Bitterness and Yeast Strain

Abstract:
Brewers choose yeast strains for many reasons. Different fermentation characteristics are desired in order to craft certain styles of beers. Characteristics like ester profiles, flocculation, alcohol tolerance and attenuation are all considered in yeast selection while IBU calculations are forgotten like the trub at the end of the kettle. Quantifying a yeast strain's effect on the bitterness is necessary to accurately predict the final profile of the beer. This fermentation experiment showed the IBU's in the beer are dependent upon the yeast strain in fermentation.

The Brew:

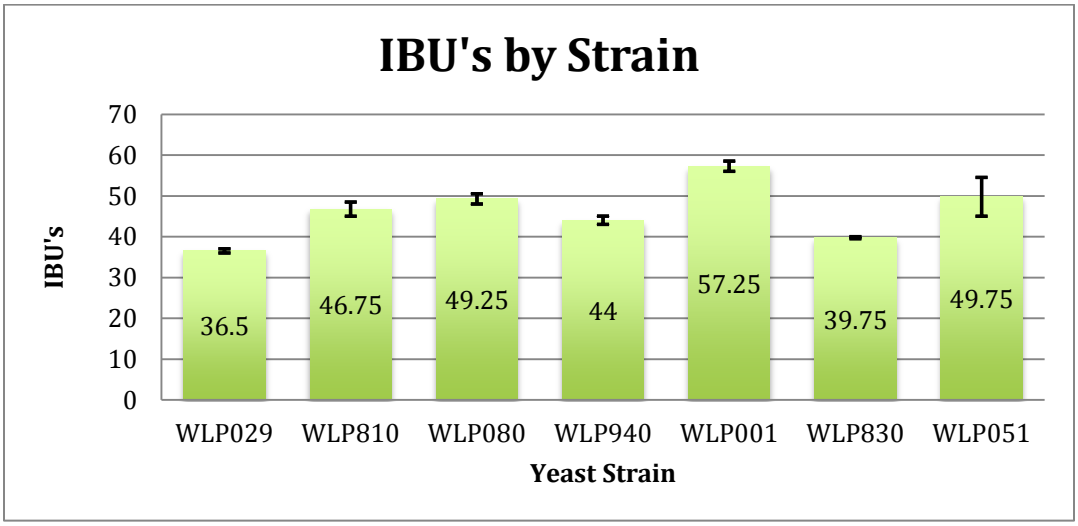
2-Row Pale Ale Malt	89%	Columbus 14.9 AA	60min
Caramel 40L Malt	8%	Cascade 7.2 AA	30min
White Wheat Malt	3%	Centennial 10.2AA	0min
		Cascade 7.2AA	Dry Hopped

64°C Single infusion mash, 14 day fermentation at 20°C

Method

The wort was split into 14 different fermentations after chilling to 20°C and seven yeast strains were pitched. After 14 days, IBU's were determined by spectrophotometry at 275nm by the ASBC method in duplicates.

The Results:



Conclusion: Yeast strain has major effects on the IBU's after fermentation. The IBU's in this experiment ranged from 38 to 58.5. WLP001 was the most hop neutral of the strains, while the German Ale yeast, WLP029, was a hop scavenger averaging just 39 IBU's. The average was at 47 IBU's, and the data set had a standard deviation of 6.7. This shows that yeast strain can cause up to a 15% swing in the bitterness profile of the beer. A brewer must choose a strain to complement the beer being brewed. Yeast strains are affected by the hop particles by charge interaction on the cell surface. Different strains express different cell charges and will scavenge the acids, pulling them out of the beer while flocculating. Further research is necessary to explore the mechanism of yeast/IBU characteristics.