Brewing with Wild Vermont Hops

Ellen Dillenbeck,
Lejla Mahmuljin
Vermont Hops

- Kingdom: 15.1% alpha acid
- Northfield: 3.6% alpha acid
- Wolcott: 3.8% alpha acid
- Control hop - Cascade: 7.7% alpha acid
Questions:

1. What kind of flavor will a beer brewed with this hop have?

2. What kind of aroma will a beer brewed with this hop have?

3. How much bitterness will this hop add to the beer?

4. Will a beer brewed with this hop be drinkable?

5. Does this hop have any unique, desirable characteristics?
Recipe

We used the same IPA recipe for the Kingdom, Wolcott, and Cascade brews

Desired IBUs: 75

We used a Pale Ale recipe for the Northfield brew due to a shortage of hops

Desired IBUs: 45
Smash Brew: Single Malt And Single Hop
Ingredients

- Best Maltz Pilsner Malt
- Gypsum
- Wild whole cone hops
- Switchback House Ale Yeast
Low Mash Temperature

There are two enzymes that break down starch chains to produce fermentable sugars.

Keeping the mash at a low temperature for a long time period allows the enzymes to more efficiently break down starch chains into fermentable sugars.
High Water to Grist Ratio

We used a ratio of 1L of water to every 2Kg of grist.

This ratio produces a thin mash.

We wanted to make a light-bodied beer that would allow tasters to focus on the beer’s hop character.
Hop Additions

**Bitterness**: 75 minutes before the end of the boil

**Flavoring**: 20 minutes before the end of the boil

**Aroma**: End of boil

**Dry Hopping**: During primary fermentation
Sensory Analysis - Questions

❖ Would you enjoy drinking a beer brewed with this hop?

❖ On a scale from 1-10, 1 being the least bitter and 10 being the most bitter, how bitter do you think this beer is?

❖ Describe the flavor and aroma characteristics imparted by this hop
Would you enjoy drinking a beer brewed with this hop?

<table>
<thead>
<tr>
<th>Location</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingdom:</td>
<td>44%</td>
<td>56%</td>
</tr>
<tr>
<td>Wolcott:</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Northfield</td>
<td>32%</td>
<td>65%</td>
</tr>
<tr>
<td>Cascade:</td>
<td>32%</td>
<td>65%</td>
</tr>
</tbody>
</table>
On a scale from 1-10, how bitter do you think this beer is?
Hop Characteristics

- Citrusy
- Floral
- Fruity
- Herbal
- Onion/Garlic
- Piney
- Tropical
- Spicy
- Sweaty
- Woody
Northfield Hopped Beer

- Fruity: 25%
- Herbal: 20%
- Citrusy: 15%
- Floral: 10%
- Piney: 5%
- Tropical: 0%
- Sweaty
- Onion/garlic
- Spicy
- Woody
Wolcott Hopped Beer
Cascade Hopped Brew
IBU Testing

- International Bitterness Units (IBUs)
- IBUs are a measurement of specific chemicals, including isomerized alpha acids, that are known to make beer taste bitter
- Most beers contain between 5 and 120 IBUs
International Bitterness Units (IBU) Results
Perceived vs Calculated Bitterness
Conclusion

Possible Sources of Error

- Possible lab errors in alpha acid calculations
- Switchback house bias

Future Research

- Each batch of beer had different flavors and aromas
- More research and selective breeding will help determine whether these hops have commercial value
And now for the results...

Sample 1 - Kingdom
Sample 2 - Northfield
Sample 3 - Wolcott
Sample 4 - Cascade

Please check out our website for the questionnaire results:
https://www.switchbackvt.com/news
Cheers!