



# Quality at the Processor Level

Shane Dale  
BSG Hops / Rahr Hop Company

# Quality at the Processor Level

## ➤ Battling Quality Degradation in Hops

- Time
- Temperature
- Oxygen
  - Oxidation of Bittering Compounds
  - Oxidation of Aroma Compounds

## ➤ Essential Oils

- Oxidation of Oils Will Occur at a Rate Similar to Alpha Acids

## ➤ Slight Oxidation is Good?

- Some Aromas Benefit from Slight Oxidation (Spicy or Herbal)



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# Quality at the Processor Level



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May 18, 19 2018  
Hood River, OR

# Quality at the Processor Level

## ➤ Stopping the Oxidation and Degradation

- When Bales Arrive
- Initial Quality Evaluation
- Cooling Process

## ➤ Processing

- Still Battling Time
- Sooner Hops are Packaged the Better
  - Irreversible Degradation Remains
  - Selected for a Certain Profile.....in September

## ➤ Packaging

- Improvements with Bag Material
- Improvements in O2 Evacuation



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# Hop Storage Quality Retention

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# Hop Storage

## Quality Retention

- **Goal = Quality Retention**
- **The Perfect Storage**
- **Improper Storage**
- **Freight Transit Concerns**
- **What is the Damage?**
- **\$\$\$ vs Damage**



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# Hop Storage

# Quality Retention

## Goal = Quality Retention

- **Bittering? Alpha is \$\$\$.**
- **Flavor and Aroma?**
  - **Fresh is Best (Minimize Degradation)**
  - **Maintain the Hops Original Profile**
- **Its Not Uncommon to be Using 2-3 Year Old Hops**
  - **Properly Packaged and Stored Hops are a MUST**



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# Hop Storage

## Quality Retention

### The Perfect Storage

- **Storage = From Harvest to Your Kettle**
  
- **Factors that Degrade Hops – How to Combat?**
  - **Heat**
    - Maintain **CONSTANT** Storage Temps of 31-40 Deg F.
  - **UV**
    - Bag Material with UV Barrier
  - **Oxygen**
    - Proper Evacuation of Oxygen During Packaging
    - Bag Material with Oxygen Barriers (Foil)
    - Proper Bag Sealing (Nothing else matters if you have a bad seal)
  
- **Proper Storage 24/7/365**
  - Damage/Degradation due to Gaps in Proper Storage are Irreversible



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# Hop Storage

## Quality Retention

### Improper Storage

- **Extended Storage Without Refrigeration**
  
- **Open Packaging**
  - **Not Using a Full Bag – Not Repackaging Properly**
  - **Damaged Packaging – Not Repairing Immediately**
  
- **Don't Forget Hop Shipping and Transit Time!**
  - **2-5 Days in a Hot Truck? Not Good.....**



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# Hop Storage

# Quality Retention

## Freight Transit Concerns

### ➤ Before Shipment, Consider:

- The Weather (Winter? Summer? Heat Wave?)
- Transit Time (1 Day? 6 Days?)
- Transit Route (Washington to Maine.....via Texas?)

### ➤ Microbiological Organisms

- Bacteria Will Thrive in 40-140 Deg. F Conditions
- May not be Harmful, but will Damage Hops

### ➤ Transit is Still Part of the Storage Cycle

- Refrigerated Freight is Highly Recommended!



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# Quality Retention

## What is the Damage?

### ➤ **Storage/Transit in Warm Conditions**

- Alpha Acids Oxidize and May Decrease
- Iso-Alpha Acids are Formed
- Low Volatile Components Develop – Creates a “Solvent Smell”
- Pressure Increases inside the Package (Ballooning Effect)

### ➤ **Compromised Packaging**

- Expansion of Gasses Could Rupture a Bag
- Bad Seals Will Allow Oxygen to be Introduced – Rapid Oxidation

### ➤ **Pellets are More Reactive than Hop Cones**

- Lupulin Glands are Open – Faster Degradation and Oxidation



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## Quality Retention

### \$\$\$ vs Damage

#### ➤ Storage at the Processor/Dealer

- New or Upgraded Refrigeration = \$\$\$
- High Quality Bagging Equipment = \$\$\$
- Bagger Atmospheric Monitoring = \$\$\$

#### ➤ Freight Transit

- Refrigerated Freight = \$\$\$
- Order a Pallet, (not just a box) to Ship Refrigerated = \$\$\$
- If FOB Supplier, this is the Customers “call”

#### ➤ Storage at Brewery

- Expand Refrigerated Storage = \$\$\$
- Invest in a Vacuum Chamber Sealer w/ Gas Flush = \$\$\$



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## (For more information)

- **“What happens to hop pellets during unexpected warm phases?”**
  - Authored by Dr. Adrian Forster



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