# SEG-FLOW® 4800

## Automated Sampling & Feed Control System

## Seg-Flow® 4800 / Nova® BioProfile® 400 On-line Performance Data

### Introduction

Flownamics has interfaced the Nova BioProfile Basic, 100 and 400 analyzers with the Seg-Flow 4800 Automated Sampling and Feed Control System for providing on-line, real-time nutrient and metabolite monitoring of cell culture processes. In order to prove the reliability and analytical capabilities of this integrated system, an evaluation was accomplished to demonstrate analytical performance comparability between the Seg-Flow 4800/Nova BioProfile 400 system and an off-line Nova BioProfile 400 instrument. Furthermore, the study was conducted to rule out any cause for analytical drift or error that could be attributed to the type of vessel sampling probe used.

### Performance Evaluation

The Seg-Flow 4800/Nova BioProfile 400 system performed simultaneous vessel sampling and analysis of chemically defined media every 15 minutes. On-line samples were drawn from the vessel using both a FISP *in-situ* sampling probe (0.2 um microfiltered) and a glass dip tube (non-filtered). Samples obtained through each of these probes were analyzed for comparability. Off-line analyses were performed using the same Nova BioProfile 400 analyzer in manual mode. The concentrations of glucose, lactate, glutamate, glutamine, ammonium, potassium and sodium were varied throughout the experiment to ensure a broad measurement range for the Nova analyzer.

### Performance Data

Table 1 summarizes the correlation coefficients ($R^2$) observed for each analyte and differentiates the data by the on-line sampling method used, i.e., FISP *in-situ* sampling probe vs. glass dip tube. Figure 1 shows the correlation curve, $R^2$ values and slope for the measured analytical range of each analyte.

**Table 1. Correlation Summary for Seg-Flow On-line and Off-line Nova BioProfile Analyses**

| Analyte | Correlation Coefficient ($R^2$) | |
|---|---|---|
| | FISP Sampling Probe | Dip Tube |
| Glucose | 0.99 | 0.99 |
| Lactate | 0.99 | 0.99 |
| Glutamate | 0.98 | 0.98 |
| Glutamine | 0.99 | 0.98 |
| Ammonium | 0.99 | 0.99 |
| Potassium | 1.00 | 0.99 |
| Sodium | 0.99 | 0.98 |
| Osmolality | 0.98 | 0.98 |

As shown by the correlation coefficient data shown in Table 1 and Figure 1, a strong, positive correlation was observed between the off-line and on-line analytical methods for each of the analytes. Additionally, the on-line analytical performance was independent of the sampling probe used, which demonstrates the robustness and consistency of the FISP *in-situ* sampling probe as compared to the glass dip tube.

### Conclusion

In this study, the Seg-Flow 4800/Nova BioProfile 400 automated system demonstrated analytical robustness and consistency throughout the measured analytical range for each analyte. Furthermore, the Seg-Flow 4800 enhances the Nova BioProfile 400 analytical capabilities by providing fast, precise, real-time analysis for on-line cell culture monitoring.

FLOWNAMICS
Flownamics Analytical Instruments, Inc.
3025 South Stoughton Road
Madison, WI 53716
*T: 800.932.6989 F: 888.250.8197*

February **2013**
**FAI-005-004 Rev A**

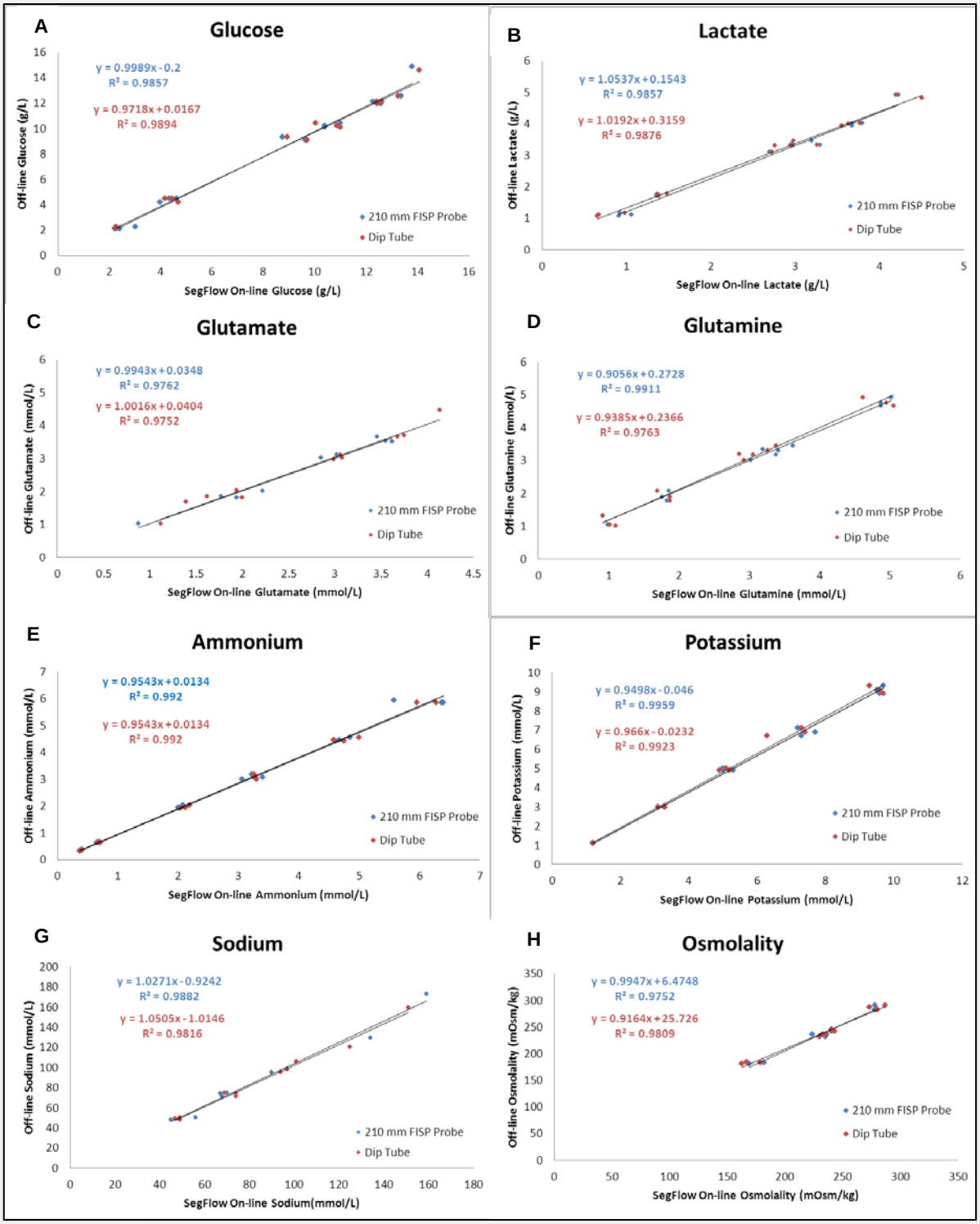


**Figure 1.** Scatter plots comparing the off-line and Seg-Flow on-line Nova BioProfile 400 analyses for (A) glucose, (B) lactate, (C) glutamate, (D) glutamine, (E) ammonium, (F) potassium, (G) sodium and (H) osmolality. Linear regression (slope) and correlation coefficient ($R^2$) are shown for each analyte. Seg-Flow on-line data generated from samples drawn through the FISP *in-situ* sampling probe and dip tube are shown in blue and red, respectively.