BioReliance®

Pharma & Biopharma Manufacturing & Testing Services

MilliporeSigma

Mini Case Study

Optimize the Formulation for a Monoclonal Antibody

You have a molecule of interest and need an effective formulation to maximize stability and minimize aggregation. Without in-house development services, you turn to the experts to get it right the first time and identify a formulation that will work across all clinical phases and commercialization.

The combination of our innovative, custom solutions and decades of expertise allows us to effectively balance cost, speed and risk when optimizing drug substance formulations in an accelerated timeframe.

The Challenge

An emerging biotech company sought our help to develop a formulation for a monoclonal antibody. The company didn't have in-house development expertise and wanted a partner capable of delivering an optimized formulation of buffers and excipients within an aggressive timeline and budget. As with all formulations, it was essential that the buffers and excipients selected ensured stability of the drug substance, were compatible with each other and met regulatory requirements.

Our Approach

Our formulation study consisted of three components:

Buffer screening. Based on our experience and knowledge of what buffers have been successful in commercial products, we selected a set of more than twenty buffers to evaluate for their ability to maintain pH, one of the most important parameters impacting stability of the molecule. Differential scanning fluorimetry was used to assess the melting temperature of the Fab and Fc regions of the molecule in each buffer. The molarity of the buffers was also selected at this point to be low enough to enable inclusion of excipients in the formulation.

Excipient screening. A design of experiments (DOE) strategy was used to assess possible excipients to stabilize the molecule, prevent aggregation or degradation, provide freeze-thaw protection and other parameters. From an initial set of more than twenty excipients, six were chosen which targeted several degradation pathways. Use of DOE allowed us to efficiently screen the excipients directly and assess the potential for interaction with each other. Accelerated stability studies, freeze/thaw and shear stress studies identified the best excipients.

Formulation composition adjustment. The concentration of the excipient combination was established so that the molecule was stabilized, but the excipients were not present in large excess. In other words, we fit the concentration to the molecule. Some excipients interact and their concentration can be reduced; such adjustments are possible because a surface response design is used. We fit the osmolality requirement at this stage to fit with the final product application (intravenous, subcutaneous or intra-muscular)

The Outcome

The combination of our expertise in formulation, along with DOE strategies and sophisticated modeling to determine suitable concentrations, allowed us to deliver an optimized formulation for this customer in three months.

BioReliance® End-to-End Solutions is an adaptable CDMO partner for small biotechs and start-ups needing to develop and commercialize biologics. We do this by balancing speed, risk and cost through custom solutions, by leveraging our bioprocessing technologies and process development expertise, and by allowing our clients to transfer their process and knowledge to their end point at any step of their drug development. To learn more, please visit **EMDMillipore.com/adaptive-CDMO**

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