



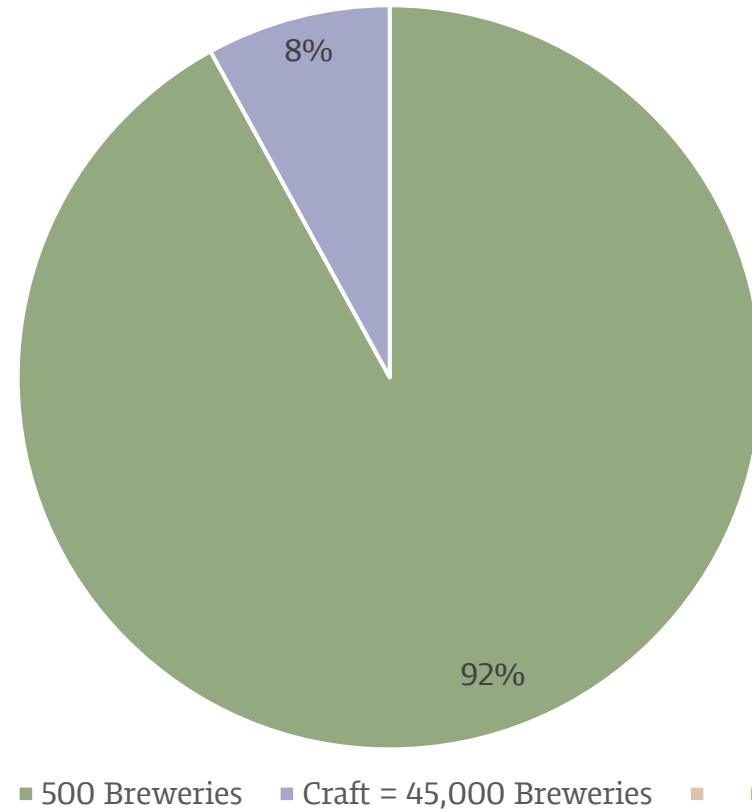
BarthHaas®

***CONSISTENCY, EFFICENCY  
& THE EVOLUTION OF BREWING***

# HOW DO WE FEED OURSELVES IN THE FUTURE?

There is only so much pie to go around..... How do you make sure you get a big enough slice?

Market Share



***BEING A SUCCESSFUL BREWER  
IS REALLY FRICKIN' HARD!!***

***BE A BREWER THEY SAID...***



***WHAT HELPS YOU STAND ABOVE IS  
QUALITY AND CONSISTENCY,  
BUT THAT'S THE HARDEST BIT...***

# WHY IS CONSISTENCY SO IMPORTANT?

High competition for taps



High competition for drinkers



High competition for shelf spaces



Consumers are increasingly risk averse



# WHY IS CONSISTENCY HARD?



- Why would a biological product be 100% consistent?
- How can one field of hops be identical to the next field?
- Why does a living organism like yeast ferment the same way every time?
- Why does a field of barley grow identically each year? The answer is of course they don't.
- What does vegetation bring to a beer?
- What even is typical Citra?
- Why build in risk to your portfolio?



**HOW DO WE REDUCE RISK IN OUR BREWING PROCESS?**



***KETTLE HOPPING***  
***ON THE HOT SIDE,***  
***WHERE BITTERNESS IS CREATED...***

## ***WHAT ARE THE RISKS IN THE KETTLE?***

- ⚡ Adding vegetation reduces beer output**
- ⚡ T90 alpha levels are inconsistent**
- ⚡ The bittering process requires adaptation of each brew**



# **CLASSIC WAYS TO IMPROVE EFFICIENCY AND CONSISTENCY IN THE BREW KETTLE**



## **USE CO<sub>2</sub>-EXTRACTS TO REDUCE BEER LOSSES**

Up to 5% compared to T90 pellets



## **USE CO<sub>2</sub>-EXTRACTS TO INCREASE THE UTILIZATION OF ISO-ALPHA-ACIDS**



## **USE PRE-ISOMERIZED EXTRACTS TO SHORTEN THE BOILING TIME AND INCREASE THE UTILIZATION**

Create light stable beers with specially developed extracts





**FLOWABLE AND DESIGNED SPECIFICALLY  
FOR HIGH EFFICIENCY BITTERING**



- ✓ *Increased yields - 3 to 8 % wort savings*
- ✓ *Increased alpha acid utilisation - compact version of bittering hops*
- ✓ *Reduced shipping and storage*
- ✓ *Reduced waste*
- ✓ *Reduced cleaning time*
- ✓ *Utterly consistent finish*



*“Flex was a success from the outset and was soon integrated in our brewing process [...] Flex is consistent [...] very clean and rounded bitterness [...] increased wort yields and finally less cleaning”*

- Andy Parker, Head Brewer & Founder, Elusive Brewing, UK

***“We now use FLEX® in all our beers because we want clean bitterness in all of them. [...] FLEX® helps me do this super consistently and super efficiently”***

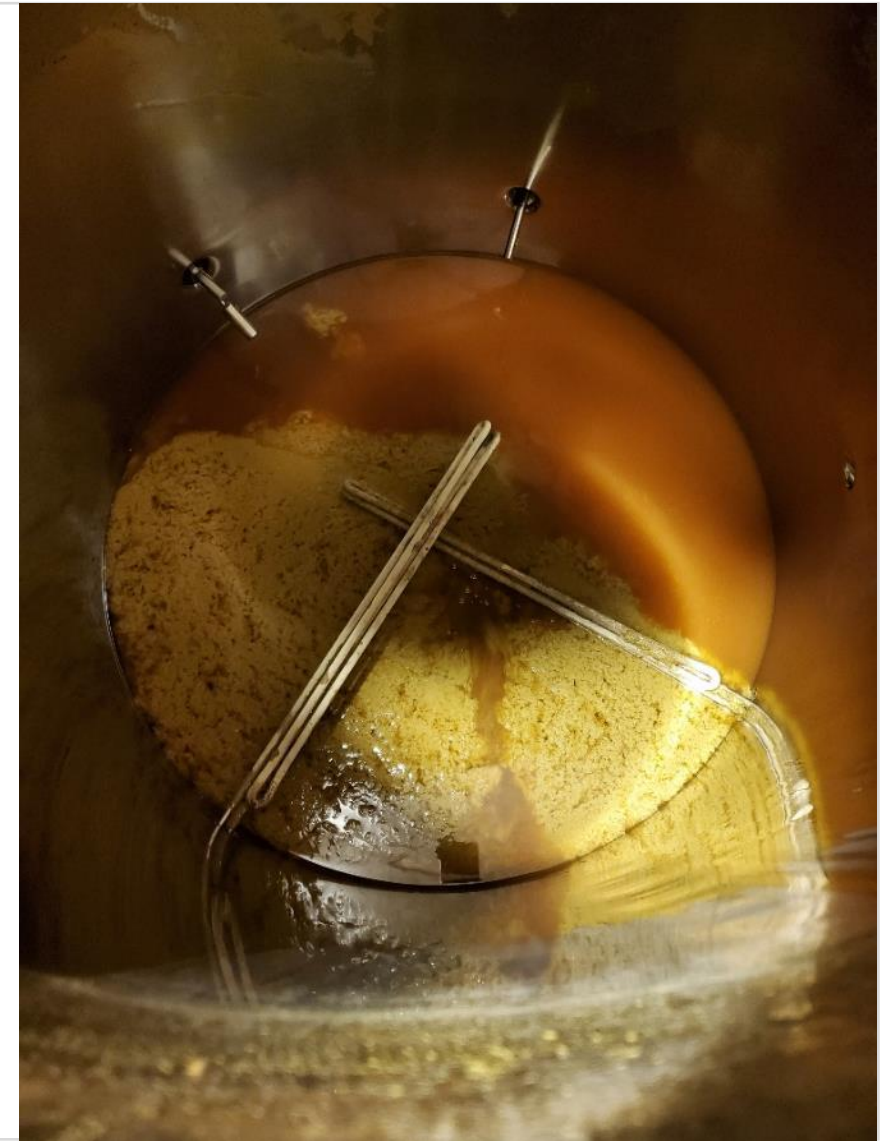
- Davin Bartosch, Co-owner & Brewmaster - Wiseacre Brewing Co.



***LATE HOPPING - SPINNING FLAVOR IN  
THE WHIRLPOOL***

# **PROBLEMS WITH HOPPING IN THE WHIRLPOOL**

- ⚡ **Adding Vegetation**
- ⚡ **Negative impact on wort clarification**
- ⚡ **Clog up the yeast**
- ⚡ **Can clog the filter causing delays and problems**
- ⚡ **Increased bitterness perception**
- ⚡ **Higher/darker beer color**
- ⚡ **Reduces beer volumes**
- ⚡ **Can be an inconsistent finish on flavour profile**



- During Whirlpool, Isomerization comes secondary; main purpose should be creating aroma base for great flavor perception in the final beer
- Hop pellets contain approx. 50% Cellulose and Lignin = insoluble in wort ==> basically losses
- T90 Pellets flavor profile varies from batch to batch



## ***RISKS AND TIME WASTING***





Source: Visgil et. Al: Supercritical CO2 hop extract improves brewery process yield over hop pellets - 2017 - Master Brewers Conference

**T-90 pellets**

Avg. Loss: **11,4 %**

**Lupomax**

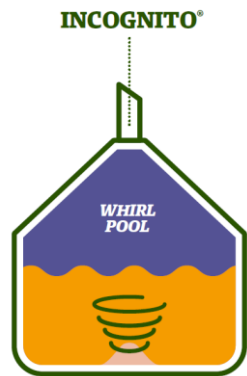
Avg. Loss: **7,3 %**

**Liquid Hop**

Avg. Loss: **4,3 %**



**FLOWABLE AND PERFECT FOR LATE HOPPING WITH MINIMUM PROCESS LOSS**



- ✓ *100% hop derived and natural*
- ✓ *Easy-to-dose and highly efficient*
- ✓ *Late-hopping without beer losses*
- ✓ *No equipment limitations*
- ✓ *Variety specific*

**USE INCOGNITO® TO REDUCE THE LOSSES WITH THE HOT TRUB, WITH T90 PELLETS, 6 - 7 % OF THE WORT IS LOST WITH THE HOT TRUB.**



**CITRA, MOSAIC, CENTENNIAL, CHINOOK, EKUANOT, HBC 1019**



# ***RANGE BREWING CO.***

- 12 hL (10 US bbl) brewhouse
- ~500 brews per annum
- Double Dry Hopped West Coast IPA

INCOGNITO	0 gm / hL	75 gm / hL
Total T90 (kg)	45	35
Wort Loss	6.0%	1.5%
Finished Beer Yield	80%	85%



Images courtesy Range Brewing Co.



## 100% HOP DERIVED LIQUID FLAVOR.



- ✓ *Lower Alpha-acid, lower resulting bitterness*
- ✓ *No beer losses in the whirlpool*
- ✓ *Standardized and variety specific*
- ✓ *100% hop derived and natural*
- ✓ *No equipment limitation*



**AVAILABLE IN CITRA® / MOSAIC® / GALAXY® /  
ECLIPSE® / EL DORADO / CASCADE / VIC SECRET /  
AZZACA / BRU-1/ HBC 1019/ ENIGMA/  
HERSBRUCKER/WILLAMETTE**



***“[...] the most significant benefit we observed was in our yield. We noticed a notable increase in our wort collection into FVs”***

- Brian Dickson, Co-founder & Technical director – Northern Monk

***“We have found that using Spectrum, we are achieving a much larger yield on our products. We have see our efficiency increase quite dramatically almost overnight”***

- Gary Farlow – Technical Brewer – Vocation Brewery, Hebden Bridge, UK



***DRY HOPPING - NEEDS TO EVOLVE TO SURVIVE***

## WHAT ARE THE RISKS OF DRY HOPPING?

 **1 kg Citra T90 pellets can absorb theoretically up to 14 L**

### **CASE STUDY**

- 100 hl fermentation tank
- Dry hopping at 8 g/l with regular T90 pellets
- 80 kg in total, 16 x 5 kg foils

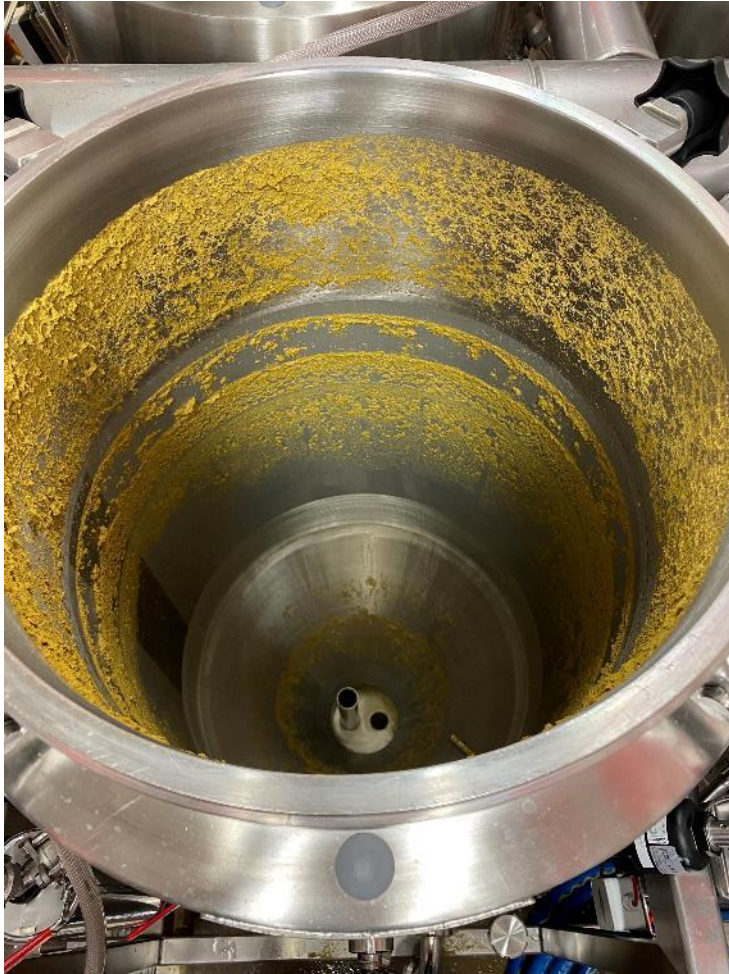


Can absorb up to approx. **1250 l**  
Up to **12,5 % losses** due to dry hopping

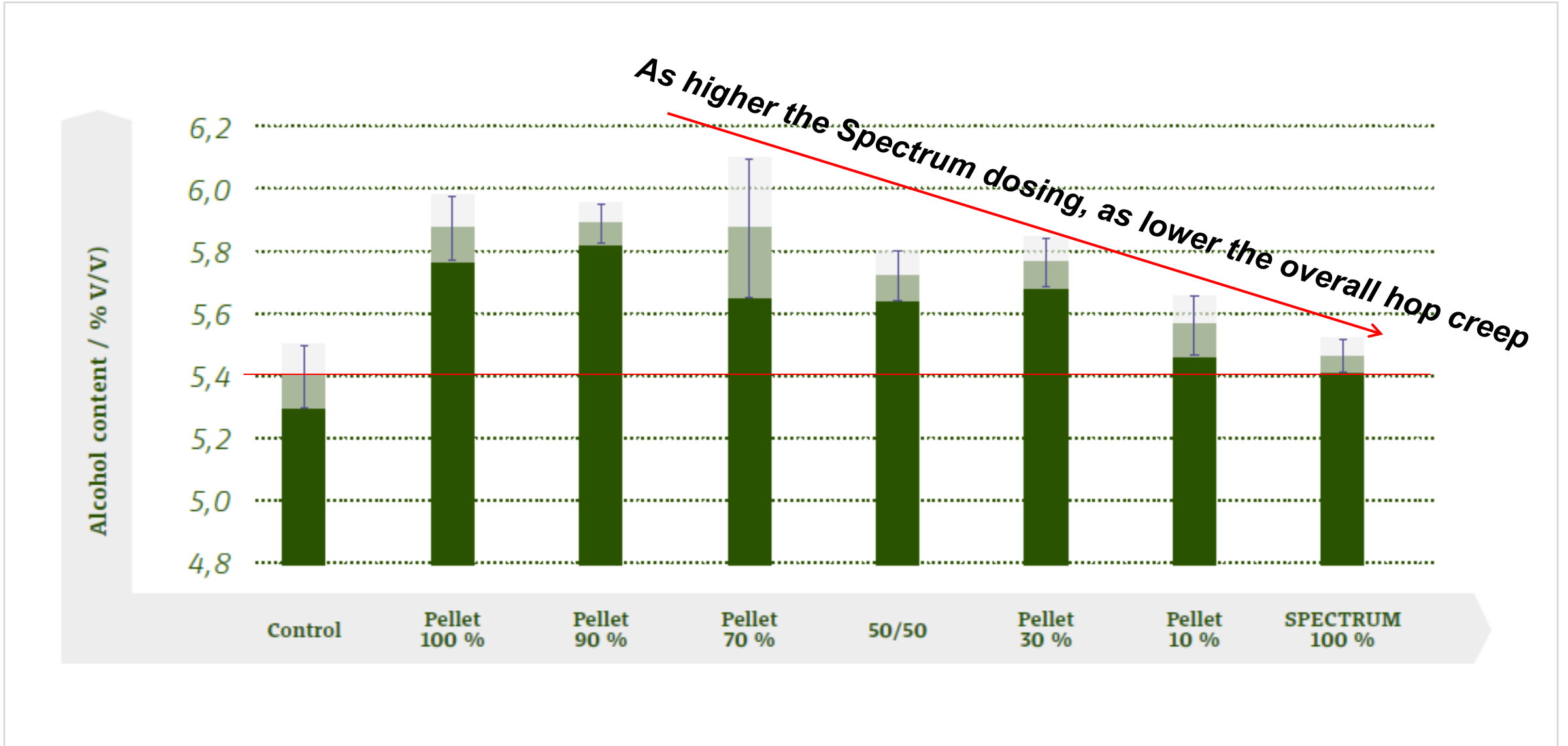
And its inconsistent!!



# ***CLEANING & CLOGGING DUE TO DRY HOPPING***



# HOP CREEP - PELLET VS. SPECTRUM



# **CLASSIC WAYS TO IMPROVE EFFICIENCY WHEN DRY HOPPING**



## **REDUCE BEER LOSSES BY USING ENRICHED PELLETS LIKE OUR LUPOMAX®**

- Save up to **50%** of the beer losses during Dry Hopping by decreasing the amount of pellets compared to T90

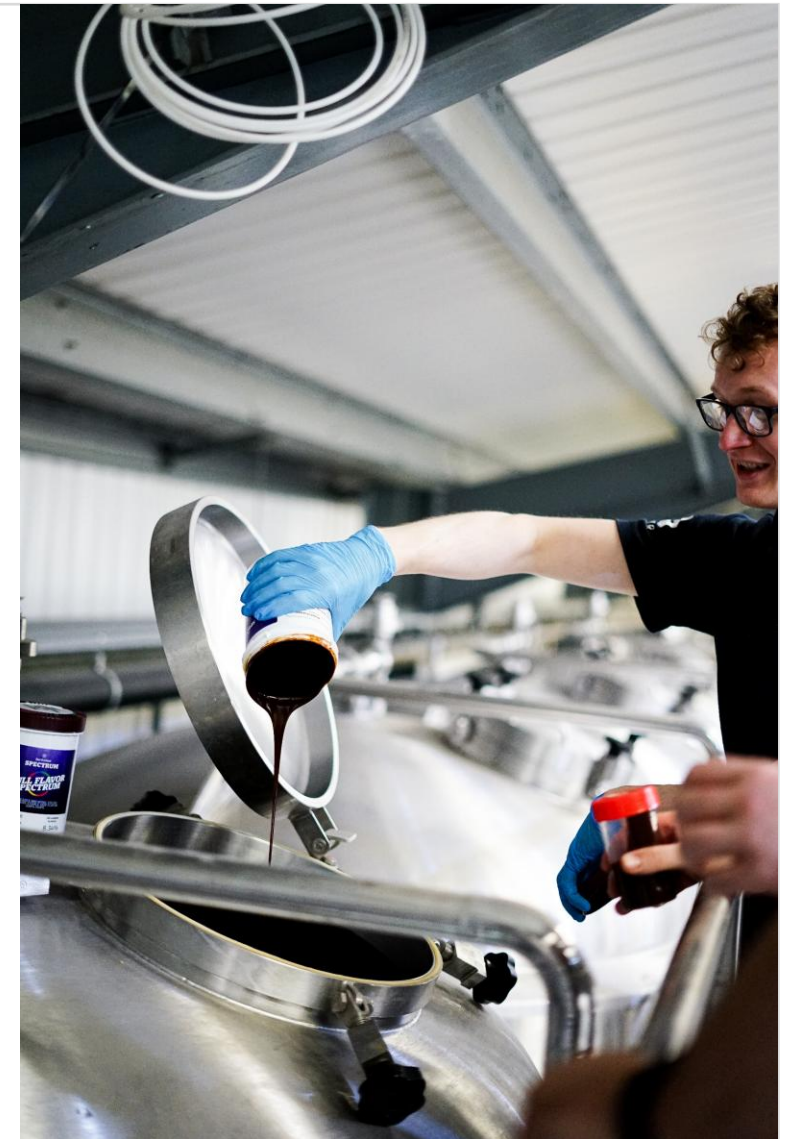


## **IF USING PELLETS, USE A DYNAMIC DRY HOPPING EQUIPMENT TO SAVE TIME AND TO INCREASE THE UTILIZATION OF AROMA**



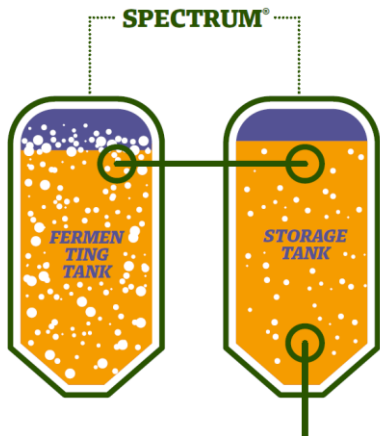
## **USE A SEPARATOR OR DECANter TO REMOVE THE PLANT MATERIAL**

- Depending on the system a reduction of dry hopping related beer losses up to **90%**





**100% HOP DERIVED LIQUID  
DRY HOPPING FLAVOR.**



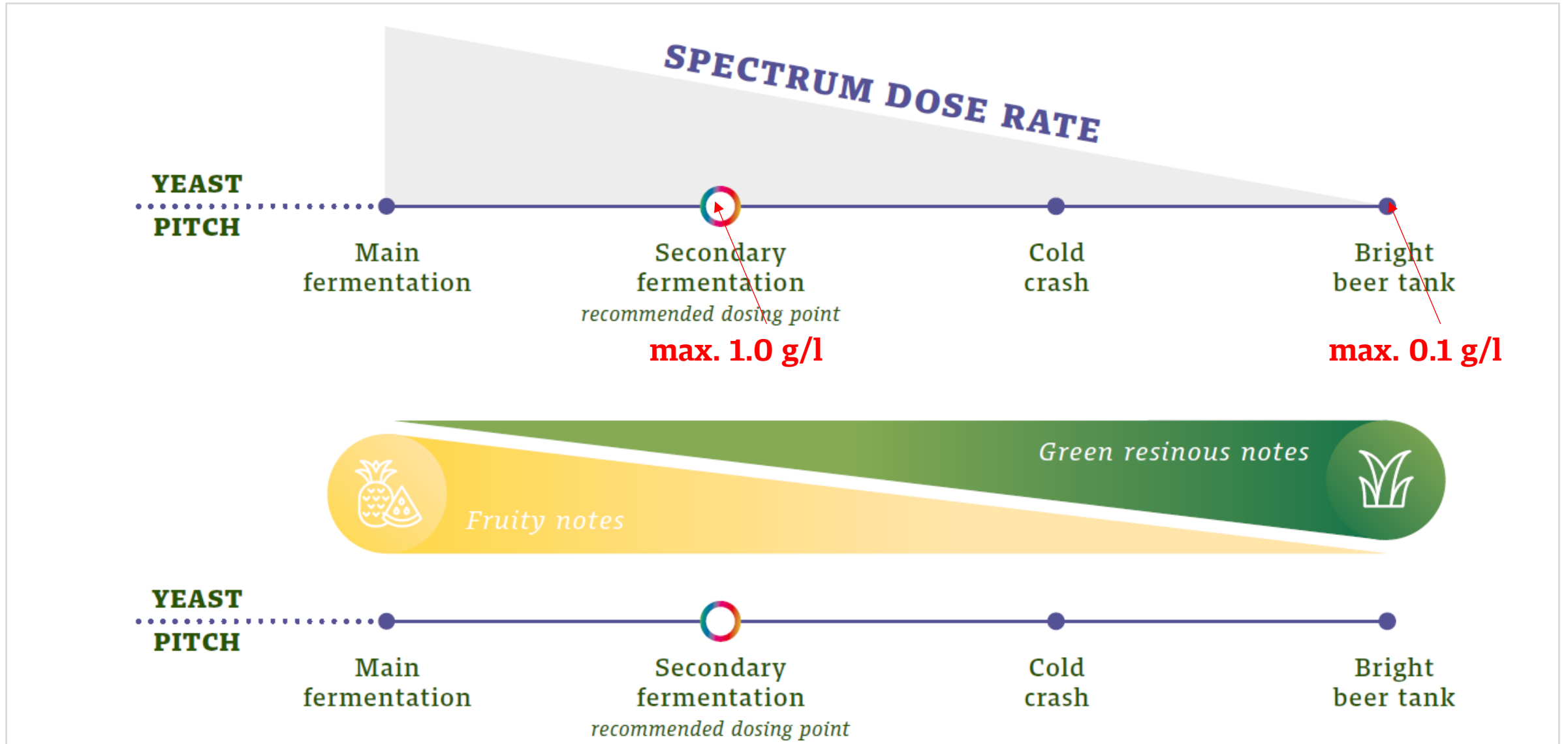
- ✓ *World's first liquid dry-hopping product*
- ✓ *No beer losses or hop creep*
- ✓ *Standardized and variety specific*
- ✓ *100% hop derived and natural*
- ✓ *No dry-hopping equipment needed*



**AVAILABLE IN CITRA® / MOSAIC® / GALAXY® /  
ECLIPSE® / EL DORADO / CASCADE / VIC SECRET /  
AZZACA / BRU-1/ HBC 1019/ ENIGMA/  
HERSBRUCKER/WILLAMETTE**

**Check varieties**

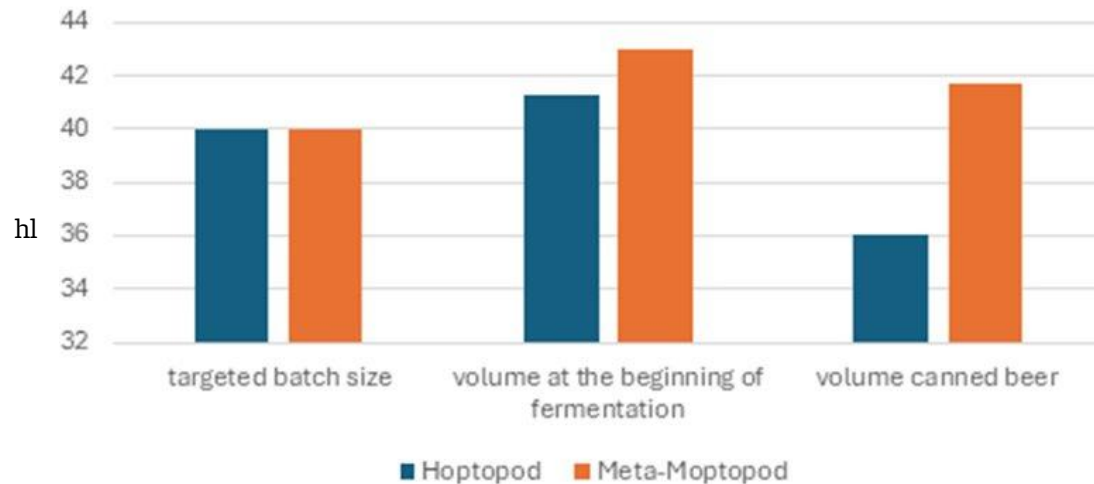




## CASE STUDY - DOGMA BREWERY

- 10% increased yield
- 25% reduced production time
- Great natural aroma and flavor
- Reducing cleaning and maintenance efforts

Volumes in the production of Hoptopod compared to Meta-Hoptopod

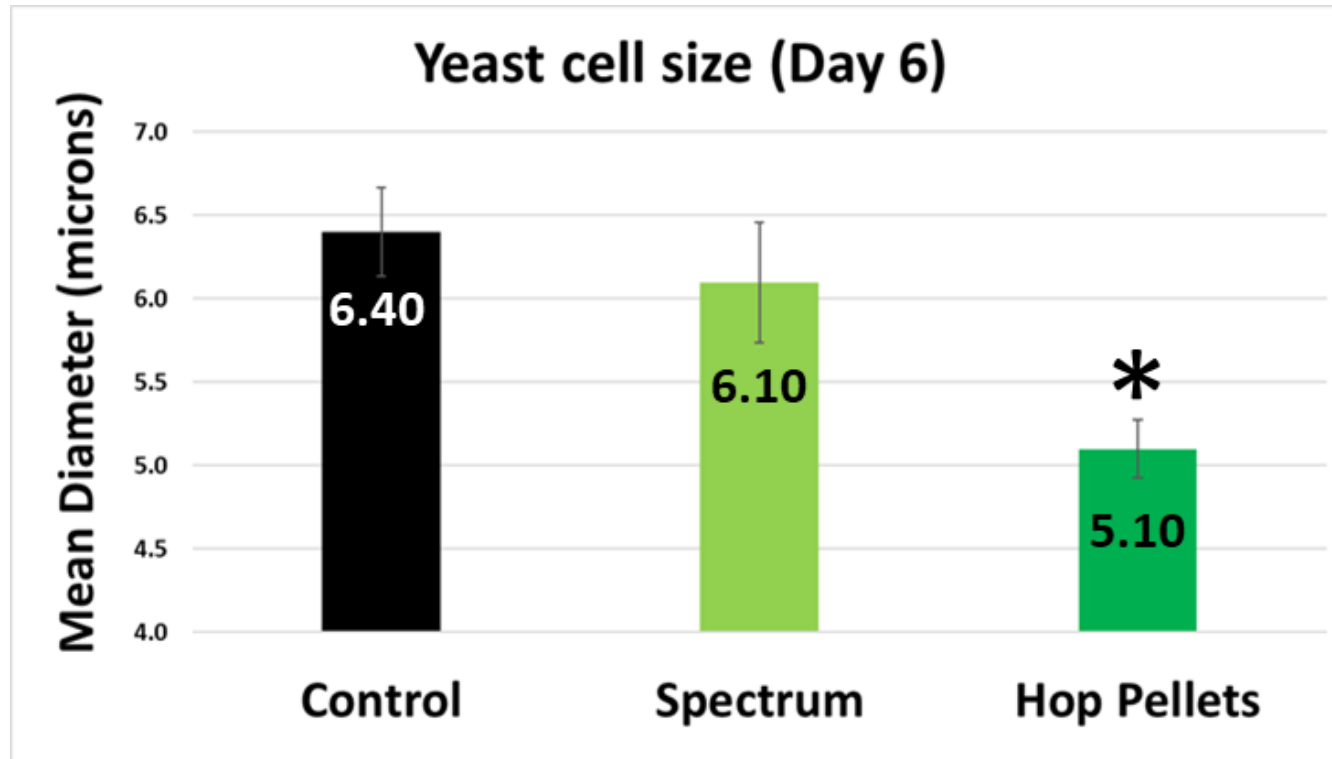


Nemanja Petrovic  
Head Brewer at Dogma Brewery

*"The results speak for themselves," concluded Nemanja. "We're producing more beer, more efficiently, without sacrificing the quality that our customers expect."*

***“But in any case, we have never brewed a Double IPA with more than 35 yields out of 40. Those are numbers; and numbers don’t lie”***

- Matt Arnes, Head brewer – Amundsen Bryggeri



- Yeast cell size for Hop pellets was significantly lower at Day 6 (5.10  $\mu\text{m}$ ) compared to the control (6.40  $\mu\text{m}$ ) and Spectrum (6.10  $\mu\text{m}$ ) (see **Figure**). Smaller yeast cell size indicates a stressed yeast. The size of yeast cells in fermentations with Spectrum, although slightly lower than the control, were not significantly different. Therefore, Hop pellets but not Spectrum, seem to affect yeast cell size after 6 Days of fermentation.



***FERMENTATION -  
WHERE WORT BECOMES BEER***

## ***WHAT ARE THE RISKS IN THE FERMENTOR?***

- ⚡ **Cleaning**
- ⚡ **Infection risks**
- ⚡ **Capacity issues**
- ⚡ **Foaming issues**
- ⚡ **Cropping**





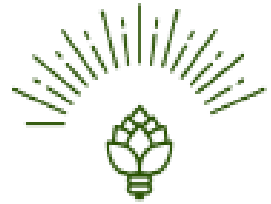
## ANTIFOAM MADE FROM HOPS!

HOPAID®  
ANTIFOAM



- ✓ ***Krausening needs to be considered by planning production***
  - Up to 25% of the tank volume as head space is often mentioned to ensure no overfoaming. Depending on the tank size and brew batch volumes this means one brew batch less per tank
- ✓ ***By using Hopaid(R) Antifoam the volume of foam during fermentation could be reduced by up to 75%***
- ✓ ***Much easier cleaning as krausen no longer touches the sides. No more scrubbing! (Or shorter cycle on cip)***





***IF THERE WERE ONE  
PRODUCT EVERY BREWER  
SHOULD USE FOR EVERY  
BREW.....***

***THIS IS IT.***

**Overfoaming  
during  
fermentation?**

**HopAid®  
Antifoam**

**Tap for the solution**

***“Sometimes it’s [...] the difference between money in the bank and just paying the bills”***

- Chris Pilkington, Former Owner & Head brewer – Pohjala

*“Over the last year or so demand for our core range, Parka, has increased... [HopAid Antifoam] has been really useful for us to reduce the mess and keep those yields up... It’s improved our yields up to around 5 %”*

- Jim Fullegar, Head Brewer, Double Barrelled Brewery, Reading UK



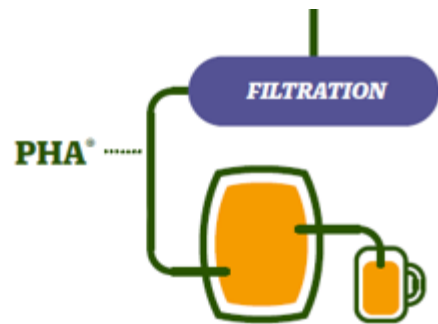
***POST FERMENTATION - THE FINAL STEP  
TO CREATING PERFECTION***

- ⚡ Stable haze over the shelf life is challenging you?
- ⚡ Citra dry-hopped Pale Ale is not citrusy enough? Second or third dry hopping is no option?
- ⚡ You do not want to risk an additional oxygen ingress by dry hopping in your lager tank?
- ⚡ Acetaldehyde is peaking? Do you want to cover any other unwanted aroma compounds?





**PHA® - PRECISION IN HOP AROMA**



- ✓ *Improve and refine your beers flavor and aroma with precision adjustments.*
- ✓ *Diversify single production streams super efficiently by dosing PHAs post filtration.*
- ✓ *Fast and efficient NPD from benchtop to large scale production using PHAs*
- ✓ *Waterbased carrier option for super clean label addition with no legal dosing limits.*

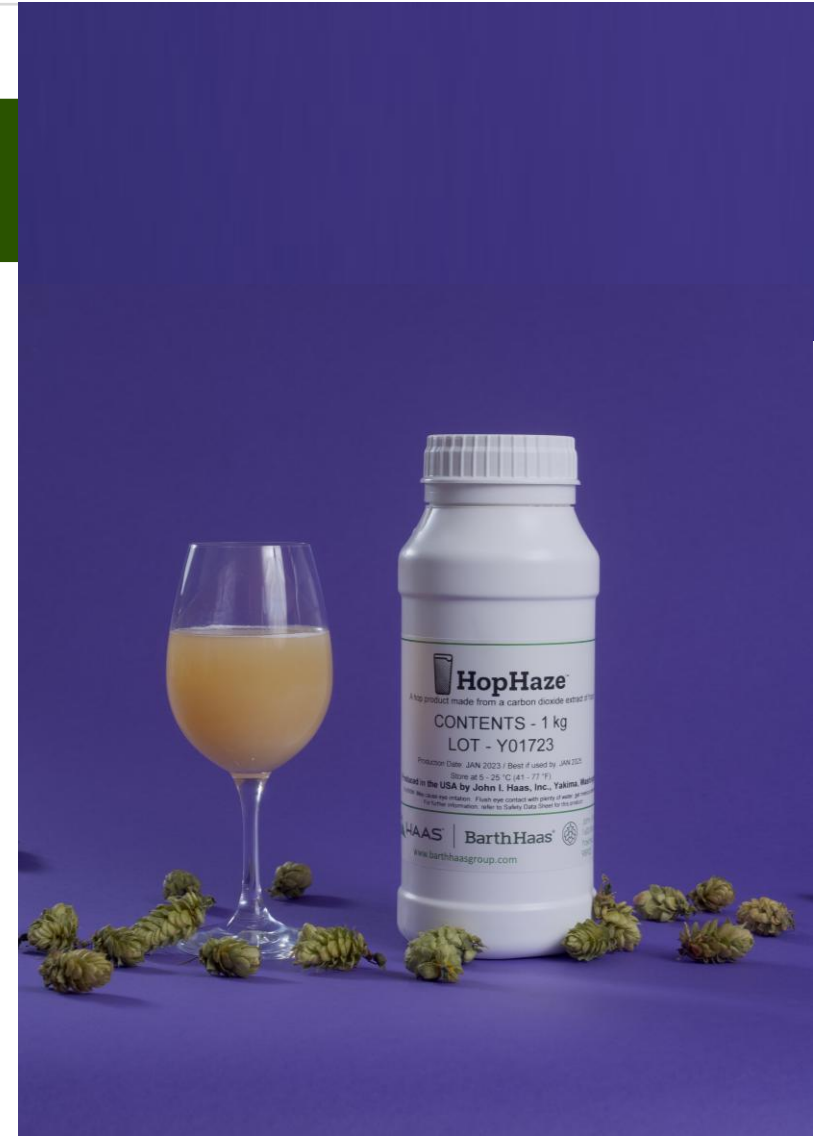




## HOPHAZE® - STABLE BEER HAZE CREATED WITH HOPS!



- ✓ *Traditional methods of creating haze in beer can be expensive, time consuming and less stable.*
- ✓ *HopHaze is made entirely from hops to give an efficient, natural alternative to creating long lasting, stable beer haze.*
- ✓ *HopHaze has no impact on flavor or aroma.*
- ✓ *Using HopHaze can reduce the associated cost and complexity when adding beer haze, while increasing haze stability and ultimately extending the shelf-life of your beer.*





Hoppy Ale

Filtered Light Lager

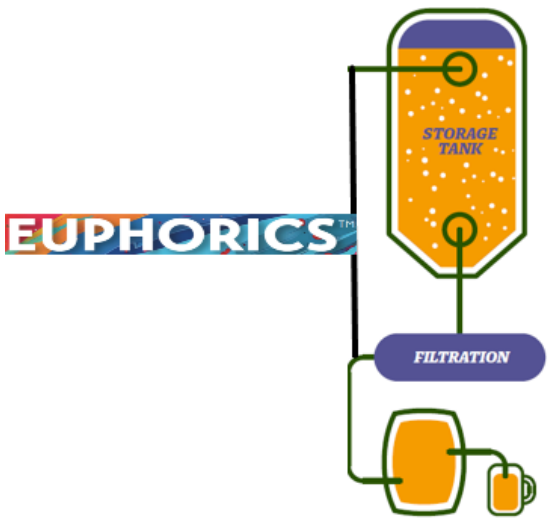
0 250 500 800 1000 2500

HopHaze® Dose (mg/L)

Maximum Dosing Rate: 500 ppm

# HOW TO CREATE IMPACTFUL AROMA AND FLAVOR ?

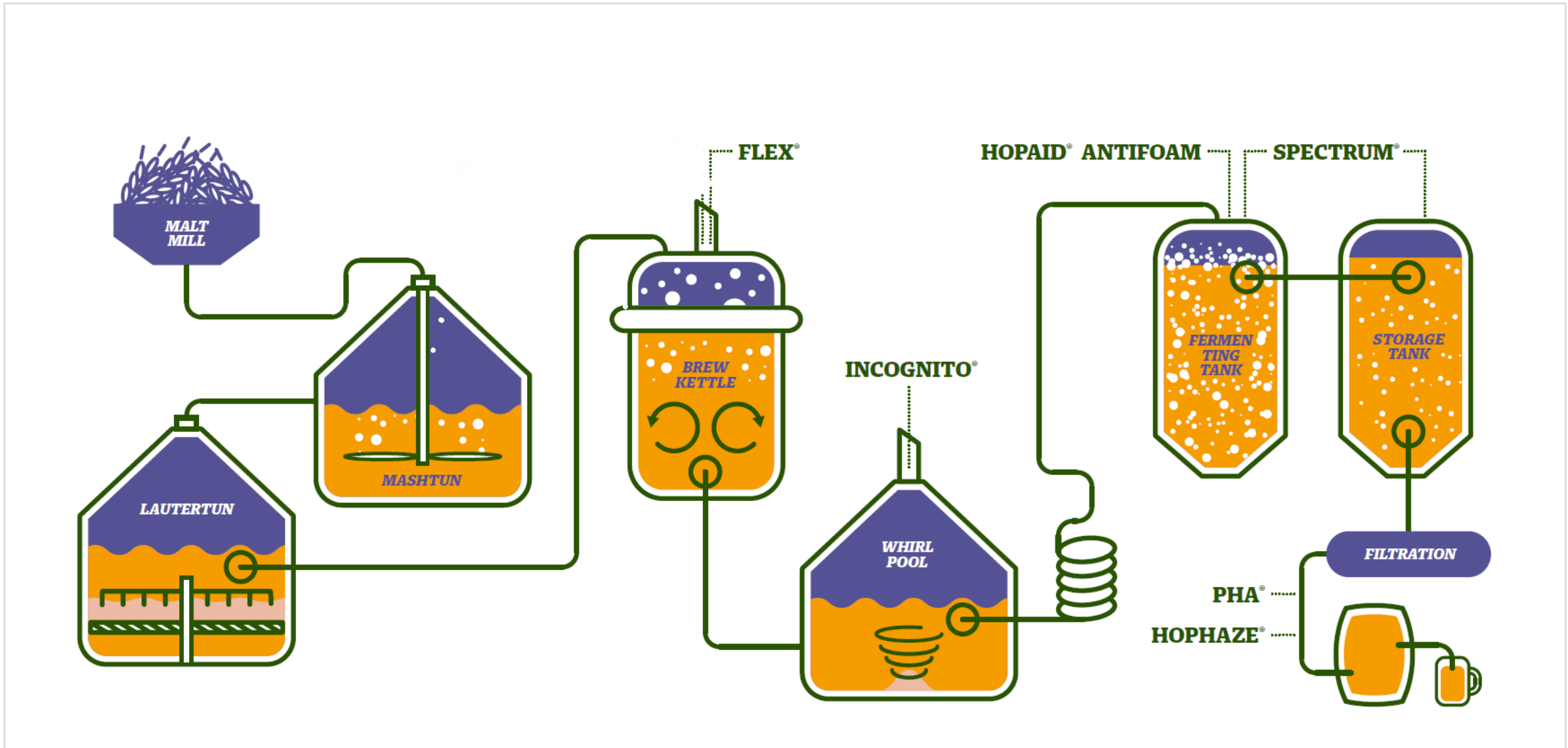
## **EUPHORICS™** - A REVELRY OF HOPS AND OTHER BOTANICALS.



- ✓ *A highly-concentrated, water-soluble flavor and aroma liquid product*
- ✓ *Euphorics are made by brewers for brewers*
- ✓ *Made with 100% natural hops and botanicals.*
- ✓ *Creative tool to achieve flavors beyond traditional hops,*
- ✓ *Doses as low as 3 mL/hL deliver immediate aroma impact.*
- ✓ *Reduce risks of using fruit purees in the cold side post-fermentation.*
- ✓ *Available in Cosmic Guava, Peachy Keen, Pineapple Paradise and Pomelo Daydream.*
- ✓ *Formats: 50ml; 500ml; 1.000ml; 5.000ml*



# OVERVIEW EFFICIENT PRODUCTS FOR BREWING





BarthHaas®

***THANK YOU FOR YOUR  
COMPANY***

Now please welcome