

Magnetic separation technology

A versatile tool for purification of recombinant Strep-Tag proteins from *E.coli* lysates using MagSi Strep-Tact in coated magnetic beads

Introduction and background

Magnetic separation technology is being used more and more in the field of biotechnology for the isolation of nucleic acids, proteins and cells, and replacing traditional chromatography techniques due to some clear advantages: sample preparation within minutes, high sensitivity and selectivity, and ease of use.

IBA GmbH (Göttingen, Germany), uses their patented TAG technology to isolate recombinant proteins from cell lysates.

Via recombinant engineering, Strep-tag I and Strep-tag II - peptides of 8-9 amino acid residues - are introduced into the proteins synthesized by cells using recombinant engineering techniques. These peptides form a complex with Strep-Tactin, i.e. modified streptavidin. This complex can be broken by

incubation with desthiobiotin, which has a higher affinity for Strep-Tactin than the tag-peptides.

Magnetic microbeads modified with covalently bound Strep-Tactin, are used to isolate over-expressed Strep-tag fusion proteins.

These proteins are bound to the magnetic beads, separated from the lysate using a magnetic, and after rinsing eluted from the beads using free desthiobiotin. Magnamedics Diagnostics BV recently provided IBA GmbH with their latest MagSi-S platform for protein immobilization. IBA used this platform to generate their MagStrep type 2 beads and compared the performance with the original MagStrep type 1 beads.

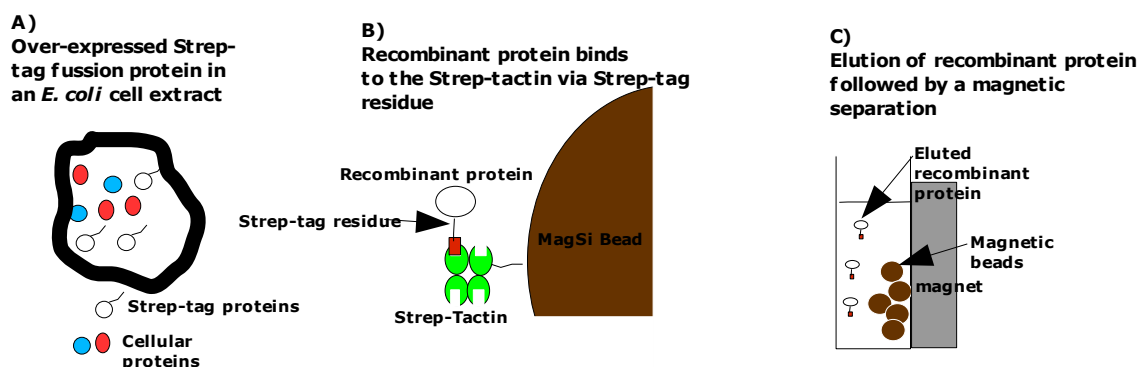


Figure 1. Purification of recombinant Strep-Tag protein

Results

The new MagStrep type 2 beads, based on the new Magnamedics platform, clearly outperformed the original MagStrep type 1 beads in 4 out of 5 isolation experiments (see below).

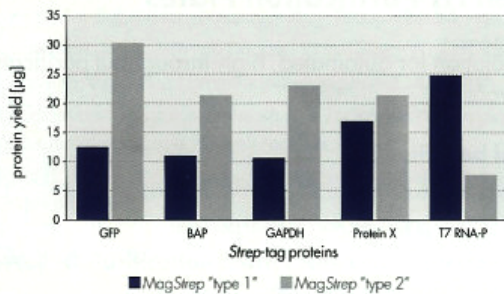


Figure 2. Protein yield after purification.

Conclusion

The new MagStrep type 2 beads for the isolation of Strep-tag labeled proteins shows an improved yield for most of the tagged proteins, and serves as an excellent replacement of the original MagStrep type 1 beads.

This new platform, MagSi-S is available in different sizes (1, 2 and 5 µ), with iron oxide contents between 30 and 50 wt% when magnetic properties have to be fine-tuned, and are also available with different functional groups (-COOH, -NH₂, -SH, -CHO).

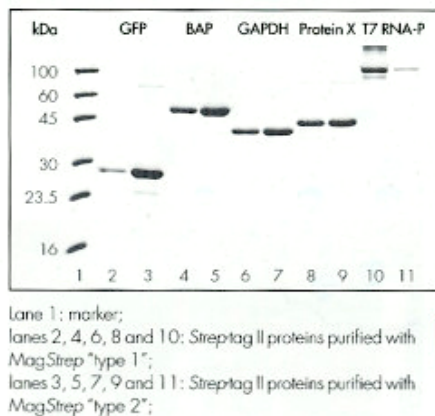


Figure 3. Electrophoresis after purification