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High-throughput multicomponent metabolite profiling by LC-MS/MS for advance cell culture media development and process monitoring of biopharmaceutical products

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Developing an optimal cell culture media, combined with a robust high-throughput analytical method to monitor the influence of nutrient feed and their metabolites on the productivity of the cell culture and the desired product quality are as essential as engineering an effective expression system or choosing a good host cell line. Information gained from the high-throughput cell culture profiling analytical method could help to establish the intricate balance of the intracellular and extracellular metabolites and subsequently used to drive modification to the nutrient feed and cell culture process to optimize yield or target specific product attributes during production of biopharmaceuticals such as therapeutic antibodies. In this study, we demonstrate a high-throughput LC-MS/MS method for the simultaneous analysis of 95 components in cell culture media at a rate of 17 minutes per sample. The method targets sugars, amino acids, vitamins, nucleic acid associated substances, organic acids etc. To our best knowledge, the method represents the highest number of cell culture media components and their secreted metabolites analyzed simultaneously in a single analysis.

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