Putting some numbers on first wort and mash hop additions.

Presented by David Curtis.
standardized hopping

- 60 minute bittering
- 20-30 minute flavor
- 0-15 minute aroma
- flameout/whirlpool
- dry hopping
first wort hopping

- old german method
- smoother bitterness
- enhanced flavor
- higher ibu contribution
mash hopping

• waste of hops?
• similar to first wort hops?
• less documentation
what do they add?

• ibu impact
• flavor/aroma impacts
• other impacts

  color, process, etc.
how we use them

first wort hops

• hops added during wort collection in kettle
• use 30% of finishing hops
• only use low alpha hops
• increased ibu contribution
how we use them

mash hops

• hops added directly to the mash
• higher pH & oxygen presence allow volatile compounds to form oxidation products with components in the malt
• resulting compounds are not volatile and remain in the wort through lautering & boil
• more 'rounded' flavor
what we expect
compared to 60 minute addition

mash hopping
• low bitterness addition
• round hop character

first wort hopping
• higher ibu addition
• smoother bitterness
• more hop flavor
the experiment

three batches

• control – 60 min. addition only
• fwh – first wort addition only
• mash – mash addition only

analysis

• tasters – taste panel/peers
• lab data – AntonPaar system
	hanks to james spencer, denny conn, & dan listermann!
the recipe

three gallons

- 1.057
- 8 pounds 2-row malt
- 1 pound munich malt
- 1 ounce cascade hops
- 1 packet us-05 dry yeast
- 34 calculated ibus (tinseth)
the process

- electric herms system
- recirculated mash
- mash temp – 150
- 166 degree mashout
Results laboratory analyzed 39 days after brewing

- Control – 19.6 ibus
- First wort hop – 21.6 ibus
- Mash hop – 5.7 ibus

Thanks to Carrie Stordeur!
APPEARANCE

ANY NOTICEABLE DIFFERENCES IN THE 3 BEERS’ APPEARANCE?
YES ☐ NO ☐

IF YES, PLEASE DESCRIBE:

AROMA

WHICH BEER HAS THE MOST HOP AROMA?
A ☐ B ☐ C ☐

WHICH BEER HAS THE LEAST HOP AROMA?
A ☐ B ☐ C ☐

ANY COMMENTS ABOUT THE AROMA OF THESE BEERS?

FLAVOR

WHICH BEER HAS THE MOST HOP BITTERNESS?
A ☐ B ☐ C ☐

WHICH BEER HAS THE LEAST HOP BITTERNESS?
A ☐ B ☐ C ☐

ANY COMMENTS ON THE BITTERNESS OF THE BEERS? (SHARPNESS, SMOOTHNESS, ETC.)

WHICH BEER HAS THE MOST HOP FLAVOR?
A ☐ B ☐ C ☐

WHICH BEER HAS THE LEAST HOP FLAVOR?
A ☐ B ☐ C ☐

ANY COMMENTS ON THE FLAVOR OF THE BEERS?

FINAL COMMENTS

ANY FINAL COMMENTS ON THESE BEERS? (DIFFERENCES, SIMILARITIES, ETC.)
results

tasters

homebrew club/co-workers

• 42 tasters
• 69% chose mash as least bitter
• 54% chose fwh as most bitter
• 50% chose fwh as most hop flavor
• 40% chose mash as having most & least aroma

thanks to KLOB/bell's downtown managers!
results

tasters

bell's taste panel

- rank in order of hop character
- 14 tasters
- only 1 taster rated mash as most hop character
- only 4 tasters rated mash as 2nd most
- mash=20 pts., fwh=32 pts., control=33 pts.
- 99% confidence=9.21, we had 11.04

thanks to kevin payne!
round 1

• mash stands out as least bitter
• fwh & 60 minute very hard to discern
• if 60 minute addition is 100%:
  • fwh is 110% of 60 minute
  • mash hop is 29% of 60 minute
round 2 double the hops

• exact same recipe
• 2 oz. of cascade hops
• concentrate more on 60 minute and fwh comparison
• calculated 68 ibus on control
round 2 laboratory analyzed 25 days after brewing

• control – 31.2 ibus
• first wort hop – 33.7 ibus
• mash hop – 10.8 ibus

thanks to carrie stordeur!
results

tasters - round 2

bell's taste panel

only fwh & control
choose most hop character

• 5 of 6 tasters chose first wort hop
takeaway round 2

- if 60 minute addition is 100%:
  - fwh is 108% of 60 minute
  - mash hop is 35% of 60 minute
final thoughts

numbers
• fwh is 8 to 10% higher ibu value
• mash is 30 to 35% of 60 minute

taste
• mash hop has minimal impact
• subtle difference between 60 minute and fwh
questions?