

# NucleoMag<sup>®</sup> DNA Food

Automated purification of genomic DNA from food and feed samples on the KingFisher<sup>®</sup> Flex platform



## Introduction

Food safety concerns become more relevant in times of prominent food scandals. Especially rapid detection of food-borne pathogens via molecular detection methods have major advantages compared to (time consuming) classical culture based methods. The isolation of genomic DNA from food and feed samples is widely performed with the purpose of species identification, GMO testing, or detection of foodborne pathogens.

One common issue during DNA isolation from food and feed samples, is the vast diversity in terms of consistency and composition. Food samples are very heterogeneous and contain many different components, like lipids, polysaccharides and high content of proteins, which are released during DNA extraction. In subsequent biomolecular applications these compound related interferences have a strong impact by, e.g., interaction with nucleic acids or disturbing DNA polymerase activity. Furthermore, processed and complex food matrices often exhibit a very low and degraded DNA content.

To circumvent these diverse sample matrix based obstacles, MACHEREY-NAGEL developed the NucleoMag<sup>®</sup> DNA Food kit, allowing rapid and reliable purification of genomic DNA from food and feed samples in a 96-well format. Two different protocols were designed for the KingFisher<sup>®</sup> Flex platform to cover the broad range of diverse food and feed sources. The standard protocol was designed for complex materials enabling the processing of 96 samples within 40 minutes. The fast protocol is suitable for less complex samples containing lower amounts of fibers or polysaccharides (e.g., raw meat) and enables the processing of 96 samples within 20 minutes on a King Fisher<sup>®</sup> Flex automation platform.

## Product at a glance

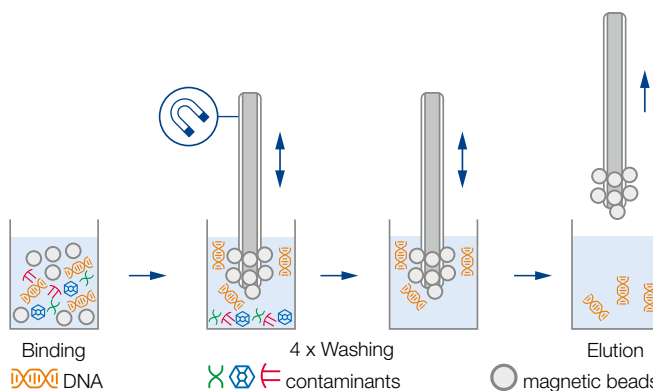
NucleoMag <sup>®</sup> DNA Food	
Technology	Magnetic bead technology
Sample material	≤ 200 mg food or feed
Preparation time	Approx. 20 or 40 min on KingFisher <sup>®</sup> Flex for 96 samples depending on protocol (excl. sample preparation/lysis)
Typical yield	0.1–10 µg depending on sample quality
Elution volume	50–200 µL
Binding capacity	0.4 µg/µL beads

King Fisher <sup>®</sup> Flex	
Sample volume	20–5000 µL
Capacity	24 / 96 samples (8 plates per deck)
Heating / cooling	4–96 °C
Size / weight	60 x 38 x 68 cm / 28 kg
Special features	Included NucleoMag <sup>®</sup> protocols** Individual and easy programming for your needs

\*\* Instruments distributed by MACHEREY-NAGEL including NucleoMag<sup>®</sup> protocols exclusively in Germany (D) Austria (A) Switzerland (CH).

## Material and methods

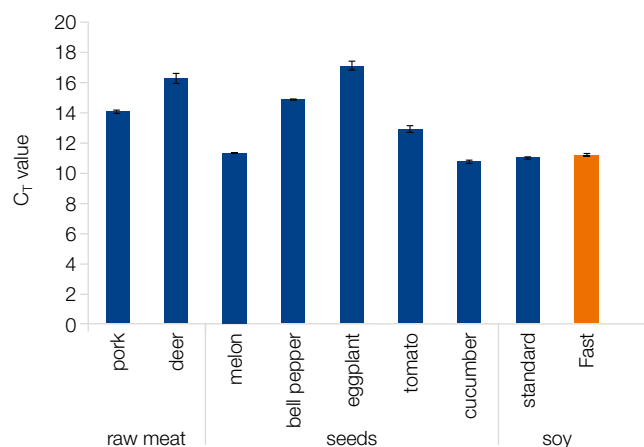
Samples from up to 200 mg food or feed are lysed with Buffer CF and Liquid Proteinase K for 30 minutes at 65 °C. Depending on the sample type lysis conditions, like buffer volume and incubation time might change (please see the NucleoMag<sup>®</sup> DNA Food kit manual for more detailed information). After centrifugation the cleared lysate is transferred to a Square-well Block for further processing. Subsequent DNA isolation is performed on the automation platform KingFisher<sup>®</sup> Flex. The isolation principle is based on reversible adsorption of nucleic acids to paramagnetic beads under appropriate buffer conditions.



### Workflow on automation platform

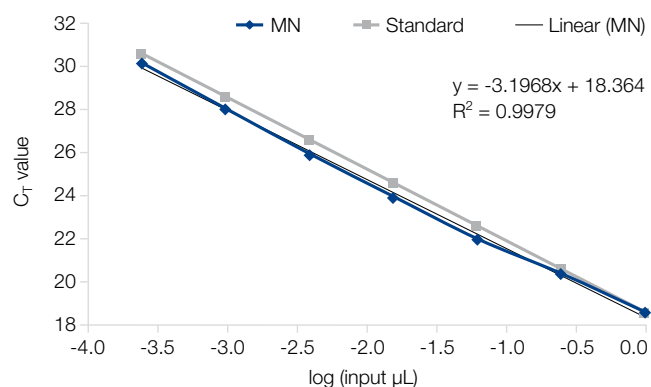
Binding of DNA to the NucleoMag<sup>®</sup> B-Beads is achieved by the addition of Binding Buffer CB. Subsequent to the magnetic separation, the NucleoMag<sup>®</sup> B-Beads are washed to remove contaminants and salts using Wash Buffer CMW, CQW, and 80 % ethanol respectively. After air drying the NucleoMag<sup>®</sup> B-Beads for 10–15 min at room temperature the highly pure genomic DNA is finally eluted under low ionic strength conditions in the slightly alkaline Elution Buffer CE.

## Application data



### Extraction of DNA from various food and feed samples using different automation protocols

DNA was isolated from different food and feed samples including raw meat, seeds, or shredded soybeans (dark blue bars) using the NucleoMag<sup>®</sup> DNA Food kit on a KingFisher<sup>®</sup> Flex platform with the standard protocol. The performance of the fast protocol was compared to the equivalent standard protocol for soy material (orange bar). A subsequent qPCR analysis was performed for a 130 bp 18s rRNA amplicon using the Maxima SYBR<sup>®</sup> Green kit from Thermo Scientific on an Applied Biosystems<sup>®</sup> 7500 Real-Time PCR System.



### qPCR performance analysis of purified nucleic acids from milk chocolate

DNA was isolated from 200 mg of grinded milk chocolate using the NucleoMag<sup>®</sup> DNA Food kit on a KingFisher<sup>®</sup> Flex platform and subjected to a subsequent qPCR analysis using different amounts of eluate (e.g., 1:4 serial dilution). The qPCR was performed for a 130 bp 18s rRNA amplicon using the Maxima SYBR<sup>®</sup> Green kit from Thermo Scientific on an Applied Biosystems<sup>®</sup> 7500 Real-Time PCR System. The logarithms of the calculated eluate input volumes were plotted against the CT values (blue) in comparison to a theoretical standard curve (grey) and the regression curve (black). The slope of the regression curve (-3.1968) and the calculated qPCR-efficiency (approx. 105 %) show an excellent qPCR-performance without PCR inhibition.

## Ordering informations

Product	Specifications	Preps	REF
NucleoMag <sup>®</sup> DNA Food	Kit based on magnetic bead technology for the isolation of genomic DNA from food and feed samples including NucleoMag <sup>®</sup> B-Beads, buffers, Liquid Proteinase K	1 x 96	744945.1
		4 x 96	744945.4
KingFisher <sup>®</sup> Accessory Kit A*	KingFisher <sup>®</sup> Deep-well Block, Deep-well Tip Combs, Elution Plates, for 4 x 96 preps of NucleoMag <sup>®</sup> Tissue using KingFisher <sup>®</sup> Flex platform	4 x 96	744950
KingFisher <sup>®</sup> Flex**	Instrument** for magnetic bead based nucleic acid extraction in 96-well and 24-well plate format pre-programmed with NucleoMag <sup>®</sup> protocols	8 x 12	744952

\* For use on KingFisher<sup>®</sup> Flex, KingFisher<sup>®</sup> 96, MagMAX<sup>™</sup> Express Magnetic Particle Processors

\*\* Instruments distributed by MACHEREY-NAGEL including NucleoMag<sup>®</sup> protocols exclusively in Germany (D) Austria (A) Switzerland (CH).

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Category	Tested sample material
Raw, vegetable origin	Carrot, potato, soy, maize, rapeseed, linseed, oat, rice, wheat, sunflower seed, grape, seeds (tomato, cucumber, eggplant, melon, bell pepper), animal food
Raw, animal origin	Deer, pork
Processed, animal origin	Milk, cheese, honey, salami, meat sausage, liver sausage
Processed, vegetable origin	Agave nectar, oatmeal
Complex processed, vegetable origin	Vegetable broth, crisps, pastry, coca, fried onions, tea, spices, tofu, juice, cereal bar, bread
Complex processed, animal origin	Tiramisu, fruit gum, licorice, chocolate, Nutella, noodles, baby food, oil, dripping

### Overview of successfully tested food and feed materials

The table shows sample materials successfully processed using NucleoMag<sup>®</sup> DNA Food. Presence of DNA was either tested by qPCR or via agarose gel electrophoresis.

## Automate your genomic DNA extraction from food and feed samples

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

- Reliable performance and excellent DNA yields for ,e.g., species identification and GMO detection
- Speed up your DNA extraction by processing of 96 samples in less than 20 minutes (excluding lysis)
- Purchase the ultrafast KingFisher<sup>®</sup> Flex platform and optimized MACHEREY-NAGEL extraction kits from one single source (one stop shopping\*\*)