MACHEREY-NAGEL

NucleoMag® Plant

Automated purification of genomic DNA from plant material on the automation platform KingFisher® Flex

TaKaRa
Available from and supported by Takara Bio USA, Inc.

Introduction

The efficient and rapid isolation of genomic DNA from a wide range of plant species and plant organs is an integral step in plant research or plant breeding laboratories. Applications such as TILLING (Targeting Induced Local Lesions IN Genomes), simple sequence repeat (SSR) or quantitative trait loci (QTL) mapping analyses demand a reliable high throughput genomic DNA extraction. One common issue during nucleic acid extraction from plant samples is the release of polyphenolic compounds and complex polysaccharides. By crosslinking with nucleic acids or disturbing DNA Polymerase activity, these compound based interferences have a strong impact on subsequent biomolecular applications. To circumvent these obstacles, MACHEREY-NAGEL designed the NucleoMag® Plant kit for the rapid and automated parallel purification of genomic DNA from plant material in a 96-well format. The obtained DNA of high quality can be used directly as template for qPCR, NGS, blotting, or any kind of enzymatic reactions. Our optimized protocol on the KingFisher® Flex automation platforms allows the processing of 96 samples within 22 minutes.

Product at a glance

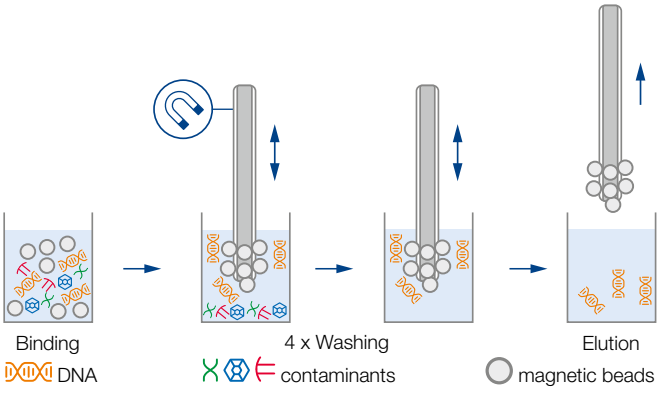
NucleoMag® Plant	
Technology	Magnetic bead technology
Sample material	20–50 mg plant tissue (wet weight)
Preparation time	Approx. 22 min on KingFisher® Flex for 96 samples (excl. lysis)
Typical yield	10–20 µg (50 mg plant tissue, wet weight); depending on plant material and species
Elution volume	50–200 µL
Binding capacity	0.4 µg/µL beads

King Fisher® Flex	
Sample volume	20–5000 µL
Elution volume	20–100 µL
Capacity	24 / 96 samples (8 plates per deck)
Heating / cooling	4–96 °C
Size / weight	60 x 38 x 68 cm / 28 kg

Material and methods

Samples from up to 50 mg homogenized plant material are lysed with Buffer MC1 (if samples contain large amounts of RNA, the addition of the included RNase A is recommended) for 30 min at 56 °C followed by a centrifugation in order to pellet cellular debris and insoluble plant fibers (Check the NucleoMag® Plant kit protocol for more detailed information). All subsequent steps are automated on the KingFisher® Flex platform.

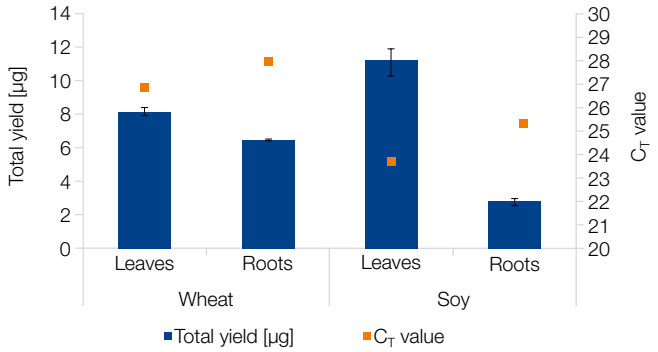
Subsequent DNA isolation is performed on the automation platform KingFisher® Flex. The isolation principle is based on reversible adsorption of nucleic acids to paramagnetic NucleoMag® C-Beads under appropriate buffer conditions.



Workflow on automation platform

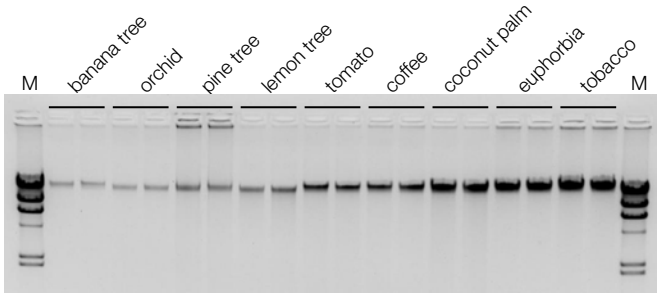
After DNA Binding and magnetic separation, the NucleoMag® C-Beads are washed to remove contaminants and salts using Wash Buffer MC3, MC4, and 80 % ethanol respectively. A final short wash step of magnetic beads with Wash Buffer MC5 removes ethanol from previous wash buffers. Highly pure genomic DNA is finally eluted under low ionic strength conditions in a slightly alkaline Elution Buffer MC6.

Application data



Isolation of genomic DNA from young leaves of different plant species

DNA was isolated from 20 mg fresh leaves or 40 mg fresh roots from different plant species using the NucleoMag® Plant kit on a KingFisher® Flex platform. The total yield was determined by UV spectrometry (dark blue bars). A subsequent qPCR analysis (orange squares) was performed with a Taqman® Probe for a 103 bp actin amplicon using the SensiFast™ Probe Lo-ROX kit from Bioline on an Applied Biosystems® 7500 Real-Time PCR System.



Integrity of genomic DNA from various plant species

DNA was isolated from 40 mg leaf material derived from different plant species using the NucleoMag® Plant kit on a KingFisher® Flex platform. The integrity was exemplarily analyzed by gel electrophoresis (15 µL per eluate; 1 % TAE gel; M: Lambda DNA/Hind III – Thermo Scientific).

Category	Plant Species
Agricultural plants	*Beta vulgaris (sugar beet), Brassica napus (rape), Capsicum spec., Citrus × limon (lemon tree), Coffea arabica, Cucumis sativus (cucumber), Dioscorea spec. (yam), Glycine max (soy), Helianthus annuus (sunflower), Lactuca sativa, Musa spec. (banana tree), Ocimum basilicum (basil), Sorghum spec., Theobroma cacao, Triticum aestivum (wheat), Vitis vinifera, Zea mays (maize)*
Conifers	*Abies nordmanniana, Chamaecyparis pisifera, Larix spec. (larch), Picea spec. (spruce), Pinus spec. (pine tree)*
Others	*Cocos nucifera (coconut palm), Dahlia spec., Eucalyptus spec., Euphorbia trigona, Ilex spec., Masdevallia bellavallia (orchid), Nicotiana tabacum, Peperomia quadrangularis, Prunus laurocerasus (cherry laurel), Schefflera nora, Scindapsus pictus, Yucca spec.*

Overview of successfully tested plant species

Different plant species successfully tested with the NucleoMag® Plant kit on a KingFisher® Flex platform.

Automate your genomic DNA extraction from plant samples

MACHEREY-NAGEL delivers a ready to go solution for your high throughput DNA extraction. We adapted the NucleoMag® Plant procedure on instruments of the KingFisher® series to speed up your nucleic acid purification workflow.

- Reliable performance and excellent yields from various different plant sample material
- Speed up your DNA extraction by processing of 96 samples in less than 30 minutes (excluding lysis)

Ordering information

Product	Specifications	Preps	REF
NucleoMag® Plant	Kit based on magnetic bead technology for the isolation of genomic DNA from plant samples including NucleoMag® C-Beads, Elution Plate U-bottom, buffers, RNase A	1 x 96 4 x 96 24 x 96	744400.1 744400.4 744400.24
KingFisher® Accessory Kit B*	Deep-well Plates, Deep-well Tip Combs, and Elution Plates for 4 x 96 NucleoMag® Plant preps using the KingFisher® Flex platform	4 x 96	744951

*For use on KingFisher® Flex, KingFisher® 96, MagMAX™ Express Magnetic Particle Processors