Q&A: Using media and feed panels during media development

Each cell clone has its individual metabolic needs, and finding a cell culture medium and feed formulation that meets them is crucial for maximizing the productivity of your biopharmaceutical manufacturing process. However, finding this formulation can be challenging, often requiring screening a wide range of options.

One popular approach that can help accelerate this process is the use of media and feed panels. These panels consist of nutritionally diverse formulations specifically designed to help you identify the optimal nutrient balance for your target clone. A complete experimental protocol is also provided to further streamline the screening process.

To find out how a panel-based approach can help accelerate media and feed development, we spoke to Erica Wehling (EW), R&D senior manager, and Jennifer Zatina (JZ), global product manager, at Thermo Fisher Scientific.

To start, Jennifer, could you please provide us with an overview of what media and feed panel evaluations are and how they can be used?

JZ: Yes, of course. Media and feed panel evaluations offer rapid access to a library of ready-to-use formulations that are easy to optimize and customize, along with a protocol to simplify the screening process. The panel formulations are carefully designed to help maximize formulation diversity. As a result, they can help you rapidly identify formulations for your cell line that will enhance the productivity of your process.

Could you please tell us more about the difference between screening catalog products and utilizing a panel?

JZ: Screening catalog products alone can be costly and time-consuming as there is often limited formulation information available, so you could be screening multiple formulations with similar nutritional profiles. A panel, however, enables you to try a broader range of nutritionally diverse media formulations. Compared to screening catalog products, this can allow you to identify the nutrients driving productivity and an optimal formulation more quickly.

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You mentioned that one of the key benefits of panels is that they are designed with maximum formulation diversity in mind. Erica, why is this so important to get the most out of the panel evaluation process?

EW: Ultimately the more diverse the panel formulations are, the more likely you are to narrow down the key components that can drive productivity, shorten timelines, and reduce costs. The formulation diversity of a panel also creates a wide enough design space to kickstart your immediate development workflow. This can help you avoid missing critical formulation compositions that could be outside your initial experimental design. Consequently, panels are often ideal as a starting point in media and feed development workflows.

So far, we have discussed the benefits of panels and the importance of formulation diversity. Moving on to selecting the right panel for your process, how important is it for developers to choose a panel designed for their specific cell type?

EW: Very important. Panels are typically developed with a particular cell line, culture type, and application in mind. Although the panel-based approach to media and feed development initially became popular for monoclonal antibody manufacturers using CHO cells, it has now been extended to other areas. Most notably, media and feed panels designed for adeno-associated viral vector production in HEK293 cells are now available.

After a suitable panel has been selected, how does the evaluation process work?

JZ: The evaluation process itself depends on the specific vendor. However, at Thermo Fisher, it begins with a kickoff meeting with one of our field application scientist (FAS) team members. During this meeting, they can provide advice on how best to utilize the panel based on your goals, production clone needs, and available resources and equipment. During and after the kickoff call, the FAS can also provide support with implementing the experimental protocol and completing data analysis.

Evidently, panels can help accelerate the development of a formulation that meets the clone's needs. What additional support can be provided to further accelerate media and feed optimization?

EW: Following the evaluation, support in data analysis can help you gain a better understanding of the growth, titer, and product quality data collected. An FAS can also further advise you on appropriate next steps and help streamline process optimization and scale-up.

On that subject, what are the typical next steps for developers following a media and feed panel evaluation?

EW: At this stage, they may then progress with optimizing other process parameters, such as feeding strategies and temperature or pH setpoints and shifts. They may also opt to work with a rapid prototyping service to manufacture small-scale non-cGMP batches of their chosen formulation. This can enable them to test the manufacturability and scalability of the formulation and reduce the risk of scale-up delays. After which, some developers may be ready to scale up a formulation for cGMP manufacturing.

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Finally, if a panel formulation is close to enabling developers to meet their goals but needs further optimization, what additional steps would you suggest?

EW: There are several solutions you can consider to help you further optimize your formulation and achieve the best results. One key approach I would recommend is additional analytical testing—through spent media and multi-omics analyses. Used in combination, these analyses provide a powerful tool for informing further media development. Spent media analysis can be used to determine what is secreted or taken up by the cells in culture, whereas multi-omics can identify cellular pathways that may influence cell growth, cell viability, and productivity.

JZ: You can also choose to utilize additional development services from a panel vendor such as Thermo Fisher. For example, in addition to providing a wide selection of analytical capabilities, our Gibco™ Media by Design™ Services can further assist you with optimizing formulations to help improve productivity and enable you to meet your project targets.

Following the evaluation, support in data analysis can help you gain a better understanding of the growth, titer, and product quality data collected.

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