, careful strokes. Briefly centrifuge to collect any droplets from the tube walls.

Table 1. Recommended Magnetic Bead-to-Sample Ratios for DNA Purification

Target DNA Size Range	Bead to Sample Ratio (V/V)*
≥ 1 kb	0.6 X
≥ 400 bp	0.8 X
≥ 300 bp	1.0 X
≥ 200 bp	1.2 X
≥ 100 bp	≥ 2.0 X

Note: All recommended bead ratios are calculated based on the sample volume (v/v).

2) Incubate the magnetic beads and DNA sample at room temperature (15-25 °C) for 8 minutes to allow DNA binding.

3) Then place the sample on a magnetic stand for at least 5 minutes until the solution becomes completely clear and no beads remain in the supernatant. Carefully remove the supernatant with a pipette without disturbing the beads.

4) Keep the tube on the magnetic stand and add 200 µl freshly prepared 80% ethanol to wash the beads (avoid disturbing the beads while adding ethanol). Incubate at room temperature (15–25 °C) for 30 seconds, then carefully remove the supernatant with a pipette.

5) Repeat step 4 once.

6) Briefly centrifuge the tube, then place it back on the magnetic stand for about 30 seconds. Use a 10 µl pipette to carefully remove any residual ethanol.

7)Keep the tube on the magnetic stand, open the lid, and air-dry the beads for 2–5 minutes until no ethanol remains.

Note: When ethanol is fully evaporated, the bead surface appears dull. Incomplete drying may reduce elution efficiency and affect downstream applications. However, do not over-dry the beads, as cracking can reduce DNA recovery.

8) Once dry, remove the tube from the magnetic stand and add an appropriate volume of elution buffer (RNase-free water or TE buffer) to fully cover the beads. Gently mix by pipetting, and incubate at room temperature (15–25 °C) for 8 minutes. If the beads appear cracked, extend the incubation time accordingly.

9) After incubation, briefly centrifuge and place the tube on the magnetic stand until the solution is clear (about 5 minutes).

10) Carefully transfer the supernatant to a new tube without disturbing the beads. The purified DNA can be stored at –20 °C.

6.2 DNA Selection

1) To perform dual-round size selection according to the desired DNA fragment length, adjust the initial DNA sample volume to 100 µl using RNase-free water.

2)Refer to Table 2 below for the recommended bead-to-sample ratio and add the magnetic beads for the first round of size selection. Vortex for 5-10 seconds or gently pipette up and down 10 times to mix thoroughly, then briefly centrifuge. The bead ratio can be adjusted based on actual requirements.

Table 2. Recommended Bead Ratios for Size Selection of DNA Fragments

Selected DNA Average Szie (bp)	200-250	250-350	350-450	450-550	550-700	700-900	900-1000
First-round volume ratio (Beads : Sample)	1.0 X	0.9 X	0.8 X	0.7 X	0.65 X	0.6 X	0.5 X
Second-round volume ratio (Beads : Sample)	0.2 X	0.2 X	0.2 X	0.2 X	0.15 X	0.15 X	0.2 X

Note:*The magnetic bead volume is calculated based on a 100 µl DNA sample volume; for example, a 0.8X ratio is used for the first round of selection. Then the input volume is 80 µl = 100 µl * 0.8.*

3) Incubate the sample at room temperature (15-25°C) for 8 minutes to allow DNA binding to the magnetic beads.
4) Place the sample tube on a magnetic stand for at least 5 minutes until the liquid becomes completely clear and no beads are visible in the supernatant. Carefully transfer the supernatant to a new microcentrifuge tube using a pipette.
Note: When transferring the supernatant, it is recommended to leave 2-5 µl at the bottom of the tube to avoid accidentally pipetting any beads, which could affect size selection and lead to retention of large DNA fragments.
5) According to Table 2, add the second-round magnetic beads to the supernatant. Vortex for 5-10 seconds or pipette gently 10 times to mix thoroughly. Briefly centrifuge the tube.
6) Incubate the sample at room temperature (15-25°C) for 8 minutes to allow DNA binding to the beads.
7) Place the sample on the magnetic stand for at least 5 minutes until the solution is clear and no beads are visible in the supernatant. Carefully remove the supernatant without disturbing the beads.
8) Keeping the tube on the magnetic stand, add 200 µl of freshly prepared 80% ethanol to wash the beads (avoid disturbing the beads while adding ethanol). Incubate at room temperature for 30 seconds. Carefully remove the supernatant using a pipette.
9) Repeat step 8 once.
10) Briefly centrifuge the tube using a benchtop centrifuge. Place the tube back on the magnetic stand for approximately 30 seconds, then use a 10 µl pipette to remove any remaining ethanol.
11) Keep the tube on the magnetic stand and open the cap to air-dry the beads for 2-5 minutes until all ethanol has evaporated.
Note: When completely dry, the bead surface will appear matte. Incomplete drying may reduce DNA elution efficiency and negatively impact downstream applications. However, avoid over-drying, as cracking of the bead surface may also reduce elution efficiency.
12) Once dried, remove the tube from the magnetic stand and add an appropriate volume of elution buffer (RNase-free water or TE Buffer) to cover the beads. Mix gently by pipetting and incubate at room temperature (15-25°C) for 8 minutes. If the beads appear over-dried or cracked, extend the incubation time as needed.
13) After incubation, briefly centrifuge the tube and place it back on the magnetic stand for approximately 5 minutes until the solution becomes clear.
14) Carefully transfer the supernatant (eluted DNA) to a new tube without disturbing the beads. The size-selected DNA can be stored at -20°C.

AG 艾科瑞生物 Accurate Biology

Accurate Biotechnology (Hunan) Co., Ltd
No.1 JinYang Road, WangCheng District, Changsha City, Hunan Province, China
service@agbio.com.cn
+86 400 767 6022
en.agbio.com.cn
Research Use Only