MAGIC SEP

User Instructions

MAGicSep LAB rack
MAGicSep LAB cube
MAGicSep PILOT 50
MAGicSep PILOT 500

Revision date 2022-03

MAGIC SEP

Revision date 2022-03

Table of Contents

Please read through this manual carefully before using the MAGicSep devices.

1. Safety instructions

Avoid direct contact with the surface of the active magnetic-separation area. It contains a strong magnetic field.

Nickel plated neodymium magnets are integrated in the MAGicSep units. Nickel can cause allergic reactions.

Persons with pacemaker and implants should not be in direct contact with MAGicSep magnetic separator units.

Keep loose magnetic material distant from the MAGicSep separator units. Do not try to disassemble the separators. Bodily injury may result. Keep a distance between two or more MAGicSep magnetic separator units.

Keep all magnetic media, watches and sensitive electronic devices away from the MAGicSep magnetic separators. Computer hard drives, credit cards and CD's can be erased in the presence of the magnetic field.

MAGicSep magnetic separator units can lose part of their magnetic force permanently at a temperature of +80 C.

2. General handling instructions

- The MAGicSep series of laboratory magnetic separators have been optimized for use with MAGicBeads magnetic agarose particles and are ideal for most bioseparation applications. The larger units are designed for durability with a lacquered PVC plastic shell, fitting standard 1-2 ml, 15 ml and 50 ml centrifuge tubes, and 500 ml bottles, and strong nickel-plated neodymium magnets placed safely inside
- The MAGic Pilot system combines the MAGicBeads particles and MAGicSep in a simple magnetic separation platform that requires no special training to use. The separators require very little maintenance and several batches can be processed in parallel using the same unit.
- The magnetic separators should be stored at room temperature, or below, in a dry area. Do not freeze or autoclave. Clean the separators by wiping with a mild detergent solution followed by a dry cloth or napkin.

3. Product data

Table 1. Product characteristics

MAGicSep	LAB rack	LAB cube	PILOT 50		PILOT 500
Tube/bottle[1]	Microtube	Microtube	15 ml	50 ml	500 ml
Sample volume	50 µl–2 ml	50 µl–5 ml	3–15 ml	10–50 ml	100–500 ml
Bead volume[2]	<5–100 µl	<5–100 µl	10 µl–1 ml	10 µl–5 ml	0.1–50 ml
Separation time	1–5 sec	1–15 sec	10 sec	15 sec	3–5 min
Diameter		-	123 mm		176 mm
Height		12 mm	119 mm		148 mm
Weight	0.5 kg	15 g	0.4 kg		2.0 kg

[1] Standard polypropylene centrifuge tubes or 500 ml borosilicate bottles.
[2] The practical volume of settled beads that can be used.

4. Product operation

MAGicSep LAB rack

Intended use

- The MAGicSep LAB rack is suitable for parallel separation of magnetic beads in 1-2 ml microtubes.

Operation

- Place the microtubes containing magnetic beads in the 1x10 magnetic rack unit.
- Within seconds the beads will be captured on the side of the tubes.
- Pipette off liquid. Place the tip on the opposite side of the tube compared to the magnet, to disturb the beads as little as possible.

MAGicSep LAB cube

Intended use

- The MAGicSep LAB cube is suitable for separation of magnetic beads in microtubes, as well as in tubes/sample volumes up to 5 ml.

Operation

- Hold the cube magnet between thumb and two first fingers in your non-dominant hand.
- Place the microtube containing magnetic beads in front of the magnet. Hold it, too, between thumb and fingers.
- Within seconds the beads will be captured on the side of the tube.
- Pipette off liquid. Place the tip on the opposite side of the tube compared to the magnet, to disturb the beads as little as possible.

Note: To free up your hand, you can attach the cube magnet to a metallic wire rack for microtubes. Then you simply hold the tube against the magnet to quickly separate the beads or place the tube in the rack.

MAGicSep PILOT 50

Intended use

- The MAGicSep PILOT 50 has two positions, one for standard 15 ml conical polypropylene centrifuge tubes (⌀ 17 mm) and the other for standard 50 ml conical polypropylene centrifuge tubes (⌀ 30 mm). The unit is suitable for initial separation of captured target protein, wash, concentration, and elution of the beads.
- A suitable volume of liquid for the separator is 3–50 ml and the recommended bead volume of settled MAGicBead particles is between 5 µl and 4 ml, depending on the size of the tube (Section 3). A maximum of 1 ml of settled beads can be handled in the 15 ml position of the unit and the corresponding limit in the 50 ml position is 4 ml.

Operation

- Place the sample tube in the MAGicSep PILOT 50 separator.
- Allow the magnet to attract the beads, which usually takes 10–15 sec.
- Inspect if any beads remain in the bottom cone of the sample tube. This can be done by looking through the side opening of the MAGicSep separator unit (Fig 1A).
- If beads remain in the bottom cone of the tube, rotate the tube back and forth in the separator or flush carefully with liquid in the cone using a pipette. Any remaining beads should then be attracted by the magnet.
- Position a pipette in the liquid, away from the beads, and carefully pipette off the solution (Fig 1B).

Note: If bead volumes close to the upper of the working range for the position are used, a small portion of the beads may follow the liquid down into the bottom cone during withdrawal. If this is observed, stop the withdrawal of liquid and carefully remove the tube from the separator. Place a MAGicSep LAB cube (Product No. 2100) at the bottom cone to locally separate the beads. The remaining solution can then safely be removed.

- Remove the tube from the magnetic separator.
- Resuspend the beads in a suitable buffer.

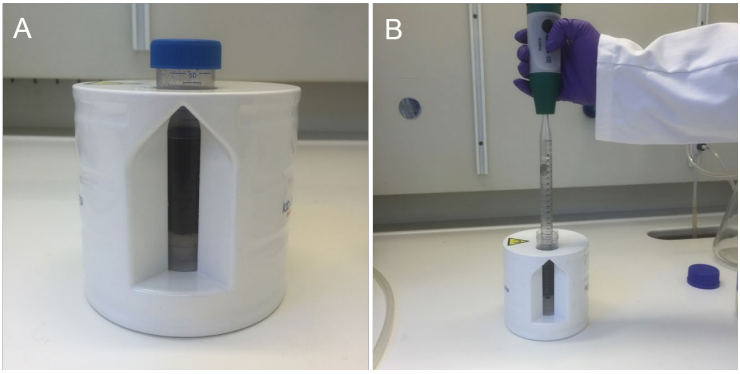

Fig 1. (A) Looking through the side opening of the MAGicSep separator unit to observe the separation of magnetic beads. (B) Removal of the solution with a pipette.

MAGicSep PILOT 500

Intended use

- The MAGicSep PILOT 500 unit fits standard 500 ml borosilicate laboratory bottles (⌀ 86 mm). This unit is intended for initial depletion of target protein from the sample, wash, concentration, and elution of the beads.
- A suitable volume of liquid for the separator is 100–500 ml. The working range of settled beads is 0.1–50 ml.

Operation

- Mix the bottle vigorously for a few seconds and then place the bottle in the separator.
- Allow the magnet to attract the beads.
- Inspect if any beads remain at the bottom of the bottle after 3–5 min, by looking through the side window or from the top.
- If beads remain free and/or in the bottom of the bottle, carefully flush with liquid towards the particles using a pipette. This gives momentum to the beads and promotes their magnetic capture to the sides of the bottle.
- Let the bottle remain in the separator until no free beads can be observed in suspension and/or at the bottom.
- Remove the solution by withdrawing liquid from the center of the bottle, using, e.g., a serological pipette connected to a water suction device or a vacuum pump, with a clean safety bottle between (Fig 2). If beads are accidently withdrawn, they can safely be recovered from the safety bottle.
- Proceed downwards with the pipette as the level of liquid decreases. Remove the pipette when all solution has been transferred to the safety bottle (Fig 2A).
- Remove the bottle from the separator. Note the black rims containing the separated beads (Fig 2B).
- Inspect the safety bottle for any beads. If present to a significant amount, transfer the liquid to an appropriate container and recover the beads using a MAGicSep separator. Resuspend the beads in a small volume and transfer back to the main container.
- Rinse the walls of the bottle with suitable buffer and recover the beads.

Note: A safety bottle should be inserted between the pipette and the suction/vacuum device (Fig 2). The safety bottle enables trapping of

beads escaping from the sample vial. The beads can then easily be recovered from this bottle by magnetic separation.

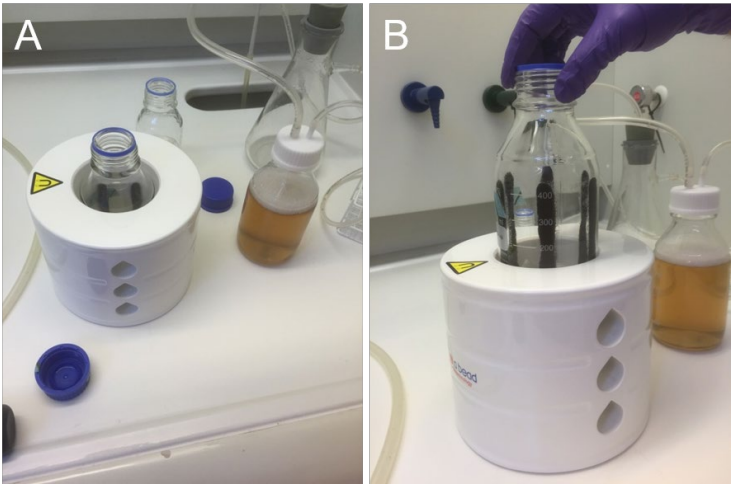

Fig 2. (A) Removal of solution from the sample bottle to the safety bottle. (B) Black rims of MAGicBead particles after separation.

5. Practical considerations

General

- The three positions in the magnetic separators, for 15, 50 and 500 ml containers, manage different bead volumes and sample volumes (Table 1), which must be considered when selecting a magnetic separator for use.
- It is important not to overload the sample container with beads, use a larger one or divide the sample into several tubes if the volume is higher than what is recommended (Table 1). In an overloaded sample container, the magnetic separator may not be able to hold the beads safely to the tube wall during liquid removal.
- Design your setup, considering appropriate bead volumes and sample volumes, so the magnetic separator(s) and sample container(s) to use can be chosen beforehand.

Binding

- The amount of beads to use depends on the quantity of target protein and the volume of your sample (see product manuals for the MAGicBeads magnetic particles).
- The sample volume should be kept as low as possible during the adsorption step, to facilitate the binding kinetics towards the magnetic beads.
- Once binding is completed, select a MAGicSep separator position for attracting the MAGicBead particles and removing the sample liquid.
- To take full advantage of the magnetic force of the separator, separations should be performed near the maximum volume of the separator position. A sample volume smaller than the maximum volume could therefore be increased by adding PBS after binding is completed (Example 1). Since binding has already occurred between target and beads, diluting the sample will not affect yield or incubation times negatively.
- Perform magnetic bead separation to remove the sample liquid from the beads (Section 4).

Washing and elution

- Select a separator and liquid volume to use according to the amount of beads used and the working ranges of the separators (Table 1). For instance, having 1–5 ml settled beads, use the 50 ml position in the MAGicSep PILOT 50and 10–50 ml buffer for washing and elution.
- To obtain the target protein in a higher concentration, elution can be performed down to 1 bead volume of elution buffer, but with a significant loss in overall yield. Beads can accidently get carried over when transferring the elution fraction to a new tube. If so, perform a new separation and transfer the elution fraction to yet another new tube.

Examples

1. A 140 ml sample was divided into three 50 ml tubes and adsorption performed in parallel. Separations were performed using MAGicSep PILOT 50. Another option would be to perform binding of the 150 ml sample and magnetic beads in a 500 ml bottle. To better make use of the magnetic capacity of MagSep PILOT 500 separator, 300 ml PBS was added after completed adsorption and thereafter placed in the separator. If the total amount of beads was <5 ml, they could be resuspended in a small volume and transferred to one single 50 ml tube for further wash and elution in MAGicSep PILOT 50.

2. A 12 ml sample was incubated with 25 µl beads in a 15 ml tube. First separation was performed using MAGicSep PILOT 50. The beads were resuspended in 0.5 ml PBS and transferred to a 2 ml microcentrifuge tube. Further bead separations during washing and elution, were performed using MAGicSep LAB cube.

6. Ordering information

Products	Quantity	Product No.
MAGicSep LAB rack	1	2000
MAGicSep LAB cube	1	2100
MAGicSep PILOT 50	1	2200
MAGicSep PILOT 500	1	2300

Related products	Product No.
MAGicBeads PrtA	1100
MAGicBeads SerA	1200
MAGicBeads ACT	1300
MAGicBeads mAb	1500

MAGic Bioprocessing AB
Virdings Allé 28
SE-754 50 Uppsala
Sweden

Email: info@magicbioprocessing.com
Web: www.magicbioprocessing.com

MAGIC BIOPROCESSING