

## **COMPARATIVE STUDY FOR THE PRODUCTION OF MABs IN SINGLE-USE (SUB) VS. STAINLESS-STEEL BIOREACTORS (SSB) BASED ON PRODUCT QUALITY AND STRESS FACTORS**

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Today's clinical manufacturing of monoclonal antibodies (MABs) in a multi-product GMP facility needs to be highly flexible in order to support the R & D's quick changing pipeline. One main challenge is to plan production in a multi-equipment GMP facility that offers a wide range of different types of bioreactor systems and scales.

While stainless steel bioreactors (SSB) have been used as the standard bioreactor type for years, over the past decade, single-use bioreactors (SUB) have been installed and are well accepted in modern biopharmaceutical manufacturing facilities. SUB's provide several advantages e.g. reduced investment costs, easy product changeover, increased productivity through shortened unit operation times and less manpower. Despite these benefits it is absolutely mandatory to ensure that the production of monoclonal antibodies in SUB's is comparable to the production in SSB's concerning product quality and stress indicators.

The aim of this study was to analyze data of cell culture runs performed in SSBs and SUBs to make a statement regarding comparability. For that purpose data from ten different antibody projects, which are representative of former and future products from R & D's pipeline, were considered in the analysis. The total data package comprised 75 different cell culture runs. The focus was on product quality attributes e.g. purity, charge heterogeneity as well as on stress indicators such as specific productivity, viable cell density, viability and LDH levels. Equivalence ranges, i.e. differences that are deemed acceptable, were defined prior to statistical analysis.

The results demonstrate that all the investigated cell culture stress indicators and product quality attributes are comparable between the single-use and stainless-steel bioreactor systems. To sum up, either system can be used for the clinical manufacturing of monoclonal antibodies.

Therefore, this study supports a highly flexible utilization of single use and stainless steel bioreactors within a multi equipment GMP facility and helps to increase production speed.