MagSi-Tools 600, 1.0, 3.0
Product Description

magtivio

I. Intended Use

MagSi-Tools are surface activated magnetic particles are intended for covalent immobilization of proteins (e.g. antibodies, enzymes), peptides, nucleic acids or other molecules of interest. Different surface modifications and bead sizes allow for choosing the optimal product for the right molecule to be coupled, and for the intended application. Please take into consideration which groups are available on the ligand for coupling, and try to prevent inactivation or hiding the active or exposed site of the ligand.

After coupling the molecule of interest (ligand) is coupled to the magnetic particles, the resulting beads can be used in downstream applications such as:

- Isolating specific target proteins, antibodies, nucleic acids, cells, viruses, etc. (preparative applications)
- Detecting specific target proteins, nucleic acids, cells, viruses, etc. (diagnostic applications)
- Immobilizing enzymes, thereby enhancing stability and minimizing auto-catalysis. Magnetic collection of the particle/enzyme complex allows to remove the enzyme from the reaction, and to reuse it.

II. Principle

Magnetic beads are an ideal tool for immobilizing molecules (proteins, enzymes, antibodies, peptides, nucleic acids, etc.) on a solid phase, to be used for e.g. detecting, enriching, or cleaving specific target molecules. The easy and efficient collection of beads in magnetic fields allows for easy rinsing and removal of excess reagents and ligand after coupling the ligand molecule, as well as easy use in downstream applications. The use of magnetic beads does not require columns or centrifugation steps, and are therefore ideal in high-throughput and automated applications.

III. Material Supplied

- 2, 10 or 100 mL MagSi-Tools 600, 1.0 or 3.0 (supplied at 10 mg/mL).

Additional materials needed

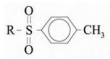
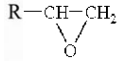
- Buffers and Materials (depending on the application, contact for support)
- Magnetic separator for bead separation/collecting (see ordering information)
- Mixer/vortex to homogenize samples and resuspend beads (depending on application, contact support)

Selection of your MagSi-Tools product

Surface activations

MagSi-Tools are available with different surface activations to best suit your needs (Table 1).

Table 1: Active surfaces and example applications of MagSi-tools

Surface activation	Formula	Example Applications
Silica (stored in 0.05% sodium azide)	Si-OH	- End-users' own application (e.g. functionalization of the MagSi beads)
Carboxyl (stored in PBS, 0.05% sodium azide)	R-COOH	- Protein and peptide immobilization - Antibody immobilization
Aldehyde (stored in PBS, 0.05% sodium azide)	R-CHO*	- Protein immobilization
Amine (stored in 0.05% sodium azide)	R-NH_2	- Protein immobilization
Sulfydryl (stored in PBS, 0.05% sodium azide)	R-SH*	- Immobilization via target cysteine groups, coupling to gold surfaces
Tosyl (stored in DSMO:THF 1:1)		- Antibody immobilization - Protein and peptide immobilization
Hydrazide (stored in PBS, 0.05% sodium azide)	R-CO-N_2H_2	- Glycoprotein immobilization - Protein and peptide immobilization
Epoxy (stored in DSMO:THF 1:1)		- Enzyme immobilization - Protein and peptide immobilization

Bead size

MagSi-Tools magnetic beads come in three sizes, 600 nm, 1 µm and 3 µm. Beads of 600 nm have a larger surface area, and the sedimentation time of 600 nm MagSi beads is approximately 4 times slower than that of 1.0 µm beads. This allows longer incubation times without shaking/mixing, and may be important in automated and other high-throughput applications in which shaking/mixing options are often lacking. MagSi beads with a diameter of 3 µm have stronger magnetic properties and will separate approximately 4x faster than 600 nm beads under same conditions; approximate separation time is ≤1 minute using a suitable magnet.

IV. Product Use

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 (except MagSi-S CHO and MagSi-S SH beads: limited stability, expiry 2 months after manufacturing). 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. If you expect iron interference in downstream applications, we strongly advise you to rinse the beads before usage.

MagSi-Tools are suspended in PBS buffer or water with 0.05% sodium azide (toxic) added as a preservative, or in a 1:1 mixture of DMSO and THF. MSDS of our products can be found at our site (www.magtivio.com). Before using the beads it is important to rinse with water or PBS to remove any components that could interfere with your test.

* coupling of other organic molecules, such as nucleic acids or carbohydrates, is also possible. CHO- and SH-beads have a limited stability.

V. Protocols for ligand immobilization

Table 2: Coupling chemistries and conditions for different MagSi-Tools

Bead Surface	Chemicals needed	Protein binding	Treatment	Comments
Carboxyl [1] (COOH)	EDC/NHS	Amine groups (from lysine and/or as unblocked N-termini) Lysine, histidine, cysteine, tyrosine etc.	No treatment needed	Can be used to couple most proteins
Aldehyde (CHO)	Aldehyde/ Amine reaction	Amine groups	No treatment needed	Add reducing agent to stabilize amide bond
Thiol (SH)	Redox reaction [3]	Free cysteine	Reduce disulphides under non-denaturing conditions to generate free cysteine.	Useful for proteins containing cysteines. Risk of multiple coupling
Amine [2] (NH2)	Gluteral-dehyde	Amine/ aldehyde	No treatment needed	Add reducing agent to stabilize amide bond
Tosyl	None	Sulfhydryl, Amine groups	No treatment needed	Useful for antibodies
Hydrazide	Sodium periodate	Oligosacharide moieties	Oxidize glycoprotein under non-denaturing conditions.	Useful for glycoproteins
Epoxy	Adsorption/ reaction support	Lysine, histidine, cysteine, tyrosine etc.	No treatment needed	Useful for enzymes

[1] The first step is to activate the functional groups with N-hydroxysuccinimide in order of creating a highly reactive succinimide ester which reacts with amine groups contained in protein.

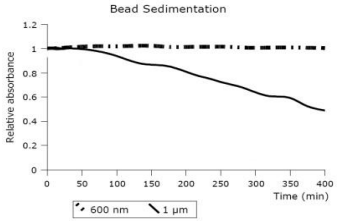
[2] Gluteraldehyde gives more stable protein binding than the carbodiimide reagents used with carboxylate beads.

Abbreviations: EDC, N-ethyl-N'-(dimethylaminopropyl) carbodiimide; NHS, N-hydroxysuccinimide.

[3] Reduction of disulfides with 0.1 M DTE (dithioerythrol); coupling of protein at pH below iso-electric point; deactivate excess thiol with 20 mM PDEA (2-(2-pyridinyldithio) ethane-amine)/ 1M NaCl, pH 4,3

VI. Technical Data

Table 3: Specifications of MagSi-Tools

Product Name	MagSi-Tools		
	600	1.0	3.0
Size	600 nm	1.0 µm	3.0 µm
Concentration	10 mg/mL		
	beads/mL		
	8 - 20 · 10^9	6 - 12 · 10^9	1 - 3 · 10^9
Supplied product volume	2 mL, 10 mL, 100 mL		
Material	Magnetic silica beads with activated surface		
Magnetic content	40%	60%	60%
Size Distribution	D5-D95		
	500 – 900 nm	0.7 - 1.4 µm	0.6 - 10.0 µm
Sedimentation			
Solution additives	MagSi-Tools, surface activated: PBS (pH 7.4), 0.05% sodium azide (NaN_3, Toxic!), except: 1) MagSi-S, unmodified silica beads and MagSi-NH_2, amine-modified silica beads: water, 0.05% sodium azide 2) epoxy- and tosyl-activated beads are supplied in DSMO:THF 1:1.		
Storage	Store at 2-8°C		

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.

Ordering Information

Product	Volume	Art. No.	Product name	Volume	Art. No.
MagSi-S 600	2 mL 10 mL 100 mL	MD16003 MD18003 MD19003	MagSi-S CHO 600	10 mL 100 mL	MD18007 MD19007
MagSi-S 1.0	2 mL 10 mL 100 mL	MD01003 MD03003 MD04003	MagSi-S CHO 1.0	10 mL 100 mL	MD03007 MD04007
MagSi-S 3.0	2 mL 10 mL 100 mL	MD41003 MD43003 MD44003	MagSi-S CHO 3.0	10 mL 100 mL	MD43007 MD44007
MagSi-S COOH 600	2 mL 10 mL 100 mL	MD16004 MD18004 MD19004	MagSi-S Tosyl 600	2 mL 10 mL 100 mL	MD16008 MD18008 MD19008
MagSi-S COOH 1.0	2 mL 10 mL 100 mL	MD01004 MD03004 MD04004	MagSi-S Tosyl 1.0	2 mL 10 mL 100 mL	MD01008 MD03008 MD04008
MagSi-S COOH 3.0	2 mL 10 mL 100 mL	MD41004 MD43004 MD44004	MagSi-S Tosyl 3.0	2 mL 10 mL 100 mL	MD41008 MD43008 MD44008
MagSi-S NH2 600	2ml 10ml 100ml	MD16005 MD18005 MD19005	MagSi-S Hydrazide 600	2 mL 10 mL 100 mL	MD16013 MD18013 MD19013
MagSi-S NH2 1.0	2 mL 10 mL 100 mL	MD01005 MD03005 MD04005	MagSi-S Hydrazide 1.0	2 mL 10 mL 100 mL	MD01013 MD03013 MD04013
MagSi-S NH2 3.0	2 mL 10 mL 100 mL	MD41005 MD43005 MD44005	MagSi-S Hydrazide 3.0	2 mL 10 mL 100 mL	MD41013 MD43013 MD44013
MagSi-S SH 600	10 mL 100 mL	MD18006 MD19006	MagSi-S Epoxy 600	2 mL 10 mL 100 mL	MD16010 MD18010 MD19010
MagSi-S SH 1.0	10 mL 100 mL	MD03006 MD04006	MagSi-S Epoxy 1.0	2 mL 10 mL 100 mL	MD01010 MD03010 MD04010
MagSi-S SH 3.0	10 mL 100 mL	MD43006 MD44006	MagSi-S Epoxy 3.0	2 mL 10 mL 100 mL	MD44010 MD44010 MD44010

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