Magnetic hydrophobic-charge induction adsorbents for the recovery of immunoglobulins from antiserum feedstocks by high-gradient magnetic fishing

BACKGROUND: The extraction of biopharmaceuticals from plasma and serum often employs overly complicated antiquated procedures that can inflict serious damage on especially prone protein targets and which afford low purification power and overall yields. This paper describes systematic development of a high-gradient magnetic fishing process for recovery of immunoglobulins from unclarified antiserum.

RESULTS: Non-porous superparamagnetic particles were transformed into hydrophobic-charge induction adsorbents and then used to recover immunoglobulins from rabbit antiserum feedstocks. Comprehensive characterisation tests conducted with variously diluted clarified antiserum on a magnetic rack revealed that immunoglobulin binding was rapid (equilibrium reached in <45s), strong (Kd < 0.1 mg mL⁻¹), of high capacity (Qmax = 214 mg g⁻¹), and pH and ionic strength dependent. In a high-gradient magnetic fishing process conducted with the same adsorbent, and a conventional ‘magnetic filter + recycle loop’ arrangement, >72% of the immunoglobulin present in an unclarified antiserum feed was recovered in 0.5 h in >3-fold purified form.

CONCLUSIONS: Fast magnetic particle based capture of antibodies from an unclarified high-titre feed has been demonstrated. Efficient product recovery from ultra-high titre bioprocess liquors by high-gradient magnetic fishing requires that improved magnetic adsorbents displaying high selectivity, ultra-high capacity and operational robustness are used with ‘state-of-the-art’ rotor-stator magnetic separators.
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.58 SJR 1.108 SNIP 1.161
Web of Science (2012): Impact factor 2.504
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.28 SJR 0.981 SNIP 0.96
Web of Science (2011): Impact factor 2.168
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.892 SNIP 0.905
Web of Science (2010): Impact factor 1.818
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.842 SNIP 0.948
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.808 SNIP 1.022
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.639 SNIP 0.845
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.674 SNIP 0.912
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.599 SNIP 0.941
Scopus rating (2004): SJR 0.645 SNIP 0.77
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.556 SNIP 1.104
Scopus rating (2002): SJR 0.686 SNIP 1.091
Scopus rating (2001): SJR 0.637 SNIP 0.983
Scopus rating (2000): SJR 0.639 SNIP 1.03
Scopus rating (1999): SJR 0.637 SNIP 1.075
Original language: English
Keywords: 4-mercaptoethylpyridine, Complex unclarified bioprocess liquors, Direct capture, Polyclonal and monoclonal antibodies, Serum and plasma
DOIs:
10.1002/jctb.5599
Source: Findit
Source-ID: 2396377506
Research output: Research - peer-review › Journal article – Annual report year: 2018