



DOC1126 Optimizing Conditions and Equipment for Modeling Fermenters

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1. PURPOSE

To establish a standardized method for collecting the required number of representative samples from fermenters, optimizing lab equipment, and ensuring overall conditions are set for the most accurate models.

2. SCOPE

This procedure applies to all personnel responsible for collecting and running fermentation samples at the ethanol plant for the purpose of building IRmadillo models. Proper sampling ensures consistency, accuracy, and reliability of the models.

3. EQUIPMENT & MATERIALS

- Sterile sample bottles (100–250 mL)
- Sampling port (sanitized)
- Ice packs and cooler (if samples need to be preserved for lab testing)
- 5-gallon bucket to catch purge material from sample ports

4. PREPARATION

- Optimal HPLC conditions have been established i.e. longer columns preferred for greater accuracy, columns are new or near new for best sensitivity and minimizing/eliminating contamination risk.
- The best practices for sample collection and material handling have been verified and agreed upon with Keit team for best possible models.
- Operators understand the importance of the timestamps and the reason why they are critical for successful model building. Incorrect time stamps will cause deviations in the final model.
- R & R has been completed for a clear understanding of current deviations or shifts in the sample results and potentially catch issues before modeling.
- Sampling hours have been established at 6, 10, 13, 15, 18, 21, 24, 26, 29, 32, 34, 36, 39, 42, 45, 48, 52, 55, Drop (Can be modified per facility if longer fermentation times are needed).
- A system has been established or already in place for collecting all the fermentation data in one place to be sent for modeling.

5. SAMPLING FROM A FERMENTER PORT

Site standard operating procedures and best practices will serve as the default approach. Through discussion and agreement, we will best position ourselves for success.

- Ensure that all sampling containers and equipment are clean and sanitized.
- Allow sample liquid to flow out to purge any stagnant sample in the port.
- Collect the sample in the sterile bottle, ensuring no external contamination.
- Seal the bottle immediately and avoid excessive handling.
- Sample prepped and run ASAP to ensure accuracy in chemistry when comparing the spectral data vs the HPLC.