MagSi-DNA 3.0 Art.No.: MD0X022
MagSi-DNA 3.0 COOH Art.No.: MD0X024
Product Description

I. Intended Use

MagSi-DNA 3.0 beads are ideal for purification or isolation of nucleic acids from various sources. The magnetic particles are intended as a solid phase extraction tool for custom buffer systems based on chaotropic as well non-chaotropic binding principles, and can be used for developing your own nucleic acid isolation and extraction methods, such as:

- Isolation of genomic, mitochondrial, or viral DNA from whole blood, cell lysates, human, animal, or plant tissue; isolation of RNA
- Isolation of genomic, plasmid, or phage DNA from bacterial cultures and bacteria from clinical samples (blood, stool, swabs, etc.)
- Clean-up of DNA from enzymatic reactions (restriction digestions, ligations) or chromatin immunoprecipitation (ChIP) procedures to remove excess primers, nucleotides, enzymes, salts, buffers and other substances that are unwanted in downstream applications

MagSi-DNA 3.0 beads are magnetic silica beads with a nano-porous surface optimal for nucleic acid binding. Due to the superparamagnetic properties and size (3.0 µm), the beads sediment slowly and typically collect within 1-2 minutes in a magnetic field. This makes them applicable for both manual and automated/robotic DNA isolation.

II. Principle

MagSi-DNA 3.0 reversibly binds DNA and other nucleic acids under sample- and buffer-specific conditions. A solution containing DNA (e.g. lysate) is combined with the beads and an application-specific binding buffer. After incubation, nucleic acids are bound to the silica surface. By applying a suitable magnet to the container (tube/deepwell microplate) the bead pellet is separated from the sample mixture. Unwanted components are further removed by washing steps in a selection of buffers (alcohol/water solutions). Finally, nucleic acids are released in DNase/RNase-free water or buffer solution (e.g. Tris, Tris-EDTA, pH~8).

Silica and carboxylated (COOH) surfaces, but also nucleic acids, are negatively charged at neutral or basic pH, while both are also hydrated. For a chaotropic binding mechanism of DNA to particles, dehydration is needed. This can be achieved by for instance alcohol, and by agents such as guanidinium salts. Negative charges on the bead surface and the nucleic acid backbones are bridged by divalent cations. This can be reversed by a water solution.

For washing, mostly alcohol/water mixtures are used, which will keep the DNA in dehydrated form and bound to the beads. To reduce premature elution of DNA, salts can be added to the washing solution. Elution takes place in a low-salt conditions.

Non-chaotropic systems may use binding mechanisms with specific pH conditions, or binding by polyethylene glycol precipitation.

Silica & Carboxylated MagSi-DNA 3.0 beads

Optimal binding conditions differ for beads with silica or with carboxylated surfaces. In Table 1 below, some of the practical differences between the 2 types of beads are shown. (To develop a new application it is recommended to try both types in parallel! Contact MagnaMedics for a test sample)

Table 1: Differences between silica (**MagSi-DNA 3.0**) and carboxylated (**MagSi-DNA 3.0 COOH**) beads

Type of beads	*Silica* MagSi-DNA 3.0	*Carboxylated* MagSi-DNA 3.0 COOH
Compatible buffer systems	Chaotropic buffers	PEG-based, low pH or chaotropic buffers
Binding mechanism	Precipitation with chaotropic salts	Precipitation by polymers like PEG, divalent cations (e.g. Mg^{2+}) or chaotropic salts
Elution	Low salt conditions	low salt conditions or pH shift from acidic binding to alkaline conditions

III. Material Supplied

- 2, 10, or 100 mL **MagSi-DNA 3.0** or **MagSi-DNA 3.0 COOH** (supplied at 20 mg/mL, in sterile water)

Additional materials needed

Depending on the application, reagents, equipment and consumables are needed:

- A specific set of lysis, binding, washing and elution buffers for the intended application
- Magnetic Separator for collection of the beads (see Order Information on the next page)
- Mixer/vortexer for homogenization of the beads and sample mixture.
- Optionally, a suspension buffer for preparation of the beads
- Container tubes or deep-well microplates and pipette tips

IV. Product Usage

This product is stable for at least 1 year after purchasing date when stored at 2-8°C. Store beads in well closed vial and in upright position to prevent drying of the beads since this makes them more difficult to re suspend. Do not freeze the product! Vortex bead suspension well before use.

MagSi-DNA 3.0 (COOH) beads are suspended in sterile water. The beads can be further pre-washed to avoid any impact in downstream applications. The suspension media can be replaced with your own buffer/storage media. The beads are compatible with typical organic solvents like ethanol or isopropanol. However, chemicals with strong redox-potential should be avoided.

The beads are stable in a pH range from 3 to 11 and at temperatures up to 95 degrees. After extensive incubations in these conditions, no degradation is detectable using spectrophotometric assays. Nevertheless, if you expect any interference in downstream applications, it is recommended to rinse the beads before use.

MagSi-DNA 3.0 Art.No.: MD0X022
MagSi-DNA 3.0 COOH Art.No.: MD0X024
Product Description

When separation speed is crucial and sufficient homogenization tools are available, MagSi-DNA may be more suitable due to its short separation time (±10 seconds, but also sedimenting fast!).

IV. Protocols

The protocols below are intended as a guideline to develop a customized protocol and application.

A. Sample Preparation

Lyse your cell, tissue, or bacterial sample via:

- Using a surfactant like Tween 20/SDS/Triton X-100.
  Lysis efficiency may be improved by heating the sample mixture.
- mechanical disruption (sonication/French press)
- Enzymatic (lysozyme) methods

B. Binding

- Add the binding buffer of choice to the lysate and mix well to get a homogeneous suspension.
- Add beads. Mix beads by vortexing before adding them to the sample. Depending on the expected amount of DNA the volume of beads can be varied. A good starting point is 20 µL when having 400-800 µL of cell lysate.
- Mix sample and incubate 2–10 minutes to allow the DNA to bind to the bead surface.

C. Washing

- Following incubation, place the sample tube in a magnetic separator.
- Wait until all the beads have been collected to the magnet. Discard the supernatant using a pipette, then remove the tube from the separator.
- Add wash buffer, vortex 10 seconds and place the sample tube in a magnetic separator in order to collect the beads and discard the supernatant.
- Wash the beads at least twice.

D. Elution

The Elution buffer consists of a nuclease-free, non-alcohol solution (TE-buffer) to rehydrate the DNA so it will elute from the bead. Concentrated TE-buffer can be added to the pure sample to improve storage properties.

- Elute DNA by adding 50-200 µL elution buffer. Incubate 2–10 minutes at room temperature and mix several times.
- Collect beads with a magnetic separator and transfer the supernatant, containing the DNA, into a new tube.
- If eluate appears brown, repeat collection of the beads.
- Elution can be improved by repeating these steps or by incubating at 60°C during elution.

VI. Technical Data

Table 2:

Technical data for MagSi-DNA 3.0 and MagSi-DNA 3.0 COOH

Product Name	MagSi-DNA 3.0 (COOH)
Size	3.0 µm
Concentration	20 mg/mL
Magnetic content	60%
Surface Area	0.8 m^2/g beads
Material	Magnetic silica beads optimized for nucleic acid isolation.
Solution additives	Sterile water
Storage	2-8°C

VII. Additional Information

Disclaimer

For R&D use only. Not for drug, household or other uses. Material Safety Data Sheet (MSDS) is available

Order Information

Product	Volume	Art. No.
MagSi-DNA 3.0	2 mL	MD01022
MagSi-DNA 3.0	10 mL	MD03022
MagSi-DNA 3.0	100 mL	MD04022

Product	Volume	Art. No.
MagSi-DNA 3.0 COOH	2 mL	MD01024
MagSi-DNA 3.0 COOH	10 mL	MD03024
MagSi-DNA 3.0 COOH	100 mL	MD04024

Related Products

Product	Art. No.
MM-Separator M12 + 12	MD90001
MM-Separator M96	MD90002
MM-Separator 96 SBS	MD90005
MM-Separator 384 SBS	MD90006

AMSBIO | www.amsbio.com | info@amsbio.com

UK & Rest of the World
184 Park Drive, Milton Park
Abingdon, UK
T: +44 (0)1235 828 200
F: +44 (0) 1235 820 482

North America
1035 Cambridge Street,
Cambridge, MA 02141
T: +1 (617) 945-5033 or
T: +1 (800) 987-0985
F: +1 (617) 945-8218

Germany
Bockenheimer Landstr. 17/19
60325 Frankfurt/Main
T: +49 (0) 69 779099
F: +49 (0) 69 13376880

Switzerland
Centro Nord-Sud 2E
CH-6934 Bioggio-Lugano
T: +41(0) 91 604 55 22
F: +41(0) 91 605 17 85