ASBC Method Highlight: Wort-23

Why measure IBU in wort?
Bitterness is an important attribute for most beer styles. Whether it be the most prominent flavor or simply added for balance, bitterness is a fundamental character of beer. Bitterness in beer predominantly originates from the hops added to the wort during kettle boil or through chemically modified hop extracts added to finished beer. Iso-alpha acids are the primary bittering compounds and are formed in the brew kettle via a heat-induced isomerization process and/or through chemical processing of hops or hop extracts. Other compounds, including hop oxidation products, also contribute to the bitterness of beer, especially in dry-hopped beers.

Why the difference in sample size between beer and wort?
In general, wort is processed in 5ml aliquots rather than the 10ml aliquot typical for beer analysis. Extraction of the iso-alpha acids is obtained by acidifying the sample, adding iso-octane (2,2,4-trimethlypentane), vigorous shaking to extract the iso-alpha acids, and finally centrifugation to obtain the separated liquid layer for spectrophotometric analyses. The make-up of wort lends itself to an increased probability in interferences during measurement, resulting in the possibility of falsely high readings. Reducing the wort sample size to 5ml helps reduce the interferences and increase the accuracy of measurement keeping the readings in the optimal range for spectrophotometer absorbance reading. Additionally, the naturally higher viscosity of wort can lead to difficulty in accurate pipetting. The increased dilution rate of wort minimizes issues with pipetting.

How do you know the emulsion is sufficient?
In general, analysis of bitterness does require some practice to master and emulsions can be an issue. The following are some recommendations when analyzing samples.

- Stopper or cap centrifuge tube tightly and place it on mechanical shaker for 15 min.
- The action must be vigorous enough to mix the layers.
- Remove the tubes from the shaker and place upright.
- Allow the organic layer to separate from the aqueous layer for 5 to 10 minutes.
- If the emulsion interface between the layers is greater than one-third the size of the solvent layer, mechanical techniques should be employed to help complete the phase separation.
- The optimum technique depends on the sample and may include centrifugation, stirring, filtration of the emulsion through glass wool, or other physical methods.
- If the emulsion persists, repeat the analysis with slightly reduced intensity of shaking.