

Magnetic Water DNA Kit

Cat. No.: M1522592 | Pack size: 48T | Storage: 2-8°C; room temperature

Overview

This kit is suitable for extracting high-purity genomic DNA from various water samples, such as tap water, river water, aquaculture pond water, and wastewater. The method employs humic acid adsorbent and magnetic bead purification technology. The adsorbent efficiently removes inhibitors from the DNA solution. The extraction process avoids toxic phenol-chloroform extraction and time-consuming alcohol precipitation. The nucleic acids purified by this method include genomic DNA from bacteria, fungi, and other microorganisms. The obtained DNA can be used directly in PCR, bacterial DNA detection, and other experiments. The purified DNA is intended for research use only.

Kit Contents & Storage

Product Code	Component	Appearance	48T	Storage
M1522592A	Lysis Buffer AL	Liquid	35 mL	RT
M1522592B	Magnetic Beads MBVB	Liquid	1.1 mL	2-8°C
M1522592C	Grinding Tube (ZB_M1)	-	1 EA×48	RT
M1522592D	RNase A	Powder	6 mg	2-8°C
M1522592E	Enzyme Dissolution Buffer ESB	Liquid	1 mL	RT
M1522592F	Precipitation Solution SPS	Liquid	11 mL	RT
M1522592G	Lysis/Binding Buffer BLS	Liquid	30 mL	RT
M1522592H	Wash Buffer AW1	Liquid	40 mL	RT
M1522592I	Wash Buffer DW2	Liquid	80 mL	RT
M1522592J	Elution Buffer DE	Liquid	6 mL	RT
M1522592K	Proteinase K	Liquid	1.1 mL	2-8°C

Each component has a shelf life of 12 months under corresponding storage conditions.

Storage Conditions

M1522592B, M1522592D, M1522592K: Store at 2–8 °C for 12 months.

M1522592A, M1522592C, M1522592E, M1522592F, M1522592G, M1522592H, M1522592I, M1522592J: Store at room temperature for 12 months.

Compatible Instrumentation

Manual extraction.

Precautions

Read the entire manual carefully before use.

Several buffers contain irritating guanidine salts. Always wear gloves and follow standard safety precautions. Avoid contact with skin, eyes, and mucous membranes. If contact occurs, rinse immediately with plenty of water and seek medical attention.

If precipitates appear due to low temperature, warm the solution at 30 °C until completely dissolved before use.

If precipitates appear in Lysis Buffer AL or Precipitation Solution SPS due to low temperature, warm at 60 °C until completely dissolved before use.

If magnetic beads cannot be resuspended by vigorous shaking due to low temperature, do not use.

Several buffers contain guanidine salts. Do not treat with oxidizing disinfectants (e.g., sodium hypochlorite) as this may release toxic gas. Dispose as medical waste.

This kit is intended for use as an integrated system. Do not interchange or mix components from different lot numbers.

Protocol

1. Sample Requirements

Applicable sample types: Various water samples, such as tap water, river water, aquaculture pond water, and wastewater.

Sample preservation and transport: Samples can be processed immediately or stored at –70 °C or lower for up to 6 months. Avoid repeated freeze-thaw cycles. Transport samples under cold chain conditions.

Freeze-thaw requirements: Quick freeze and quick thaw; avoid repeated freeze-thaw cycles.

2. Materials to Be Prepared by User

Water bath (for dissolving precipitates), dry thermostat bath;

Magnetic stand (for 1.5/2.0 mL tubes);

1.5/2.0 mL sterile, nuclease-free centrifuge tubes;

Various pipettes and tips (20 μ L, 200 μ L, 1000 μ L);

0.22 μ m or 0.45 μ m filter membrane.

3. Reagent Preparation

Check solutions for precipitates and ensure magnetic beads can be resuspended.

Dissolve RNase A (10 mg/mL): Add 0.6 mL of Enzyme Dissolution Buffer ESB to the RNase A powder to obtain a final concentration of 10 mg/mL. Mix by inversion or gentle vortexing until fully dissolved. The dissolved RNase A should be stored at -20°C to 8°C .

4. Procedure

Recommended magnetic separation procedure (starting from step 4.6): Place the tube on the magnetic stand, gently rotate left and right until the beads aggregate on the tube wall closest to the magnet. Gently invert the magnetic stand several times to collect beads from the cap onto the wall. Let stand for several minutes until the solution is clear (stand time depends on the magnet strength).

4.1 Collect microorganisms from the water sample by filtration using a 0.22 μ m or 0.45 μ m filter membrane. If the water contains a high amount of insoluble particles that may cause clogging, place a larger-pore membrane (e.g., 1 μ m and 3–8 μ m) on top of the 0.22 μ m or 0.45 μ m membrane to reduce clogging.

4.2 Remove the 0.22 μ m or 0.45 μ m filter membrane, cut it into 1–2 mm pieces, and transfer them into a Grinding Tube (ZB_M1). Add 600 μ L of Lysis Buffer AL and 20 μ L of Proteinase K. Vortex at maximum speed or transfer to a bead beater and grind at high speed for 10 minutes. (Select an appropriate program for lysis in the bead beater; for example, MP Biomedicals FastPrep-24: 4°C , 6.5 m/sec, on 90 sec, off 3 min, 2 cycles. For other brands, follow the instrument-recommended program.)

4.3 Add 10 μ L of RNase A (10 mg/mL), vortex to mix, then incubate at 70°C for 20–30 minutes. Vortex for 30 seconds.

4.4 Based on the humic acid content of the sample, choose one of the following two options:

For samples with low humic acid content: Centrifuge at $13,000\times g$ for 5 minutes and proceed to step 4.5 using the supernatant.

For samples with high humic acid content: Add 200 μ L of Precipitation Solution SPS, vortex for 30 seconds, then place at 4°C (refrigerator or on ice) for 5–10 minutes. Centrifuge at $13,000\times g$ for 5

minutes. (Note: The precipitation solution removes humic acids but may reduce DNA yield; for low-humic-acid samples, it is recommended to skip this step.)

4.5 Transfer 500 μ L of the supernatant to a new centrifuge tube. Add 20 μ L of Magnetic Beads MBVB and 500 μ L of Lysis/Binding Buffer BLS. Shake or vortex for 5–7 minutes to allow the beads to bind DNA.

4.6 Place the tube on a magnetic stand for magnetic separation until the solution is clear. Aspirate and discard the supernatant.

4.7 Add 700 μ L of Wash Buffer AW1. Vortex for 30 seconds, then return to the magnetic stand and separate until clear. Aspirate and discard the supernatant.

4.8 Add 700 μ L of Wash Buffer DW2. Vortex for 30 seconds, then separate magnetically until clear. Aspirate and discard the supernatant.

4.9 Add another 700 μ L of Wash Buffer DW2. Vortex for 30 seconds, then separate magnetically until clear. Aspirate and discard the supernatant.

4.10 Briefly centrifuge in a microcentrifuge. Place the tube on the magnetic stand and allow the solution to become clear. Aspirate and discard all remaining liquid thoroughly. Open the cap and air-dry for 3–5 minutes.

Note: Residual ethanol will inhibit downstream enzymatic reactions. Ensure that ethanol is completely evaporated during drying. Do not over-dry, as this may affect elution efficiency.

4.11 Add 50–100 μ L of Elution Buffer DE. Vortex vigorously for 2–3 minutes to fully resuspend the beads.

4.12 Incubate at 60 °C for 10 minutes. During incubation, remove the tube and vortex to resuspend the beads 2–3 times.

4.13 Briefly centrifuge to collect droplets from the cap. Return the tube to the magnetic stand for magnetic separation until the solution is clear.

4.14 Transfer the genomic DNA solution to a new centrifuge tube. If not used immediately, store at –15 to –25 °C. For long-term storage, keep at –70 °C or lower.

Limitations of the Method

For certain poorly collected samples, the extracted product may contain trace impurities that inhibit PCR amplification.

The efficiency of nucleic acid extraction is closely related to sample collection, processing, transport, and storage. Any error in these steps may lead to inaccurate results.

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Aladdin Scientific Corporation

14078 Meridian Parkway, Riverside, CA 92518, USA

Phone: 1-833-552-7181

Sales: sales@aladdinsci.com

Customer Service: custserv@aladdinsci.com

EU SALES, LOGISTICS & LOCALIZED SUPPORT

Aladdin Biochem Deutschland GmbH

Westring 2, 33142 Büren, Germany

Phone: +02951 9383958

Support: support.eu@aladdinsci.com

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