

An Integrated Process Analytical Platform for Automated Monitoring of Monoclonal Antibody N-linked Glycosylation

Protein glycosylation is an important post translational modification that needs to be monitored during upstream bioprocessing as this critical quality attribute dictates the efficacy of the final biologic. As glycosylation patterns are highly heterogenous there is need to monitor and control this attribute in real-time. we developed an online sequential-injection based PAT system, called N-GLYcanyzer, that can rapidly monitor mAb glycosylation during upstream biomanufacturing. The key innovation includes design of an integrated mAb sampling and derivation system for antibody titer and glycoform analysis in under 2 hours. The N-GLYcanyzer process includes mAb capture, deglycosylation, fluorescent glycan labeling, and glycan enrichment for direct injection and analysis on an integrated high performance liquid chromatography (HPLC) system. This work showcases how the N-GLYcanyzer platform can be implemented at/on-line to an upstream bioreactor for automated and near real-time glycosylation monitoring of a Trastuzumab biosimilar produced by Chinese Hamster Ovary (CHO) cells.