

NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit

Cat. no. LM102148

Address: SHT technology GmbH, Niederhöchstädter Str. 64, 61476 Kronberg im
Taunus, Germany

Tel.: +49 176 34989414

Website: <https://sht-medino.de/>

NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit

Cat. no. LM102148

Product Information

Cat. No.	Product name	Pack size
LM102148	NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit	16 T (pre-dispensed)
		96 T (pre-dispensed)
		20 T
		100 T
		500 T

The 16 T and 96 T formats are supplied pre-dispensed into plates/strips for direct loading onto the corresponding automated extractor; the 20 T, 100 T and 500 T formats are supplied as bulk (non-dispensed) reagents.

Kit Contents

Component	16 T	96 T	20 T	100 T	500 T
Lysis Buffer	20 mL	120 mL	20 mL	120 mL	300 mL × 2
Binding Buffer	1 × 96-well plate	1 × 96-well plate	10 mL	50 mL	250 mL
Wash Buffer I	—	2 × 96-well plate	30 mL	150 mL	375 mL × 2
Bead-Wash Buffer II	—	1 × 96-well plate	15 mL	75 mL	375 mL
Wash Buffer II	—	1 × 96-well plate	15 mL	75 mL	375 mL
Elution Buffer	—	1 × 96-well plate	4 mL	20 mL	60 mL
CY Reagent	400 µL	1.2 mL × 2	400 µL	1.2 mL × 2	1.2 mL × 10
Papain (100 mg/mL)	200 µL	1.2 mL	200 µL	1.2 mL	1.2 mL × 5

For the 16 T format, Binding Buffer is supplied as a pre-dispensed plate; Wash Buffer I, Bead-Wash Buffer II, Wash Buffer II and Elution Buffer are provided ready-loaded on the corresponding instrument consumable and are not separately listed by volume.

Storage

Papain and CY Reagent: store at –20 °C, ship on wet ice. All other components: store and ship at room temperature (10–30 °C). Kit shelf life is 1 year. Before use, check that all reagents are free of precipitate; if precipitate is present, incubate at 65 °C for approximately 30 minutes and mix until clear. Keep pre-dispensed reagents sealed and do not pierce the foil seal until ready to use.

Applicable Sample Types

Sample type	Validated plant species
Leaf	Sweet potato, cotton, rice, maize, wheat, tobacco, soybean
Seed	Rice, wheat, maize, soybean, waxy maize

The kit also supports extraction from plant protoplasts (see Protocol, section A). For species not listed above, we recommend a small-scale verification prior to full-scale use.

Introduction

The NUCQX® Universal Magnetic Bead-Based Plant DNA Extraction Kit is based on high-affinity biological nanomagnetic beads. Functional groups on the bead surface capture nucleic acids released from lysed plant tissue; protein and other impurities are removed by a series of wash steps, and a magnetic separator is then used to isolate the beads for rapid, purified DNA recovery.

The entire workflow avoids phenol, chloroform, β -mercaptoethanol and other hazardous reagents, making it safe and non-toxic to operate. Because the paramagnetic nanobeads are compatible with automated liquid-handling and magnetic-separation platforms, the kit is well suited to high-throughput automated extraction. The purified DNA can be used directly for downstream PCR, qPCR, microarray analysis, next-generation sequencing library preparation, Southern blot and molecular cloning.

Features

1. High-throughput, automation-ready format — 16 T and 96 T packs are supplied pre-dispensed onto plates matched to compatible automated magnetic-bead extractors, minimising manual reagent handling.
2. Broad species coverage — validated on leaf tissue from seven crop species and seed tissue from five crop species (see Applicable Sample Types), and also compatible with plant protoplasts.
3. Flexible sample pre-treatment — supports manual mortar/rod grinding under liquid nitrogen as well as automated bead-mill homogenisation, for both small and large/hard/high-moisture tissue amounts.
4. No hazardous organic solvents — the paramagnetic bead chemistry eliminates the need for phenol, chloroform or β -mercaptoethanol.
5. Broad downstream compatibility — purified DNA is suitable for PCR, qPCR, microarray analysis, NGS library preparation, Southern blot and molecular cloning.
6. Scalable pack sizes from 16 T to 500 T, with both fully automated and manual (bench-top) protocols provided.

Notes Please be sure to read this precaution before using the kit.

1. This product is for scientific research use only. Not for use in diagnostic or clinical procedures.
2. Throughout the DNA extraction workflow, avoid any source of DNase contamination, including gloves, pipette tips, and grinding consumables (mortars, tubes). Use high-quality, nuclease-free consumables, change gloves frequently, and minimise foot traffic and conversation in the work area.
3. High-quality plant genomic DNA typically shows an A260/A280 ratio of 1.7–2.2 and an A260/A230 ratio of 1.7–2.2. An abnormal A260/A280 ratio suggests residual protein; this can be further checked by agarose gel electrophoresis — a bright, smeared well and diffuse banding indicate protein contamination.
4. Centrifuge lysates at room temperature (10–30 °C) after lysis; low temperatures can cause the lysis buffer to precipitate.
5. When collecting supernatant, avoid the pellet at the bottom and any floating debris, as carryover of either will reduce the quality of the purified DNA.

Protocol

A. Sample Pre-treatment (Grinding and Lysis)

Sample type	Applicable pre-treatment methods
Young leaf / etiolated seedling	① Mortar grinding, ② Grinding-rod, ③ Automated bead-mill (small tissue), ④ Automated bead-mill (large/hard/high-moisture tissue), ⑤ Wet-grinding direct lysis (fresh samples only)
Seed	① Mortar grinding, ④ Automated bead-mill (large/hard tissue)
Protoplast	⑥ Direct lysis of pelleted protoplasts

- ① Mortar grinding. Cut plant tissue into small pieces and grind in a mortar under continuous liquid-nitrogen immersion, using a pestle, until reduced to a fine powder.
- ② Grinding-rod (in-tube) grinding. Cut plant tissue into small pieces in a 1.5 mL tube, immerse in liquid nitrogen, and grind with a liquid-nitrogen-pre-chilled grinding rod until the tissue is a fine powder.
- ③ Automated bead-mill grinding — small tissue amount. Place the sample in a 2 mL tube containing three 5 mm steel beads, freeze in liquid nitrogen for 30 s (pre-chill the homogeniser adapter in liquid nitrogen in parallel), then homogenise at 60 Hz for 30 s × 3 cycles, re-freezing in liquid nitrogen for 30 s between cycles.
- ④ Automated bead-mill grinding — large, hard or high-moisture-content tissue. Use a 15/30/50 mL steel jar with the matched homogeniser. Pre-chill the jar in liquid nitrogen, load the sample, re-freeze for 30 s, then homogenise at 60 Hz for 30 s × 3 cycles as above.
- ⑤ Wet-grinding direct lysis (fresh samples only). Place the sample in a 2 mL tube with three 5 mm steel beads and add lysis buffer freshly supplemented with CY Reagent and Papain, scaled to sample mass (see table below). Homogenise at 60 Hz for 5 min, then lyse at 55 °C with shaking (1,500 rpm, 45 min) or static incubation (55 °C, 75 min), and clarify by centrifugation (15,000 rpm, 16 °C, 10 min).
- ⑥ Lysis from ground powder / protoplast direct lysis. For pre-ground (liquid-nitrogen-milled) powder: dispense into a nuclease-free, liquid-nitrogen-pre-chilled 1.5 mL tube and add lysis buffer freshly supplemented with CY Reagent and Papain as above. For protoplasts: pellet at 100 g (soft mode, 2 min), carefully remove the supernatant, add 400 µL lysis buffer and 20 µL CY Reagent, vortex for 1–2 min, and lyse at 55 °C for 45 min.

Sample mass	Lysis buffer volume
25–100 mg	800 µL
100–200 mg	1,000 µL
200–300 mg	1,500 µL
Seed, 30–70 mg	1,000 µL

Prepare lysis buffer fresh before use: add Papain to a final concentration of 1 mg/mL and CY Reagent to a final concentration of 2% (e.g. per 970 µL lysis buffer, add 10 µL Papain and 20 µL CY Reagent). Do not store overnight. After grinding, store powder briefly in liquid nitrogen or at –80 °C for longer-term storage. After lysis and clarification, transfer 600 µL of cleared supernatant to the loading well for automated extraction, or continue directly with the manual protocol (section D).

B. Reagent Dispensing and Instrument Positions (Automated Extraction)

Reagent	Volume/well	S-96 / N-96 position	S-16 / S-48 position
Binding Buffer	400 µL	Position 1 (plate ①)	Position 1 (columns 1/7)
Wash Buffer I	700 µL	Position 2 (plate ②)	Position 2 (columns 2/8)
Wash Buffer I	700 µL	Position 3 (plate ③)	Position 3 (columns 3/9)
Bead-Wash Buffer II	700 µL	Position 4 (plate ④)	Position 4 (columns 4/10)

Reagent	Volume/well	S-96 / N-96 position	S-16 / S-48 position
Wash Buffer II	700 µL	Position 5 (plate ⑤)	Position 6 (columns 6/12)
Elution Buffer	100 µL	Position 6 (plate ⑥)	Position 5 (columns 5/11)

Transfer 600 µL of cleared lysate supernatant to Position 1 (plate ① on S-96/N-96; columns 1/7 on S-16/S-48), fit the magnetic rod covers, close the instrument door, and start the extraction programme (section C).

Protocol (continued)

C. Automated Extraction Programmes

1. NanoMagBio S-96

Step	1	2	3	4	5	6	7	8
Position	4	1	2	3	4	5	6	4
Wait time	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:02:00	0:00:00
Mix time	0:00:30	0:05:00	0:02:00	0:02:00	0:02:00	0:02:00	0:10:00	0:00:10
Mix speed	6	1	6	6	6	6	2	6
Magnetic capture time	1:00	1:00	1:00	1:00	1:00	1:00	2:00	0:00

Lysis temperature: 25.0 °C. Elution temperature: 60 °C. 4 °C hold: 0:00.

2. NanoMagBio N-96

Step	1	2	3	4	5	6	7	8
Position	4	1	2	3	4	5	6	4
Mix mode	6	1	6	6	6	6	2	6
Mix 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
Magnetic capture 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	1,000 µL	700 µL	700 µL	700 µL	700 µL	100 µL	700 µL
Temperature	—	25 °C	—	—	—	—	60 °C	—

Wait time and Pause are 00:00:00 / No for all steps except step 7 (wait time 00:02:00).

3. NanoMagBio S-16 / S-48

Step	1	2	3	4	5	6	7	8
Position	4	1	2	3	4	6	5	4
Mix mode	3	1	3	3	3	3	2	3
Mix 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
Magnetic capture 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	1,000 µL	700 µL	700 µL	700 µL	700 µL	100 µL	700 µL
Temperature	—	25 °C	—	—	—	—	60 °C	—

Wait time and Pause are 00:00:00 / No for all steps except step 7 (wait time 00:02:00). After the programme finishes, the instrument stops automatically. Remove the 96-well plate; purified DNA is in well ⑥ (S-96/N-96) or columns 5/11 (S-16/S-48). Transfer the DNA to a fresh tube; store briefly at –20 °C or long-term at –80 °C.

Protocol (continued)

D. Manual Extraction Protocol

1. Vortex Bead-Wash Buffer II thoroughly and dispense 700 µL per sample into a 1.5 mL tube. Place on a magnetic rack for 1 min and transfer the clear supernatant to a fresh tube.
2. Vortex Binding Buffer thoroughly and add 400 µL to the tube from step 1.
3. Add 600 µL of cleared lysate supernatant (up to 1,000 µL if more is available) to the tube. Mix by vortexing for 5 min, place on the magnetic rack for 1 min, and discard all supernatant. (Flocculent precipitate at this stage is normal — mix thoroughly to disperse.)
4. Remove the tube from the rack and add 700 µL Wash Buffer I. Vortex for 2 min, place on the rack for 1 min, and discard the supernatant.
5. Repeat step 4 with a second 700 µL aliquot of Wash Buffer I.
6. Add the 700 µL Bead-Wash Buffer II supernatant collected in step 1. Vortex for 2 min, place on the rack for 1 min, and discard the supernatant.
7. Remove the tube from the rack and add 700 µL Wash Buffer II. Vortex for 2 min, place on the rack for 1 min, and discard the supernatant.
8. Air-dry the open tube for 2 min. While drying, pre-warm Elution Buffer to 60 °C. Once the beads are dry, add 50–200 µL Elution Buffer and 5 µL RNase, and incubate at 60 °C with rotation for 10 min. Place on the magnetic rack for 2 min and transfer all eluate (avoiding the beads) to a fresh tube. Store briefly at –20 °C or long-term at –80 °C.

E. Applicable Instruments

Instrument	16 T (pre-dispensed)	96 T (pre-dispensed)	20 T / 100 T / 500 T
NanoMagBio S-16	✓	—	✓
NanoMagBio S-48	—	—	✓
NanoMagBio S-96	—	✓	—
NanoMagBio N-96	—	✓	—

Bulk (non-pre-dispensed) formats can also be processed manually with a bench-top magnetic separation rack (see Protocol, section D).