EMERGING TRENDS IN SINGLE USE TECHNOLOGY FOR MANUFACTURING OF ANTIBODY-DRUG CONJUGATES

Asmita Pawar, Lonza AG
asmita.pawar@lonza.com

Key Words: Cleaning Validation, Single-use systems, Toxins, Solvents, Leachables.

Single-use technology, designed for the manufacturing of biopharmaceutical products, has made major inroads over the last 30 years. Single-use technologies were revolutionized in the late 2000s with the introduction of single-use 2D and 3D process containers and filter assemblies for mixing and storage systems. The adoption of single-use technology is especially growing in the development and manufacturing of biologics and complex drugs like Antibody-drug Conjugates (ADCs). Antibody Drug Conjugates (ADC's) are an important class of highly potent biopharmaceutical drugs designed as a targeted therapy for the treatment of cancer. Special consideration for safe handling and containment of these operations are necessary due to the organic solvents required for the conjugation reaction and the highly potent, toxic nature of the small molecule payload.

According to various reports, 70-80% of the manufacturing of ADCs is outsourced to contract development and manufacturing organizations (CDMOs). Due to this increased outsourcing pattern, CDMOs entertain many different types of ADCs. Many ADC's are produced on a small run campaign basis with typically weeks of manufacture rather than campaigns of months or years. Hence for many ADC manufacturers the cleaning validation burden associated with a hard shell stainless steel isolator can be an issue. Single-use systems minimize cleaning processes, reducing costs and risks of cross-contamination. In the end, customers benefit from lower manufacturing costs and speed to market. The faster turnover will result in more batches made to meet the commercial demand. Single-use (SU) systems have great potential in antibody-drug conjugates (ADC) manufacturing. The use of organic solvents in the ADC process might , however, raise questions about potential leachables from the plastic and elastomeric materials of single-use components. To address those concerns, extractables studies for organic compounds and trace elements from the single-use components can be identified and semi-quantitated with a complementary set of analytical techniques.
Single-use technology offers much promise to successfully address these concerns. However, better understanding of the suitability, scalability, and solvent compatibility of both the single-use components as well as the supporting hardware and controls is needed to enable widespread adoption.