



NucleoMag[®] DNA Food

Automated genomic DNA isolation from food and feed samples on the Opentrons OT-2

Application benefits

The combination of the NucleoMag[®] DNA Food kit with the OT-2 has several advantages that streamline your genomic DNA extraction from food and feed samples:

- Verified method for fully automated nucleic acid purification workflow
- Reliable recovery and yields of genomic DNA
- Processing of up to 48 samples in parallel
- Protocols available in the Opentrons Protocol Library or via MACHEREY-NAGEL technical automation support: automation-bio@mn-net.com

Keywords

Food and feed samples, genomic DNA, GMOs, authenticity and origin analysis, hygiene monitoring, magnetic beads, Opentrons OT-2



A verified method for DNA isolation from food and feed

Food and feed analysis laboratories rely on molecular biology methods for the detection of pathogens or genetically modified organisms (GMOs), authenticity and origin analysis (food fraud), or for hygiene monitoring.

In general, the nature and composition of different foods is very heterogeneous. Depending on the food or feed sample to be analyzed, the content of lipids, polysaccharides, proteins, secondary metabolites, but also the content of DNA and possible PCR inhibitors can be very different. The MACHEREY-NAGEL NucleoMag[®] DNA Food kit is ideal for reliable isolation of DNA from complex matrices such as processed food or feed samples due to its optimized buffer chemistry, reliable recovery of degraded or low concentration DNA and excellent inhibitor removal.

In this Application Note we demonstrate automated genomic DNA isolation from food and feed samples using the NucleoMag[®] DNA Food kit on the Opentrons OT-2 equipped with the Opentrons Magnetic Module, with the Single-Channel P1000 and with the 8-Channel P300 pipettes.

An optimized protocol using the Opentrons OT-2 with the NucleoMag[®] DNA Food kit can be downloaded directly from the Opentrons Protocol Library.

NucleoMag [®] DNA Food	
Technology	Magnetic beads
Application	genomic DNA isolation from food and feed samples
Sample amount	< 200 mg
Fragment size	~300 bp – approx. 50 kbp Max.
Sample number on OT-2	48 samples

Material and Methods

The isolation procedure of the NucleoMag DNA Food kit is based on reversible adsorption of nucleic acids to paramagnetic NucleoMag[®] B-beads under appropriate binding conditions. Up to 200 mg food or feed samples were lysed with buffer CF and liquid Proteinase K for 30 minutes at 65°C (lysis conditions must be adapted depending on sample material). After lysate clarification via centrifugation, reversible binding of nucleic acids to paramagnetic beads in cleared lysates was enabled by adjustment with Binding Buffer CB. Subsequent to the magnetic separation, the NucleoMag B-Beads were washed to remove contaminants and salts using wash buffers CMW, CQW and 80% ethanol. After air drying, highly pure nucleic acids were eluted in 100 µL low-salt elution buffer CE.

All liquid handling pipetting steps and magnetic bead separations are carried out by the OT-2 and Opentrons Magnetic Module.



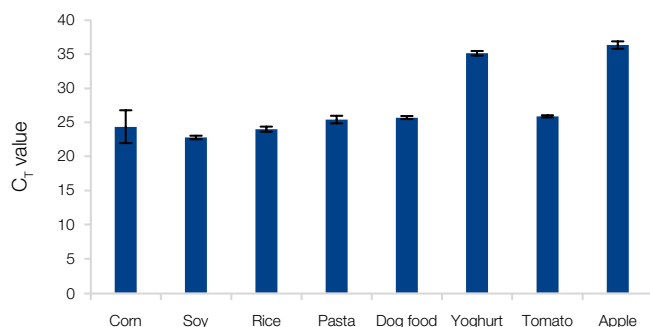
Opentrons OT-2

Technology	Automated liquid handling platform equipped with electronic pipettes and Magnetic Module (further modules are available for different applications).
Sample numbers	1 – 96 samples
Deck positions	Configurable platform with 11 deck slots
Pipetting volume	20 – 300 µL (P300 8-Channel Pipette) 100 – 1000 µL (P1000 Single-Channel Pipette) (Further Single-Channel and 8-Channel pipettes with different ranges are available for other applications)

Figure 1:

The Opentrons OT-2 is equipped with the Opentrons Magnetic Module and Opentrons GEN2 Pipettes genomic DNA purification. The Magnetic Module uses high-strength magnetic bars that can be engaged to magnetize magnetic beads, and disengaged to allow magnetic beads to remain in solution.

Application data



Reliable qPCR performance of purified DNA from diverse food samples

DNA isolated from different sample matrices (corn, soy, rice, orzo pasta, dog food, yoghurt, tomato, apple; n=3 for each sample type) was used as input for a subsequent qPCR targeting a 103 bp actin amplicon. The qPCR was conducted using the SensiFast™ Probe Lo-ROX kit from BioLine on an Applied Biosystems® 7500 Real-Time PCR System. The target was successfully amplified from all eluates tested.

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® DNA Food	Magnetic bead-based kit for the isolation of genomic DNA from food and feed samples; including NucleoMag® B-Beads, buffers, and liquidProteinase K	1 × 96 preps	744945.1
		4 × 96 preps	744945.4
OT-2 pipetting robot	Automated liquid handling platform with Magnetic Module and electronic pipettes	OT-2 Pipetting Robot	999-00111 *
		Single-Channel P1000 Pipette	999-00004 *
		8-Channel P300 Pipette	999-00006 *
		Magnetic Module	999-00098 *

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