

NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit

Cat. no. LM102111

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Product Information

Cat. No.	Product name	Pack size
LM102111	NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit	16 T (pre-aliquoted)
		96 T (pre-aliquoted)
		20 T (bulk)
		100 T (bulk)
		500 T (bulk)

Storage and Shipping

- RNase: store at -20°C ; transport on wet ice.
- CY Reagent: store at -20°C ; transport on wet ice.
- Other reagents: store and transport at room temperature ($10-30^{\circ}\text{C}$).

Check the sealing status of all reagents before use. If precipitation forms in the reagents at low temperature, incubate the sealed reagents in a 65°C oven for about 30 minutes and mix well until clear before use. Do not tear the aluminium film of pre-aliquoted reagents when placing in the oven. Shelf life: 1 year from the date of production for the entire kit.

Application

Used for high-throughput fully automated nucleic acid extraction, enrichment and purification. This product is for scientific research use only. Not for use in diagnostic or clinical procedures.

Packaging Specifications and Compatible Extraction Instruments

Instrument model	Pre-aliquoted 16 T	Pre-aliquoted 96 T	Bulk 20 T	Bulk 100 T	Bulk 500 T
S-16	✓	—	—	—	—
S-48	—	—	—	✓	—
S-96	—	✓	—	—	—
N-96	—	—	—	—	—

Extraction Principle

This kit is a nucleic acid extraction kit based on biological magnetic beads with high-specific binding capacity. The core principle is to utilize the functional groups on the surface of functional biological magnetic beads to enrich nucleic acids from sample lysis products onto the bead surface. Impurities such as proteins are removed with washing buffers, and the magnetic beads are separated using a magnetic separation device, thus achieving rapid separation and purification of DNA.

No harmful substances such as phenol, chloroform or β -mercaptoethanol are used throughout the process, ensuring safety and non-toxicity. The paramagnetic biological magnetic beads enable high-throughput

automated extraction. The extracted products can be directly used for downstream experiments including PCR, qPCR, microarray analysis, next-generation sequencing library construction, Southern Blot and molecular cloning.

Kit Contents

Comp. No.	Component	16 T (pre-aliquoted)	96 T (pre-aliquoted)	20 T (bulk)	100 T (bulk)	500 T (bulk)
1	Lysis Buffer	15 mL	70 mL	15 mL	70 mL	350 mL
2	Binding Buffer	1 × 96-well plate	1 × 96-well plate	10 mL	50 mL	250 mL
3	Washing Buffer I	—	2 × 96-well plates	30 mL	150 mL	2 × 370 mL
4	Magnetic Bead-Washing Buffer II	—	1 × 96-well plate	15 mL	75 mL	370 mL
5	Washing Buffer II	—	1 × 96-well plate	15 mL	75 mL	370 mL
6	Elution Buffer*	—	1 × 96-well plate	4 mL	20 mL	60 mL
7	CY Reagent	400 µL	2 × 1 mL	400 µL	2 × 1 mL	10 × 1 mL
8	RNase	100 µL	600 µL	100 µL	600 µL	5 × 600 µL

*Note: 100 µL of Elution Buffer is pre-aliquoted in each well of the 96-well plate for pre-aliquoted reagents.

Applicable Sample Types

Sample type	Applicable plant species
Leaf	Sweet potato, cotton, rice, corn, wheat, tobacco, soybean
Seed	Rice, wheat, corn, soybean

Instructions for Use

Pre-Experiment Preparation

RNase Usage

Add 5 µL of RNase to the elution well before loading the sample onto the extractor to avoid loss of enzyme activity.

CY Reagent Usage

Add CY Reagent to the Lysis Buffer to a final concentration of 2.5% before operation (e.g., add 15 µL of CY Reagent to 585 µL of Lysis Buffer). The prepared lysis buffer is best used on the same day.

Sample Lysis

- Protocol ①②③④⑤: for young plant leaves and etiolated seedling samples.
- Protocol ①④: for plant seed samples.
- Protocol ⑥: for plant protoplast samples.

Powdered samples ground with liquid nitrogen are lysed using the dry grinding-lysis method.

Step	① Liquid Nitrogen Manual Grinding	③ Liquid Nitrogen Automated Grinding	⑤ Wet Grinding-Lysis (fresh samples only)	⑥ Dry Grinding-Lysis
Operation	Mortar: cut plant samples into small pieces, place in a mortar, and grind the	Small-scale tissue (③): place plant samples in a 2 mL centrifuge tube containing 3×5 mm steel beads, cap tightly and	Place plant samples in a 2 mL centrifuge tube containing 3×5 mm steel beads, add Lysis Buffer and CY Reagent (final	Liquid nitrogen-ground samples: prepare RNase-free 1.5 mL centrifuge tubes, pre-cool in liquid nitrogen, and aliquot the ground

Step	① Liquid Nitrogen Manual Grinding	③ Liquid Nitrogen Automated Grinding	⑤ Wet Grinding-Lysis (fresh samples only)	⑥ Dry Grinding-Lysis
	plant tissue into fine powder with a pestle under constant liquid nitrogen immersion. Grinder rod (②): cut plant samples into small pieces, place in a 1.5 mL centrifuge tube and immerse in liquid nitrogen. Grind the sample to fine powder with a liquid nitrogen-precooled grinder rod by rotation.	freeze in liquid nitrogen for 30 s; pre-cool the grinder adapter in liquid nitrogen for 30 s simultaneously. Grind with a grinder at 60 Hz for 30 s, repeat 3 times, freezing in liquid nitrogen for 30 s after each cycle. Large-scale/hard/high-moisture tissue (④): use 15/30/50 mL steel tanks matching the grinder. Pre-cool the tank in liquid nitrogen, place the sample in, tighten the lid, freeze for another 30 s, then grind at 60 Hz for 30 s, repeat 3 times, freezing for 30 s after each cycle.	concentration 2.5%) as recommended in the table. Grind with a grinder at 60 Hz for 5 min → incubate in a 60 °C metal bath for 30 min → centrifuge at 15,000 rpm and 4 °C for 10 min.	powder. Add Lysis Buffer and CY Reagent (final concentration 2.5%) as recommended in the table. Vortex vigorously for 3 min → incubate in a 60 °C metal bath for 30 min → centrifuge at 15,000 rpm and 4 °C for 10 min.
Post-operation	Immediately transfer the ground powder to a liquid nitrogen-precooled storage tube. Store at –80 °C for long-term use, or keep in liquid nitrogen for immediate extraction experiments.		After centrifugation, place the centrifuge tube on ice. Once extraction reagents are ready, transfer 500 µL of the supernatant to Station 1 of a 96-well plate for on-machine extraction, or to a centrifuge tube for manual extraction.	

Extraction Methods

A. Automated Extraction

- For pre-aliquoted reagents: if the reagents are inverted during transportation, centrifuge the 96-well plate at low speed (≤ 500 rpm) for 1 min using a plate centrifuge to collect the liquid at the bottom of the wells. Tear off the aluminium film carefully to avoid shaking the 96-well plate and liquid splashing.
- For non-pre-aliquoted reagents: aliquot the reagents manually according to the table below.

Reagents	Aliquot volume	Corresponding station (S-96/N-96)	Corresponding station (S-16/S-48)
Binding Buffer	450 µL	Station 1 (marked ① 96-well plate)	Station 1 (columns 1/7 of 96-well plate)
Washing Buffer I	700 µL	Station 2 (marked ② 96-well plate)	Station 2 (columns 2/8 of 96-well plate)
Washing Buffer I	700 µL	Station 3 (marked ③ 96-well plate)	Station 3 (columns 3/9 of 96-well plate)
Magnetic Bead-Washing Buffer II	700 µL	Station 4 (marked ④ 96-well plate)	Station 4 (columns 4/10 of 96-well plate)
Washing Buffer II	700 µL	Station 5 (marked ⑤ 96-well plate)	Station 6 (columns 6/12 of 96-well plate)
Elution Buffer	50–100 µL	Station 6 (marked ⑥ 96-well plate)	Station 5 (columns 5/11 of 96-well plate)

- Transfer 500 µL of the centrifuged sample supernatant to Station 1 (① 96-well plate for S-96/N-96; columns 1/7 of the 96-well plate for S-16/S-48). Place the magnetic rod sleeves in position, close the chamber door, and start the extraction programme.
- Reference programmes for various extractor models are shown in Tables 1–3 below. The extractor will stop automatically after the programme ends. Remove the 96-well plate; the extracted DNA is in Station 6 (⑥ 96-well plate) for S-96/N-96, or columns 5/11 of the 96-well plate for S-16/S-48. Transfer the DNA to a new centrifuge tube, store at –20 °C for short-term use, or at –80 °C for long-term storage.

Table 1: Reference Programme for Medino S-96 Automated Nucleic Acid Extractor

Step	1	2	3	4	5	6	7	8
Station	4	1	1	2	3	4	5	6

Step	1	2	3	4	5	6	7	8
Waiting time	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:02:00
Mixing time	0:00:30	0:05:00	0:05:00	0:02:00	0:02:00	0:02:00	0:02:00	0:10:00
Mixing speed	6	1	1	6	6	6	6	2
Magnetic adsorption time	1:00	1:00	1:00	1:00	1:00	1:00	1:00	2:00
Temperature	Lysis: 25.0 °C	Lysis: 25.0 °C	Lysis: 25.0 °C	Elution: 60 °C	Elution: 60 °C	Elution: 60 °C	Elution: 60 °C	4 °C Storage: 0:00

Extraction Methods (continued)

Table 2: Reference Programme for Medino N-96 Automated Nucleic Acid Extractor

Step	1	2	3	4	5	6	7	8
Station	4	1	2	3	4	5	6	4
Waiting time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:02:00	00:00:00
Mixing mode	6	1	6	6	6	6	2	6
Mixing time	00:00:30	00:05:00	00:02:00	00:02:00	00:02:00	00:02:00	00:10:00	00:00:10
Pause	No	No	No	No	No	No	No	No
Magnetic adsorption time	00:01:00	00:01:00	00:01:00	00:01:00	00:01:00	00:01:00	00:02:00	00:00:00
Volume	700 µL	950 µL	700 µL	700 µL	700 µL	700 µL	100 µL	700 µL
Temperature	—	25 °C	—	—	—	—	60 °C	—

Table 3: Reference Programme for Medino S-16/S-48 Automated Nucleic Acid Extractor

Step	1	2	3	4	5	6	7	8
Station	4	1	2	3	4	6	5	4
Waiting time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:02:00	00:00:00
Mixing mode	3	1	3	3	3	3	2	3
Mixing time	00:00:30	00:05:00	00:02:00	00:02:00	00:02:00	00:02:00	00:10:00	00:00:10
Pause	No	No	No	No	No	No	No	No
Magnetic adsorption time	00:01:00	00:01:00	00:01:00	00:01:00	00:01:00	00:01:00	00:02:00	00:00:00
Volume	700 µL	950 µL	700 µL	700 µL	700 µL	700 µL	100 µL	700 µL
Temperature	—	25 °C	—	—	—	—	60 °C	—

B. Manual Extraction

1. Vortex the Magnetic Bead-Washing Buffer II thoroughly to mix well. Prepare 1.5 mL centrifuge tubes according to the number of samples to be extracted, and pipette 700 µL of Magnetic Bead-Washing Buffer II into each tube. Place the tubes on a magnetic rack for magnetic adsorption for 1 min, and transfer the supernatant to new centrifuge tubes for later use.
2. Shake the Binding Buffer thoroughly to mix well, and pipette 450 µL of Binding Buffer into the centrifuge tubes with magnetic beads from Step 1.
3. Pipette 500 µL of the centrifuged sample supernatant (up to 1000 µL can be used if the supernatant is sufficient) into the centrifuge tubes containing Binding Buffer and magnetic beads from Step 2. Vortex

for 5 min, place on a magnetic rack for magnetic adsorption for 1 min, and discard all the supernatant.

Flocculent precipitation is a normal phenomenon; simply vortex thoroughly to mix well.

4. Remove the centrifuge tubes from the magnetic rack, add 700 µL of Washing Buffer I, vortex for 2 min, place on the magnetic rack for magnetic adsorption for 1 min, and discard all the supernatant.
5. Repeat step 4 with another 700 µL of Washing Buffer I.
6. Add 700 µL of the reserved Washing Buffer II (collected in Step 1) to the centrifuge tubes, vortex for 2 min, place on the magnetic rack for magnetic adsorption for 1 min, and discard all the supernatant.
7. Remove the centrifuge tubes from the magnetic rack, add 700 µL of Washing Buffer II, vortex for 2 min, place on the magnetic rack for magnetic adsorption for 1 min, and discard all the supernatant.
8. Open the tube lids and air-dry the magnetic beads for 2 min. Meanwhile, preheat the Elution Buffer at 60 °C. After the magnetic beads are air-dried, add 50–100 µL of preheated Elution Buffer and 5 µL of RNase to the tubes, incubate in a 60 °C rotating metal bath for 10 min to elute the DNA. Place the tubes on a magnetic rack for magnetic adsorption for 2 min, and transfer all the eluate to new centrifuge tubes (avoid pipetting the magnetic beads). Store the DNA at –20 °C for short-term use, or at –80 °C for long-term storage.

Precautions

Avoid DNase Contamination

Avoid all DNase contamination throughout the entire process of plant DNA extraction with this kit, including contamination from latex gloves, pipette tips, centrifuge tubes, mortars and other consumables used for sample grinding. Therefore:

- Do not use low-quality latex gloves; change gloves frequently during operation.
- Wear a face mask during operation.
- Avoid heavy foot traffic and conversation in the extraction environment.

Consumables

It is recommended to use high-quality RNase/DNase-free consumables.

DNA Yield and Purity

- High-quality plant-extracted DNA has an A260/A280 ratio of 1.7–2.2 and an A260/A230 ratio of 1.7–2.2 when measured by spectrophotometry.
- An abnormal A260/A280 ratio indicates protein residue, which can be further confirmed by agarose gel electrophoresis. Obvious brightness at the loading well and smearing/tailing of the DNA band in agarose gel electrophoresis are typical signs of protein residue.