Examination of the Fermentation Trends of Single Day vs. Split Day Brews

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Background

- **In order to add an extra tank being brewed into during the week, split-day batches of a mainstay beer were added to the wort production week**
- **A difference in the fermentation trends was noted for these split-day batches versus the single day batches of the same beer**
  - This observation led to an examination of the efficacy of split-day batches for the following:
    - Fermentation time
    - Dry-hopping date
    - Concentration of vicinal diketones (VDK)
  - Other off-flavors such as acetaldehyde, hydrogen sulfide, dimethyl sulfide, and trans-2-nonenal were screened for throughout fermentation
- **Objective of study: to determine the total length of time from initial knock out to crash cooling for split-day batches and single day batches**

Methods

- **Pitch rate of BSI-01 yeast:**
  - For single day brews, 60 kg of yeast was pitched, following a 15 kg/20 barrel parameter
  - For the split day brews, 45 kg of yeast was pitched on the first day
- **The gravity was taken on the following day and if the gravity drop was less than 2 °P, then the next knockouts were oxygenated**
- **Daily monitoring of pH and specific gravity using an Anton Paar DMA 35**
- **VDK determination via a Hach DR 6000EDU spectrophotometer with Hach TNT 819 vials**
  - Testing begins two days after dry-hopping
  - The threshold for VDK value was set to 0.100 mg/kg
  - VDK standard is checked weekly for accuracy

Single Day Brew Fermentation Trends

- **Tower Station is a 7.3 % IPA**
- **The target final gravity for when this data was taken was 3.5 °P**
- **Tower Station is dry hopped when it is approaching final gravity and its gravity has less than a 0.5 °P drop in the last 24 hours**
- **Single day Tower Station batches are typically dry-hopped on Day 4 or Day 5 of fermentation**
- **Single day Tower Station batches are typically crashed on Day 7**

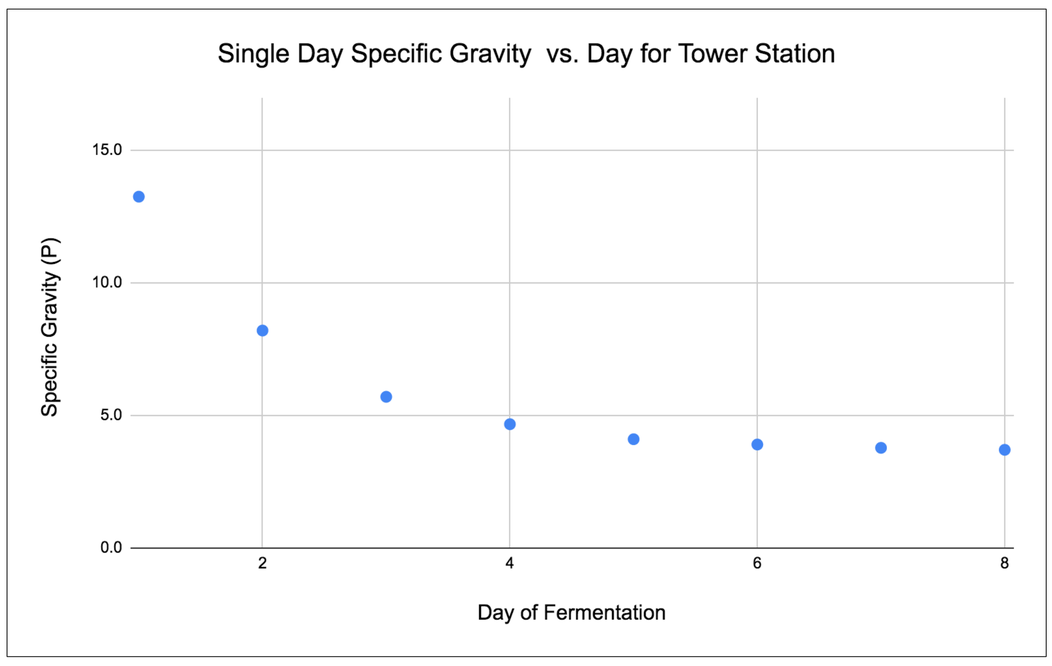

Figure 1. A graph demonstrating the fermentation trends of single day Tower Station brews. Dry-hopping of the tank usually occurs on Day 5 of fermentation when the tank has neared its final gravity and dropped less than 0.5 °P from the previous day.

Split Day Brew Fermentation Trends

- **Split day Tower Station batches are typically dry-hopped on Day 5 or Day 6 of fermentation**
- **Split day batches are typically crashed on Day 8 or 9 of fermentation**

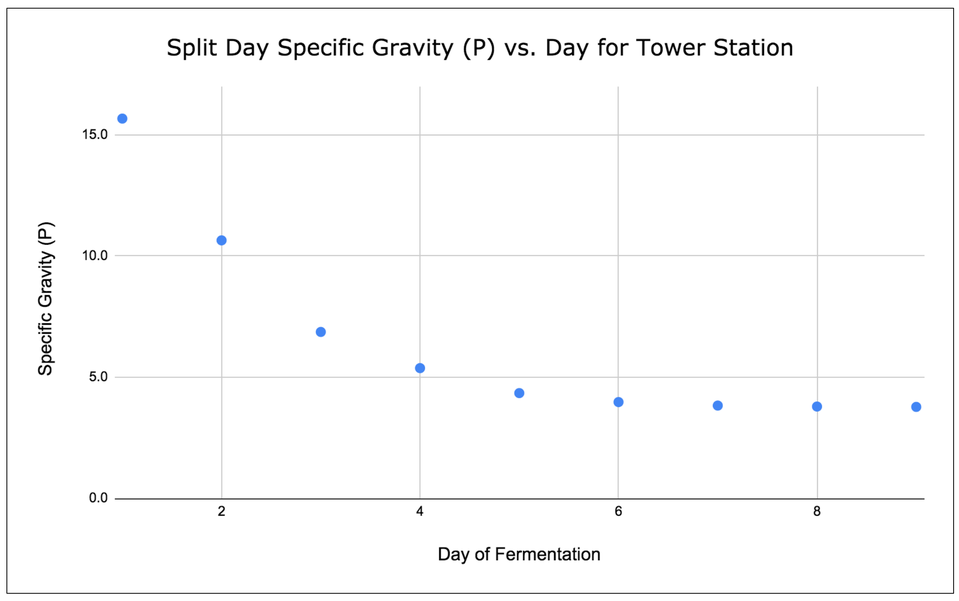

Figure 2. A graph demonstrating the fermentation trends of split day Tower Station brews. Dry-hopping of the tank usually occurs on Day 5 or 6 of fermentation when the tank has neared its final gravity and dropped less than 0.5 °P from the previous day.

VDK Trends for Split Day versus Single Day Batches

- **VDK are run two days after dry-hopping the tank**
- **For single day brews, that is on Day 7 of fermentation**
- **For split day brews, that is on Day 8 or 9 of fermentation**
- **Generally, single day brews are crashed on day 7 of fermentation and split day brews are crashed on Day 9 of fermentation**

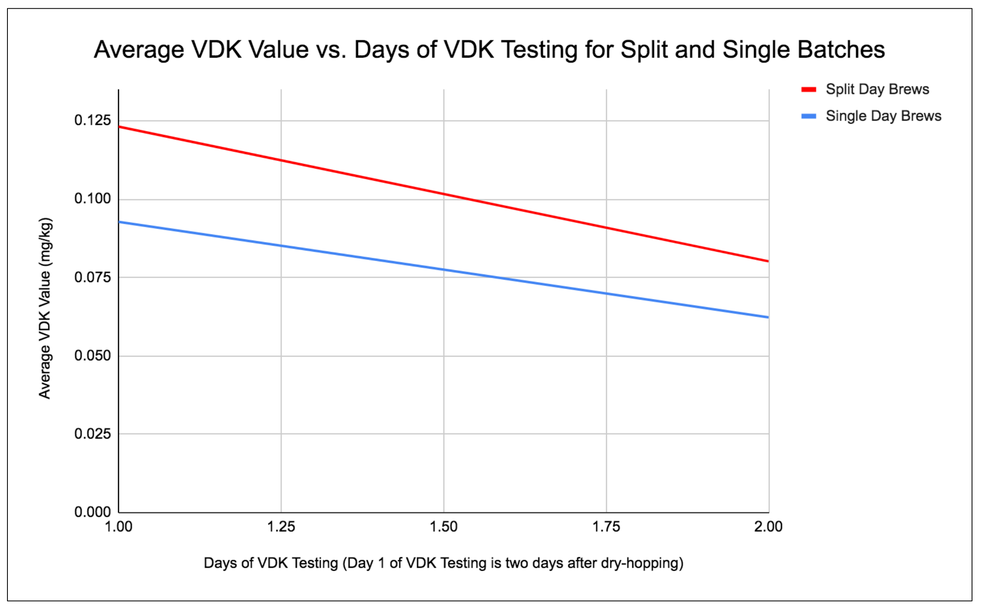

Figure 3. A graph demonstrating the VDK values of single day batches (blue) and split day batches (red). Single batches typically pass VDK on Day 1 of testing, while split day batches typically pass on Day 2 of testing.

Conclusions

- **Single day batches ferment in a more predictable pattern and pass VDK on Day 1 or 2 of testing**
- **Single day batches are ready to be crash cooled on Day 7 of fermentation, while split day batches are ready to be crash cooled on Day 8 or Day 9 of fermentation**
- **Depending on the needs of the brewery (ie. Quicker production or more product), breweries should pick and choose when to use split batches carefully**
  - Split batches allow for more brew days in the week and therefore more total volume of product
  - Single batches allow for a faster fermentation time and therefore enable the brewery to get more product out faster to consumers

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