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Microplates with integrated oxygen sensing for medium optimization in animal cell culture

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Abstract:

A new approach using microtiter plate cultivation with on-line measurement of dissolved oxygen (DO) was applied for medium optimization of mammalian cell culture. Applying dynamic liquid phase balance, oxygen uptake rates were calculated from the DO level and used as an indicator for culture viability. The developed method was successfully applied to optimization of the concentration of glucose, glutamine and inorganic salts for cultivation of a Chinese Hamster Ovary (CHO) cell line. Using 2^3 full factorial central composite design, the optimum medium composition could be identified in one single run. The concentration of inorganic salts had a significant influence on cultivation. The developed method exhibits high potential to improve procedures of medium optimization for animal cell cultivation by allowing the investigation of large sets of potentially important variables in short time and with reduced effort.

Key-words: CHO cells; design of experiment, medium optizimation, microplate, oxygen uptake rate