

The background features a dark grey, slightly blurred image of hop cones and a hop powder container. The hop cones are scattered across the frame, with one large one in the upper left and another in the lower left. A hop powder container is visible in the lower right. The overall aesthetic is clean and professional, focusing on the hop ingredients.

CRYO HOPS™: DRY HOPPING WITH LUPULIN HOP POWDER

Joe Mohrfeld

Director of Brewing

Pinthouse Pizza Brewpubs

Austin, TX

Cryo Hops™: Lupulin Hop Powder

- Techniques
- Usage
- Benefits
- Pitfalls
- Case study

Cryo Hops™: Lupulin Hop Powder

- Techniques
 - How to go about introducing this Lupulin Hop Powder to your beer

Cryo Hops™: Lupulin Hop Powder

- Usage
 - Rates
 - Blending usage with pellets

Cryo Hops™: Lupulin Hop Powder

- Benefits of Lupulin Hop Powder
 - Aroma and flavor increases
 - Yield increase

Cryo Hops™: Lupulin Hop Powder

- Pitfalls
 - Challenges with mixing
 - Aroma and flavor qualities

Cryo Hops™: Lupulin Hop Powder

- Case Study: A Tale of Two Electric Jellyfish
 - Showcasing the difference of a beer brewed with the traditional all pellet dryhop and one brewed with a blend of pellet and lupulin powder.

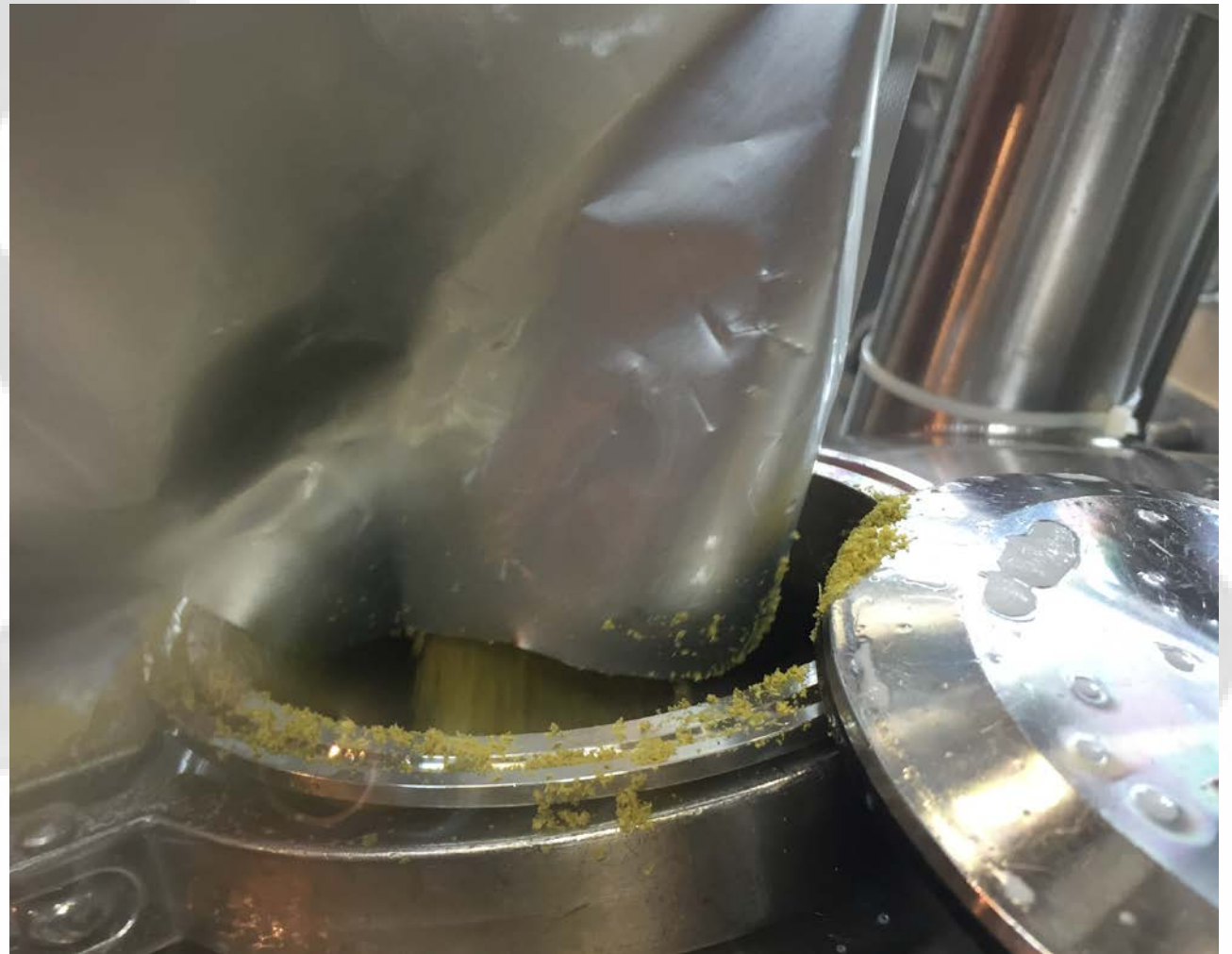
Cryo Hops™: Techniques

- So... how do you go about introducing this Lupulin Hop Powder to your beer...

...Very similar to adding pellets!

Adding Lupulin Hop Powder

- Depressurize Tank
- Create a CO2 blanket
- Add Lupulin Hop Powder through dry hop port
- Cap tank and repressurize



Adding Lupulin Hop Powder

- Recirculate tank from bottom valve through vent arm



Adding Lupulin Hop Powder

Start of Recirculation



End of Recirculation



Adding Lupulin Hop Powder

- First sample shows the beer pre-recirculation
- Second Sample shows the beer post-recirculation



Cryo Hops™: Usage

- Usage rate in comparison to pellet hops
- 30-50% usage rates have been tested
 - 40% usage rate for adapting to an existing recipe
 - No noticeable increase in flavor and aroma at 50% usage rates
 - 30% usage rate needs more experimentation

Cryo Hops™: Usage

- Can be blended with pellets during the same dry hop or as a second or third dry hop
 - Biggest benefit for flavor and aroma intensity and complexity when blended 20%-80% of total hop usage with pellet hops

Cryo Hops™: Benefits

- Immediate flavor and aroma pickup during recirculation
- Possible reduction of total tank times with less dry hop contact time needed for extraction with an equal or increased flavor and aroma

Cryo Hops™: Benefits

- **Yield Increases**
 - **2-6% in beers using an addition of Lupulin Hop Powder as a complete or partial replacement for pellet hop additions**

Cryo Hops™: Benefits

- Remains in Suspension longer
 - Less need for continued tank rousing to keep hops in solution and maximize extraction
 - Potential for increased flavor and aroma intensity at 40% usage rate

Cryo Hops™: Benefits

- Less vegetative matter in your beer
 - Reduced polyphenol extraction – especially in recirculated beers
 - Less astringency and smoother hop character in heavily dry hopped beers

Cryo Hops™: Pitfalls

- More difficult to mix thoroughly than pellet hops
 - Thorough recirculation needed to completely mix and saturate Lupulin Hop Powder.
 - Recirculation needed on all sizes of tanks
 - More potential for O₂ pickup from the recirculation process

Cryo Hops™: Pitfalls

- Two days after Lupulin Hop powder addition to a non-recirculated tank



Cryo Hops™: Pitfalls

- Exclusive use is limiting on flavor and aroma depth and complexity
 - Lack of “Organic” hop character present in beers we have dry hopped exclusively with Lupulin Hop Powder...

Cryo Hops™: Pitfalls

...But, when supplemented as a large percentage of the dry hop (80%+) in addition to pellet hops we saw a noticeable increase in the intensity of hop flavor and aroma without the vegetative qualities sometimes found in our most heavily dry hopped beers.

A Tale of Two Electric Jellyfish

- Electric Jellyfish IPA
 - 6.5% ABV
 - 60 IBUS
 - 5lbs/bbl



A Tale of Two Electric Jellyfish

Electric Jellyfish IPA with traditional Hop Pellets

- Brewed with a combination of 3 hop pellet varieties in the Dry Hop
 - Haas Citra pellets
 - BT Loftus Simcoe pellets
 - ????
- Dryhopped at a rate of 3.3lbs/bbl
- Recirculated and roused tank during dryhopping

Electric Jellyfish IPA w/Lupulin Hop Powder and Pellets

- Brewed with a combination of Lupulin Hop Powder and hop pellets
 - Citra Powder (40% usage rate)
 - Simcoe Powder (40% usage rate)
 - ????
- Dryhopped at an equivalent rate of 3.3lbs/bbl
- Recirculated tank when dry hops were added

A Tale of Two Electric Jellyfish

Electric Jellyfish IPA with traditional Hop Pellets

- Sensory Notes:
 - More noticeable polyphenol harshness and astringency
 - Softer fruit aromatics and more “organic” hop character

Electric Jellyfish IPA w/Lupulin Hop Powder and Pellets

- Sensory Notes:
 - Brighter and more intense hop aroma
 - More rounded and full hop flavor
 - More intensity of aroma and flavor
- Plus... a 6% increase in yield!



THANKS!

Joe Mohrfeld

Joe@pinthousepizza.com