



Dear Analytical Chemistry Students at Indiana University,

The Upland Brewing Company was founded in 1997 and takes its name from the rolling hills of southern Indiana. The microbrewery has a popular onsite brewpub in Bloomington featuring live music and an art gallery. By 2004 distribution had reached all 92 counties of Indiana. By 2010, distribution had expanded to southern Wisconsin and to northern Kentucky. A new facility enabling increased production and quality control is to be completed in the Spring 2012, located on the west side of Bloomington at Profile Parkway and Curry Pike. This 37,000 square foot facility will be the primary brewing facility for Upland, encompassing their everyday and seasonal lineup. The 11th Street brewery will be scaled down to become a research and development facility and primarily be the site of Upland's growing Belgian-style wild ales.

As a result of the expansion and newly acquired equipment, the Upland anticipates the ability to produce more uniformity in batches of our beer. We would like for your class to assist us in testing important components of beer over the next several years to help us evaluate the success of our new facility and flavor of our beer. In each lab section, we would like for the following compounds to be analyzed.

1. Bitterness Units (Iso-alpha acids),
2. Calcium and Magnesium (in beer and in source water),
3. Chloride and Oxalate ion (in beer and in source water),
4. Percent Alcohol by Volume
5. Polyphenol (Total and Individual Profile of Important Polyphenols)

We request that you summarize your experiments and findings in a formal report, so we can keep a record for quality control over time. We would also like you to prepare a scientific poster to display in our laboratory as a reference for employees working on beer formulations.

To summarize, we are asking for your assistance with three tasks to be completed by early May.

- 1) *Each group should perform one of the analyses listed above using published procedures as a guide. The most suitable calibration method (regular, standard addition, or internal standard) should be utilized.*
- 2) *Writing a formal report that includes background information, procedural details, individual group results and class results (including uncertainty), and conclusions.*
- 3) *Creating a scientific poster that will serve as quick reference guide for brewery employees wishing to understand how the measurement was made, the results, and conclusions.*

To help with these tasks, Caleb Staton, head brewmaster at the Upland Brewery, will visit your class to discuss the brewing process and the importance of the compounds being measured. He will work with Dr. Robinson to develop the criteria for your report and poster so what you produce will meet our expectations. Thanks in advance for all your help, and see you soon!

Caleb Staton
Head Brewmaster
Upland Brewery
Bloomington, Indiana