



NucleoMag[®] Plant

Automated isolation of total DNA from diverse plant samples on the MultiEX 032 workstation

Application benefits

Experience fast and flexible nucleic acid purification with the NucleoMag[®] Plant kit and the MultiEX 032 system, featuring:

- Verified methods ensuring a reliable automated purification process
- Consistent recovery of total DNA with high reproducibility on both yield and purity
- Increasing throughput capability, processing up to 32 samples in parallel
- No programming or complex setup required: Verified and pre-installed methods available.

Keywords

Total DNA, nucleic acid extraction, automated DNA purification, inhibitor removal, plant, agriculture, phylogenetics, GMO testing, magnetic beads, MultiEX, magnetic rod system, laboratory protocol optimization



MultiEX 032

Scripts are pre installed and biologically verified on the MultiEX 032 workstation.

Introduction

DNA extraction from plants is essential in various research fields, including phylogenetics, biodiversity studies, agricultural crop improvement, disease resistance, plant breeding, genetic engineering or even medical plant research. Techniques like CRISPR/Cas9, TILLING, SSR, and QTL mapping require reliable high-throughput DNA extraction. Common issues include low DNA quality, limited sample throughput and the release of plant metabolites like polyphenolic compounds or complex polysaccharides. This application note presents a solution using the MACHEREY-NAGEL NucleoMag[®] Plant kit with the MultiEX 032 workstation. The described workflow on the magnetic rod system ensures reproducibility in yield and quality while minimizing manual interactions through automated magnetic separation and bead transfer, and extracts pure DNA from up to 32 samples in 30 minutes. The NucleoMag[®] Plant kit achieves excellent DNA quality and yield, suitable for various downstream applications.

Accurate and efficient DNA extraction is vital for these research areas to obtain high-quality genetic material for further analysis.

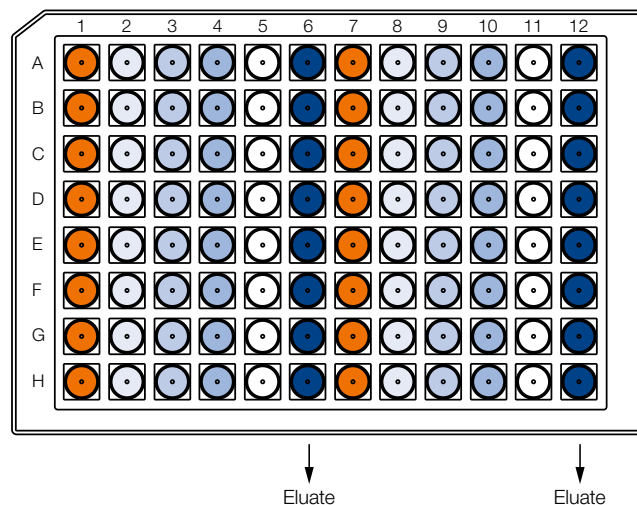
NucleoMag [®] Plant	
Technology	Magnetic beads
Sample material	Plant tissue
Target molecules	Genomic DNA
Elution volume	50 – 100 µL
Fragment size	~300 bp – approx. 50 kbp
Sample numbers on MultiEX 032	32 samples with 2 plates and 4 tip combs
Processing time	Approx. 30 min (excluding lysis)

MultiEX 032	
Technology	Automated magnetic rod system
Sample number	1 – 32 samples
Deck positions	Two plate positions and 4 rows of magnetic rods
Capacity	Volume per well: 50 µL to 1000 µL
Size / footprint	349 x 325 x 390 mm (width x depth x height)
Usage	Plug in and ready to use verified scripts
Ease of Use	10-inch color touch screen
Contamination Control	Built-in UV lamp for disinfection
Advantages	Fast automated processing for higher efficiency and reliability

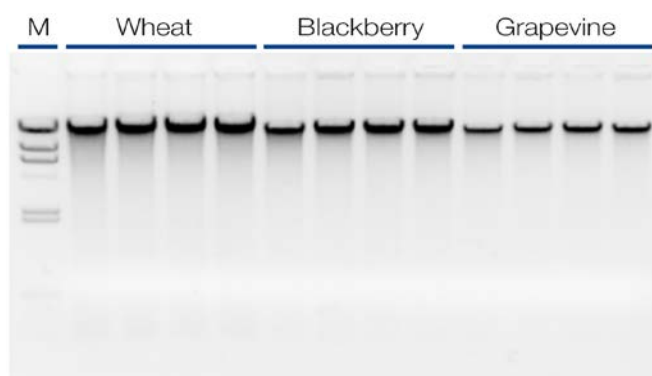
Material and Methods

The NucleoMag® Plant kit is used for isolating DNA from various plant species. Up to 50 mg of homogenized plant material (e.g., leaf, root) is processed. The plant homogenization and lysis, utilizing 500 µL of Lysis buffer MC1, is performed manually to keep maximum flexibility for various sample types and preference for homogenization methods. 400 µL cleared lysate is transferred to Column 1 ● of the 96 Deep-well extraction plate for MultiEX 032. Add 30 µL NucleoMag® C-beads and 400 µL Binding Buffer MC2. All further buffers are dispensed into the columns of the plate as shown in the plate layout to the right and described below. The plates are placed in the instrument, the covers inserted, and the protocol selected and started. The complete nucleic acid extraction is performed automatically, starting with reversible binding of the nucleic acids to the magnetic beads. Subsequent wash steps with 600 µL of different wash buffers across columns 2-5 (MC3 ●, MC4 ●, 80% Ethanol ●, MC5 ○) remove contaminants. Pure DNA is eluted under low ionic conditions by using 50 µL to 200 µL Elution Buffer MC6 ● within the last column.

Plate Layout

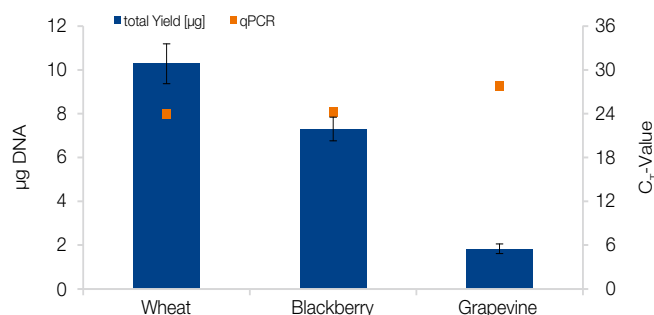


Application Data



DNA extraction from 20 mg of three different plant samples

DNA extraction was conducted from 20 mg leaf material of wheat (*Triticum aestivum*), blackberry (*Rubus armeniacus*) and grape wine (*Vitis vinifera*) using the NucleoMag® Plant kit on MultiEX 032 system. High DNA quality and integrity was visualized via gel electrophoresis (1% TAE-gel), revealing consistently high-molecular DNA. These results demonstrate the reliability and consistency of the NucleoMag® Plant kit and the MultiEX 032 system when performing high-quality DNA isolations from a variety of plant samples.



Photometric quantification and qPCR amplification of DNA from various plant types

DNA extraction from three different plant species using the NucleoMag® Plant kit on the MultiEX 032 system was quantified photometrically, showing the total DNA amount in µg as blue bars and also used in subsequent qPCR analysis, targeting a highly conserved photosynthetic relevant part of the chloroplast genome, conducted with the SensiFast™ probe Lo-ROX kit from BioLine on an Applied Biosystems® 7500 Real-Time PCR System. Results show a high amplification of DNA across all sample materials, represented by the C_T-values as orange squares, indicating a reliable and consistent qPCR performance (n=4 each).

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® Plant	Flexible magnetic bead based isolation of DNA from a multitude of plant samples, including buffers and magnetic beads. (Plastics are robot specific and need to be purchased separately)	96 preps 384 preps 2304 preps	744400.1 744400.4 744400.24
96-Deep-Well plates	96-Deep-Well plates for processing of NucleoMag® kits with magnetic rod systems, e.g. MultiEx 032	25 pieces	744955
MultiEX 032	Magnetic rod system for bead based automated nucleic acid purification	1 – 32 samples	*

NucleoMag® is a registered trademark of MACHERY NAGEL (contact: automation-bio@mn-net.com); Applied Biosystems® is a registered trademark of Applied Biosystems.

*For more detailed information, please reach out to your local distributor