

APPLICATION NOTE

Mass Spectrometry-based Host Cell Protein Analysis in Biologics Development

Highlights

Advantages of LC-MS based HCP profiling for development of complex biologics includes:

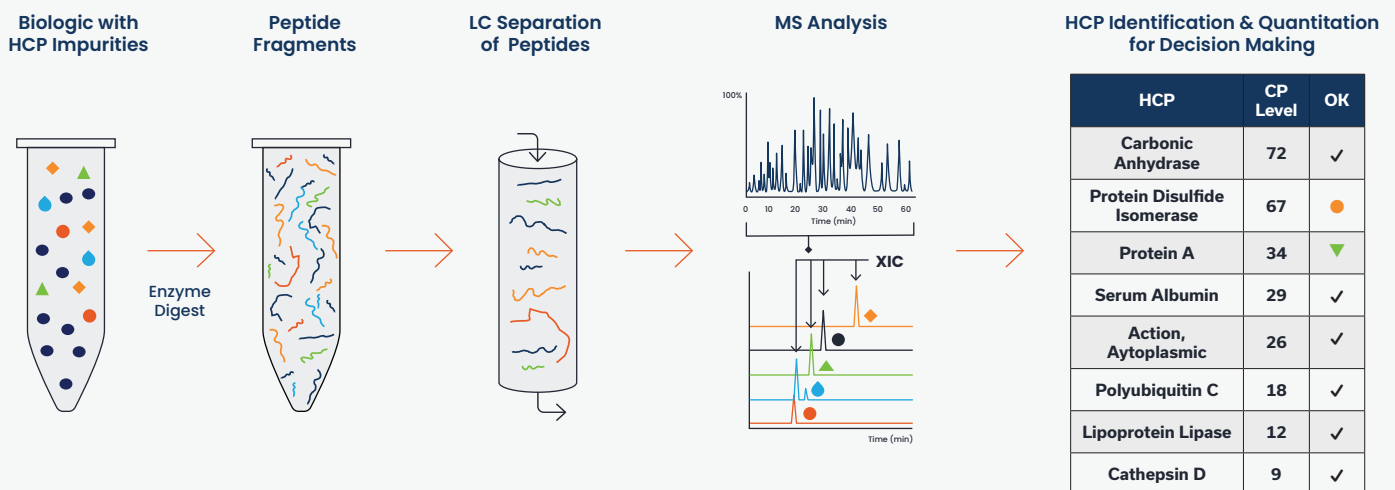
- ◆ Sensitive Detection of Peptides
- ◆ Excellent Accuracy and Precision
- ◆ Fast Estimate of Concentration Based on Selected Peptides
- ◆ Rapid Assessment of Relative Amounts
- ◆ Effective Comparison Among Samples
- ◆ No Custom Immunoreagents Required

Introduction

Host cell proteins (HCPs) are impurities present in all therapeutics derived from biological sources, and as a critical quality attribute (CQA), they must be characterized in detail and controlled through the manufacturing process and in the final drug product.

The individual protein contaminants that make up the HCP profile may vary significantly among individual biologic products, including cell and gene therapies and expression systems, even for very closely related molecules. As such, the HCP profile must be analyzed to identify even low levels of potentially concerning species in a biologic drug.

LC-MS Approach to HCP Profiling



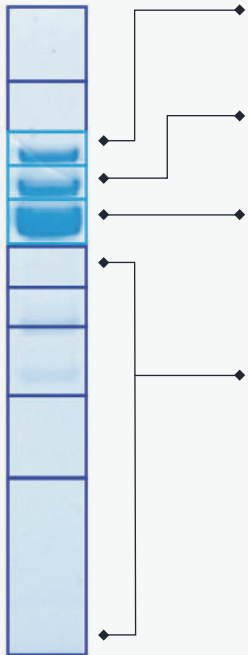
To ensure consistency of product manufacture and shelf-life stability, and to minimize potential adverse clinical reactions, significant attention must be paid to identifying HCPs that remain in a biologic product following purification.

Once identified, HCPs are often monitored and the levels controlled by process development decisions, to consistently yield a safe and efficacious product.

While ELISA methods have historically been the main approach to detecting total HCP content, LC-MS-based HCP detection methods have increasingly become an expected orthogonal standard in successful biologic development.

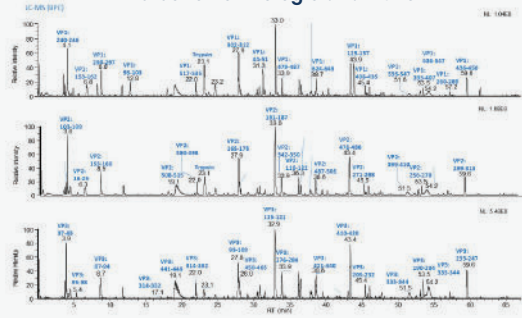


Process Gel Bands



LC-MS Characterization

Detection of Biologic and HCPs





Partner with ProtaGene for Successful LC-MS HCP Profiling

To obtain accurate information using LC-MS profiling of HCPs to guide decision making depends on a few key aspects.

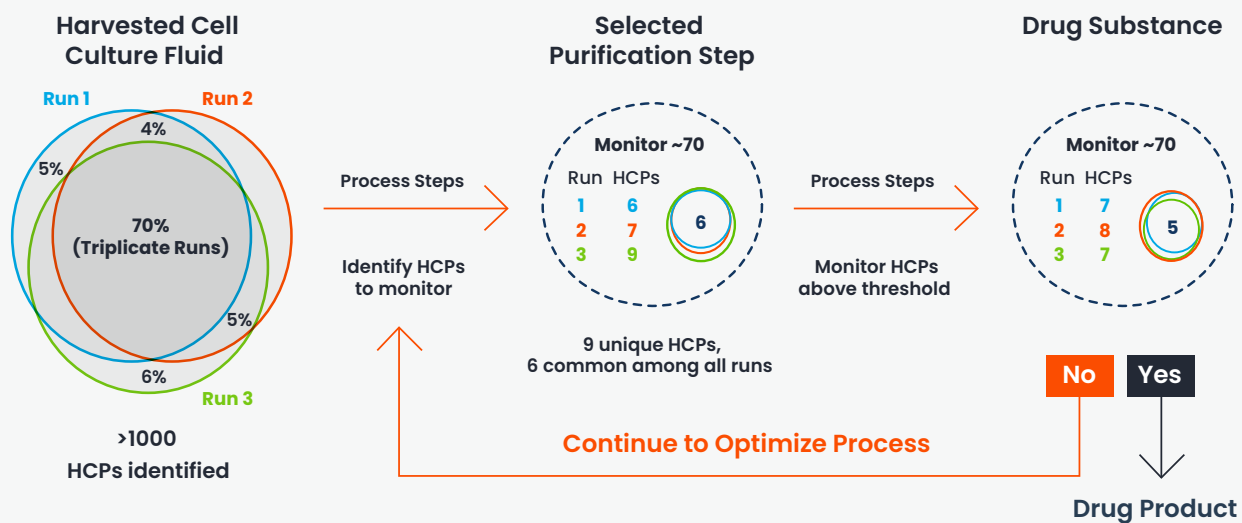
We take a rigorous approach to ensure high-quality results for all projects through:

- ◆ Initial Development and Optimization of the Method for Each Unique Product/System

- ◆ Thoughtful Attention to Individual Sample Handling and Preparation

- ◆ Generation of a Complete Peptide Library for the Host Cell Source

HCP Profiling and Comparability by Process Step



HCP profiling is applied to a wide range of biologic products, from antibodies to enzymes to gene/cell therapies, which are manufactured using diverse cell types. There are substantial differences in the possible HCP impurities derived from different host cell sources, and we have developed complete peptide libraries for common expression systems, including CHO, HEK, and *E. coli*. We have also worked with our clients on unique host cell systems to develop customized, corresponding libraries.