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## **HEK293 Cell-Based Bioprocess Development at Bench Scale by Means of Online Monitoring in Shake Flasks (RAMOS and SFR)**

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### **Abstract:**

The platforms for bioprocess development have been developed in parallel to the needs of the manufacturing industry of biopharmaceuticals, aiming to ensure the quality and safety of their products. In this sense, Quality by Design (QbD) and Process Analytical Technology (PAT) have become the pillars for quality control and quality assurance.

A new combination of Shake Flask Reader (SFR) and Respiratory Activity Monitoring System for online determination of OTR and CTR (RAMOS) allows online monitoring of main culture parameters needed for the bioprocess development (pH, pO<sub>2</sub>, OTR, CTR, and QR) as presented below. Eventually, a case study of the application of the combination of SFR-RAMOS system is presented. The case study discloses the optimization of HEK293 cells cultures through the manipulation of their metabolic behavior.

Keywords: Ramos, SFR, OTR, bioprocess optimization, HEK293 cells, culture monitoring, glucose and lactate co-consumption, metabolic phases