

High-Throughput Sample Processing and Analytics of Samples Derived from High-Throughput Down Scale Bioreactor Systems



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1 – Background

USP challenges:

High level process understanding and multivariate statistical approaches require elevated data density & a high number of experiments.

High-throughput (HT) cultivation systems, e.g. ambr15/ambr250 (Sartorius Stedim Biotech) are implemented.

Bottleneck:

Large amounts of samples & data are generated.

Need for fast HT sample processing and analytics.

2 – Benefits of HT cultivation systems

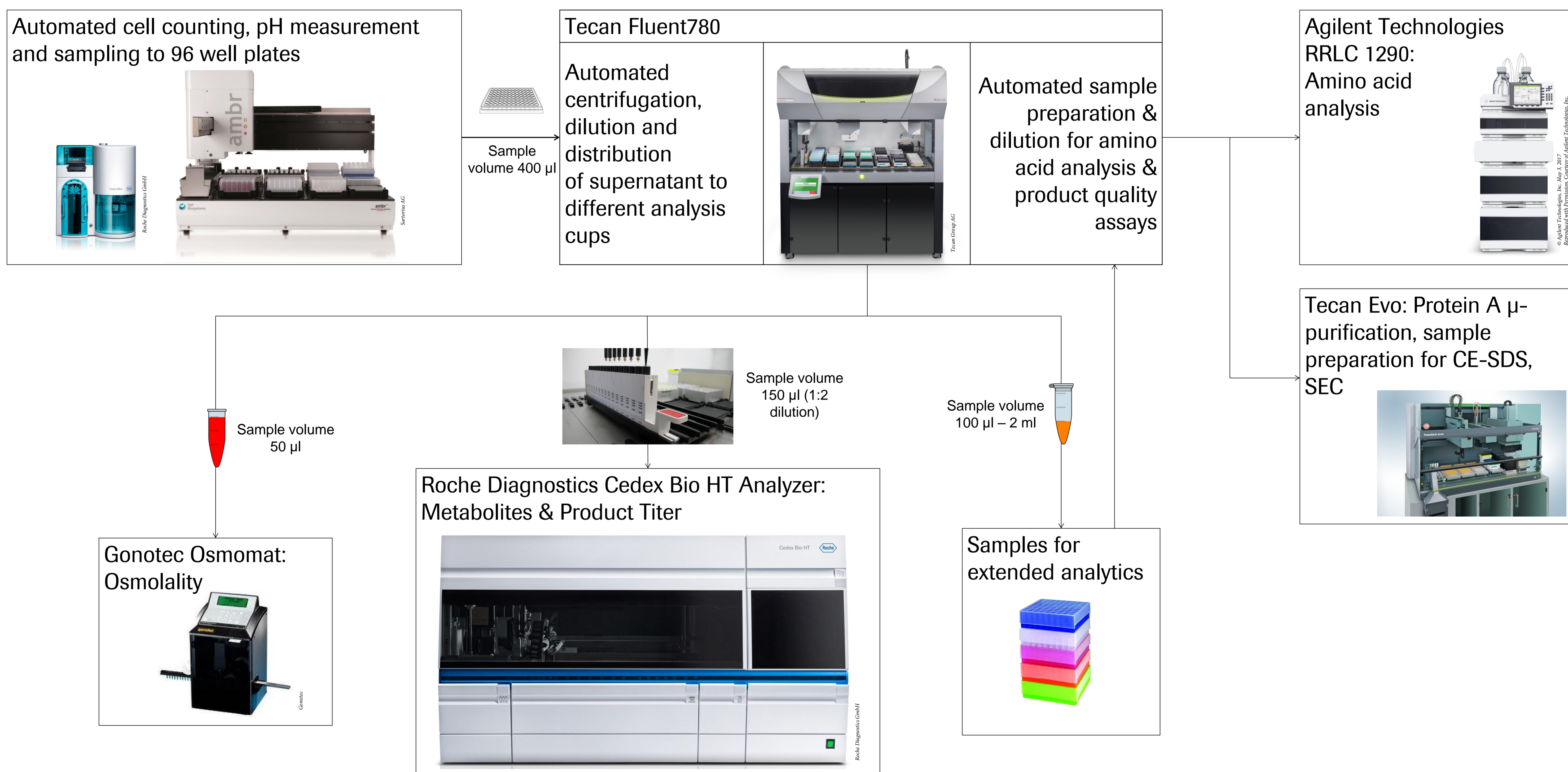
- Automation & parallelization of cultivations
- Single-use equipment, short set-up time
- Fully pH and DO controlled systems
- Automated collection of process samples
- Increase of fermentations that can be handled by one employee in parallel



3 – Bottlenecks caused by HT cultivation systems

- Strong increase in number of generated samples
 - About 400 samples have to be handled by one person in a 14 d cultivation
- Strong increase in generated amount of data
 - About 0.7 million data points/48 vessels for a 14 day cultivation for online pH and DO readings
 - Over 5000 data points generated by offline analytics

4 – Tecan Fluent780 links ambr systems & Cedex Bio HT Analyzer



6 – Conclusion

- Tecan Fluent is perfectly suitable to link an ambr cultivation system to a Cedex Bio HT Analyzer
- A fast and automated workflow for accurate and efficient sample processing for 12 – 192 samples is now available
- 48 samples can be processed within 20 minutes (manual processing: 60 minutes); the operator only has to spend about 5 minutes hands-on
- Higher and operator independent accuracy for sample pre-dilution

6 – Outlook

- Connect ambr15/ambr250, Tecan Fluent780, and Cedex Bio HT Analyzer via microplate shuttles or robotic arms
- Establish feedback loop from Cedex Bio HT Analyzer to ambr15/ambr250 via Sm@rtline Data Cockpit (SDC) middleware (AGU GmbH) for automated feeding
- Enable a fast and easy to use data management & analysis system for HT cultivation systems