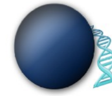
MagSi-DNA trial kit Art.No.: MD06028

Product Description



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I. Intended Use

MagSi-DNA beads are ideal for purification or isolation of nucleic acids from various sources. The magnetic nanoparticles 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

II. Principle

MagSi-DNA 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.

III. Description of materials

The MagSi-DNA trial kit contains 8 x 2 mL of each MagSi-DNA product as described in Table 1 below. All MagSi-DNA beads are supplied as a suspension in sterile water with 0.05% sodium azide. MagSi-DNA mf and MagSi-DNA mf COOH are supplied in storage buffer which is especially developed to keep the magnetic particles in a prolonged suspension time; containing 0.05% sodium azide

Table 1: Beads supplied in MagSi-DNA trial kit

Product	Art.No.	Size	Surface activation	Magnetic content
MagSi-DNA mf	MD020001	~300 nm	Silica	95%
MagSi-DNA mf COOH	MD020004	~300 nm	Carboxylated	95%
MagSi-DNA 600	MD01016	600 nm	Silica	40%
MagSi-DNA 600 COOH	MD01021	600 nm	Carboxylated	40%
MagSi-DNA allround	MD01018	1.2 µm	Silica	60%
MagSi-DNA allround COOH	MD01020	1.2 µm	Carboxylated	60%
MagSi-DNA 3.0	MD01022	3.0 µm	Silica	60%
MagSi-DNA 3.0 COOH	MD01024	3.0 µm	Carboxylated	60%

Bead size

Four bead sizes are included in our kit: 300 nm, 600 nm, 1.2 µm and 3.0 µm. MagSi-DNA mf are ferromagnetic and will separate within seconds and may require mixing during incubation steps. MagSi-DNA 600, MagSi-DNA allround and MagSi-DNA 3.0 beads are superparamagnetic and separate within 1-5 minutes (depending on protocol and magnetic separator), and have longer suspension time (the smaller the particle size, the longer the time in suspension).

Silica & Carboxylated MagSi-DNA beads

Optimal binding conditions differ for beads with silica or with carboxylated surfaces. In Table 2 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!)

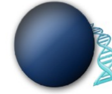
Table 2: Differences between plain silica and carboxylated beads

Type of beads	*Silica* MagSi-DNA	*Carboxylated* MagSi-DNA 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

IV. Product Usage

When stored at 2-8°C, this product is stable for up to 2 years, but no longer than the expiry date on the label. 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.

The components of the MagSi-DNA trial kit are suspended in sterile water with sodium azide. 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.



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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.

V. 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 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. Bulk quantities

magtivio offers all products in bulk quantities up to several litres with the same (or customized) bead specifications as outlined for the products in this kit.

VII. Additional Information

Disclaimer

For Research Use Only (RUO). Not for drug, household or other uses. Safety Data Sheet (SDS) is available at www.magtivio.com.

VIII. Order information

Product	Volume	Art. No.
MagSi-DNA mf	2 ml	MD0200010002
MagSi-DNA mf	10 ml	MD0200010010
MagSi-DNA mf	100 ml	MD0200010100
MagSi-DNA mf COOH	2 ml	MD0200040002
MagSi-DNA mf COOH	10 ml	MD0200040010
MagSi-DNA mf COOH	100 ml	MD0200040100
MagSi-DNA 600	2 mL	MD01016
MagSi-DNA 600	10 mL	MD02016
MagSi-DNA 600	100 mL	MD03016
MagSi-DNA 600 COOH	2 mL	MD01021
MagSi-DNA 600 COOH	10 mL	MD02021
MagSi-DNA 600 COOH	100 mL	MD03021
MagSi-DNA allround	2 mL	MD01018
MagSi-DNA allround	10 mL	MD02018
MagSi-DNA allround	100 mL	MD03018
MagSi-DNA allround COOH	2 mL	MD01020
MagSi-DNA allround COOH	10 mL	MD02020
MagSi-DNA allround COOH	100 mL	MD03020
MagSi-DNA 3.0	2 mL	MD01022
MagSi-DNA 3.0	10 mL	MD03022
MagSi-DNA 3.0	100 mL	MD04022
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 PCR	MDMG0005
MM-Separator 384 PCR	MDMG0006
MM-Separator 96 DeepWell	MDMG0013

magtivio B.V.

Office, Lab & Production

Daelderweg 9

6361 HK Nuth (The Netherlands)

Tel: +31-(0)45-208 4810

Fax: +31-(0)45-208 4817

E-mail: info@magtivio.com