



Basics of Brewing Quality

A Hands-On Workshop

Tentative agenda:

8:00 – 8:15 – Welcome, Orientation and Safety

8:15 – 9:00 – Lecture: Brewing Microbiology Basics

- Yeast
 - Saccharomyces vs Non-Saccharomyces
 - Lager vs Ale
- Bacteria
 - Types - aerobic/anaerobic/facultative
 - Staining tests (Gram stain), catalase tests

9:15 – 10:00 – Lecture: Microscopy basics

- The Microscope
 - Basics of microscope set-up
 - Wet mounting/dry mounting/oil immersion
 - Yeast counting with a hemocytometer
 - Staining: Methylene Blue & Gram Stain
- Plating and media
 - Aseptic techniques
 - Differential media, selective media, non-selective media
 - Isolating and streaking pure cultures
- Other Micro
 - Forced fermentations for estimating attenuation
 - Yeast propagation
 - Sediment analysis
 - Catalase tests

10:15 – 12:15 - Microbiology laboratory practical

- Station 1: The Microscope
 - Microscope set-up
 - Pipetting
 - Dilutions and staining live samples
 - Counting yeast on the hemocytometer
- Station 2: Plating
 - Perform Aseptic technique
 - Conduct pour plate
 - Conduct pipetting 1 ml into HLP
 - Reviewing differential media and selective media
 - Look at results from sample plates
 - Document total count, and make observations on selective/differential media
- Station 3: Gram Stain and Catalase Test

12:15 – 1:30 – LUNCH

1:30 – 2:15 pm – Lecture: Brewing Chemistry

- Brewhouse performance
 - Wort gravity via hydrometer, densitometer and refractometer
 - Spectrophotometry tests/beer color, IBUs in beer (mention of all others)
 - pH
- Fermentation performance
 - Beer calculations – Extract of original wort, real degree of fermentation, ethanol, carbohydrates, calories
 - Ethanol – Direct measures
 - Diacetyl measurement – Quick/Simple vs Complex
 - Other checks - O₂ pick up, temp controls, pH
- Finishing and Packaging Performance
 - Dissolved oxygen in beer
 - Beer stability/clarity
 - Package gases (TPO, CO₂, headspace air)
 - Packaging material quality (crowns, glass)
- Sanitation Performance
 - ATP Checks
 - Residual chemicals
 - pH
 - Water
- Food Safety Hazards
 - Glass, chemicals, etc.

2:15 – 3:15 – Roving Lab Practice skills and Demonstrations

- Station 1 - Finishing and Packaging Performance
 - Cold-side - Dissolved oxygen in beer
 - Zahm Nagel Piercer demonstration
 - DO meter piercer set-up
- Station 2 - Sanitation Performance
 - Cold-side – Beer stability/clarity
 - Sediment under 3 microscopes
 - Discussion of how to perform sediment test (Decant, spin, wetmount, stain)
- Station 3 - Brewhouse performance
 - Wort gravity via hydrometer, densitometer and refractometer
 - Test wort (n = 3) with all three methods
 - Note variation between students' results

3:15 – 4:15 – Report from stations

- Students report findings tested skills and what they learned

4:30 – 5:00 – Lecture: Putting it all together

- Data analysis and interpretation
- Communication and improvement