MACHEREY-NAGEL

NucleoMag® DNA Food

Automated purification of genomic DNA from food samples on the HAMILTON NIMBUS® Presto workstation

Introduction

DNA from food and feed is used in numerous research and applied testing workflows. Typical applications range from genetic analysis (e.g. species identification), detection of foodborne pathogens, identification of contaminants and GMO-testing.

Two of the major challenges in DNA isolation from food and feed samples are their heterogeneity and presence of PCR inhibitors. Food samples can be of plant or animal origin, liquid or solid, hard or soft, processed or raw. Furthermore, processed and complex food matrices often exhibit a very low and degraded DNA content and high amounts of polysaccharides, lipids and secondary metabolites, many of which negatively impact downstream DNA amplification.

The MACHEREY-NAGEL NucleoMag DNA Food kit contains specialized buffers for sample lysis and removal of inhibitory substances, enabling the efficient purification of highly pure DNA.

The HAMILTON NIMBUS Presto workstation combines the utility of automated liquid handling with the high-speed processing of the KingFisher Presto unit.

Your advantages at a glance

- Proven NucleoMag® lysis and purification procedure suitable for various food samples
- Automated plate prefilling and plate handling by the Hamilton NIMBUS liquid handling system
- High speed nucleic acid purification by the integrated KingFisher™ Presto instrument
- Continue with downstream application without manual intervention

NucleoMag® DNA Food	
Technology	Magnetic beads
Sample material	≤ 200 mg food or feed
Elution volume	50 – 200 µL
Typical DNA yield	depending on sample type and quality
Preparation time	Approx. 70 min (excl. lysis) / 96 samples

The NIMBUS Presto workstation combines liquid handling and magnetic rod processing for fully automated, high throughput nucleic acid extractions.

NIMBUS Presto Workstation	
Technology	Automated liquid handling platform (Hamilton NIMBUS) with integrated magnetic rod processing unit (KingFisher™ Presto)
Capacity	1–96 samples (≤ 200 µL sample volume)
Processable volume	50 – 5000 µL
Footprint	L 1359 mm | W 709 mm | H 889 mm

Material and Methods

Samples from up to 200 mg food or feed are lysed with Buffer CF and Liquid Proteinase K for 30 minutes at 65 °C. Lysis conditions can be adapted depending on sample type and local regulations (e.g. for GMO-testing; see NucleoMag® DNA Food kit manual for more detailed information). Cleared lysates can be supplied either in tubes or in a 96-deep-well plate. The DNA isolation is carried out by the KingFisher Presto unit, which is integrated in the NIMBUS system. The isolation principle is based on reversible adsorption of nucleic acids to paramagnetic beads under appropriate buffer conditions. Pure DNA is eluted in low ionic strength elution buffer.

In this application note we demonstrate the automated purification workflow exemplarily for five different sample materials: rice, wheat, pasta, maize, peanut. By using sample materials that are either highly processed and/or rich in polysaccharides/lipids we demonstrate the versatility of the NucleoMag® DNA Food kit.
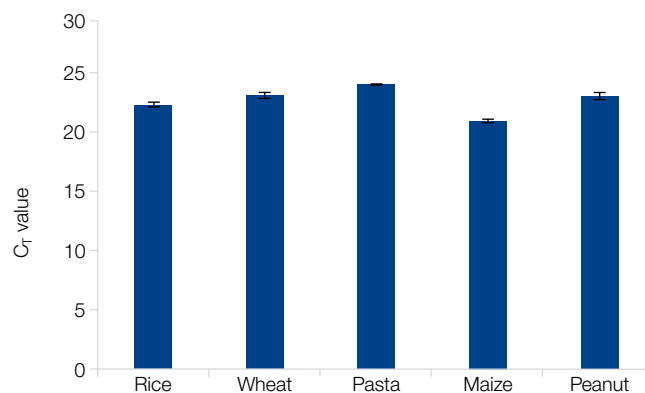
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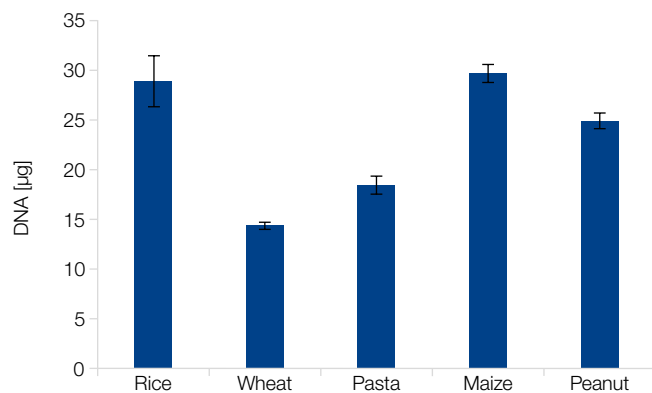
Reliable DNA isolation from diverse food and feed samples

DNA was isolated from five different sample matrices (n=8 for each sample type), among them samples rich in polysaccharides and fats as well as highly processed materials. DNA was quantified photometrically. The isolation yielded high amounts of DNA from all samples materials tested (>10 µg DNA for all samples).
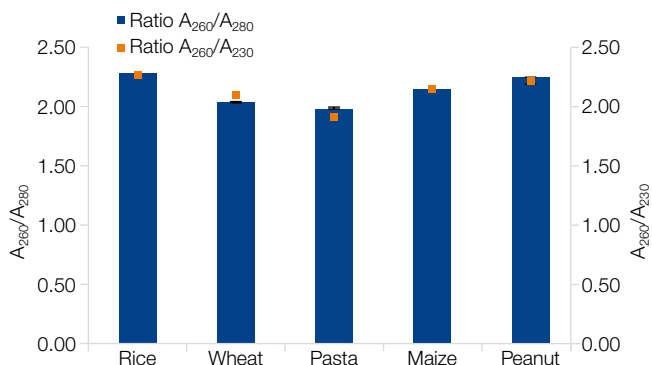
Highly pure DNA from diverse food and feed samples

DNA was isolated from five different sample matrices (n=8 for each sample type), among them samples rich in polysaccharides and fats as well as highly processed materials. DNA purity was determined photometrically by measuring the OD ratios at 260/280 nm and 260/230 nm. All eluates exhibit values of >1.8 both for the 260/280 nm and 260/230 nm value.

Reliable qPCR performance from diverse food and feed samples

DNA isolated from five different sample matrices (n=8 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.

A rapid, fully automated solution DNA purification from food and feed samples

MACHEREY-NAGEL and Hamilton deliver a tailored solution for your high throughput genomic DNA extraction needs from various food and feed sample materials. We adapted the NucleoMag® DNA Food procedure on the NIMBUS Presto workstation to meet the expectations of agricultural research and applied testing laboratories.

Here, we demonstrate the successful use of the NucleoMag® DNA Food kit for isolation and downstream qPCR assays. The powerful combination of the NucleoMag® technology and the NIMBUS Presto workstation has several advantages over standard nucleic acid purification procedures:

- Save hands-on time by using automated plate-prefilling and plate-handling performed by the NIMBUS workstation
- Benefit from the high-speed extraction procedure of the integrated KingFisher™ Presto unit
- Efficient DNA isolation even from highly processed sample matrices
- Reliable performance in downstream applications

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, Liquid Proteinase K	1 x 96 preps 4 x 96 preps	744200.1 744200.4
NIMBUS Presto	Automated liquid handling platform with 4 pipetting channels, a CO-RE gripper, barcode scanner and many additional features		Hamilton*

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