A magnetic adsorbent-based process for semi-continuous PEGylation of proteins

A magnetic adsorbent-based process for semi-continuous PEGylation of proteins

A semi-continuous magnetic particle-based process for the controlled attachment of PEG (PEGylation) to proteins is described for the first time. Trypsin and 2 kDa mono-activated PEG were used to systematically develop the steps in the process. Proof of concept was shown in a microfluidics system to minimize reagent consumption. Two streams containing (i) 1.2 g/L trypsin and (ii) 4 g/L magnetic adsorbents derivatized with the reversible affinity ligand benzamidine were pumped into a pipe reactor. At the exit, a third solution of activated PEG (0-40 g/L) was introduced and the solutions immediately fed into a second reactor. Upon exiting, the mixture was combined in a third reactor with a fourth stream of free amine groups to stop the reaction (50 mM lysine). The mixture continued into a high-gradient magnetic separator where magnetic supports, with PEGylated trypsin still attached, were captured and washing and elution steps were subsequently carried out. Analysis of the conjugates (with SDS-PAGE & LC-MS) showed that the extent of PEGylation could be controlled by varying the reaction time or PEG concentration. Furthermore, the PEG-conjugates had higher enzyme activity compared to PEGylation of non-immobilized trypsin.

General information
State: Published
Organisations: Department of Systems Biology, Center for Microbial Biotechnology, Department of Micro- and Nanotechnology
Contributors: Ottow, K. E., Maury, T. L., Hobley, T. J., Lund-Olesen, T., Hansen, M. F.
Pages: 396-409
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Biotechnology Journal
Volume: 6
Issue number: 4
ISSN (Print): 1860-6768
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.12
Web of Science (2017): Impact factor 3.507
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.2 SJR 1.29 SNIP 0.969
Web of Science (2016): Impact factor 3.649
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.91 SJR 1.172 SNIP 0.874
Web of Science (2015): Impact factor 3.781
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.98 SJR 1.189 SNIP 1.062
Web of Science (2014): Impact factor 3.49
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.01 SJR 1.136 SNIP 1.093
Web of Science (2013): Impact factor 3.708
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.4 SJR 0.944 SNIP 0.957
Web of Science (2012): Impact factor 3.446