

Using Distilled Hop Oils

brewers association
**CRAFT
BREWERS**
conference
& BrewExpo America

Standard Operating Procedures (SOP)

Presented by **Tim Schnars II, Brewmaster**
Meadowlark Brewing LLC



An Introduction and Perspective

► Caveat to All:

This is our current SOP, based on our facilities and our recipes.

We believe that this is the future of finishing hops. The benefits are more than the aroma/flavor bump and solving problems relating to dissolved O² ingress. We looked at the economic benefits: reduced filtration losses/yield gain, shipping, storage, shelf-life, reduced carbon footprint. All of which pointed to a better bottom line

You might tweak things here or there in this SOP and discover that you've found a better way. All I ask is that you share your methods/discoveries with the rest of the distilled hop oil community.

We all stand on the shoulders of giants, and the view is quite brilliant because of that.



Tim Schnars II
Brewmaster
Meadowlark Brewing, Sidney, MT USA
brewmaster@meadowlarkbrewing.com



Step 1: Separate/Filter/Fine



Figure A

- ▶ Steam-distilled, hop oil is a cold-side-only, aroma addition.
- ▶ **KEY POINT:** addressing only distilled oil from fresh hops at harvest, not dried.
- ▶ A little goes a long way.
- ▶ We think of it as *“liquid dry-hopping”*
- ▶ Oil should be added to finished beer, whatever level of separation, filtration, or fining that may entail.
- ▶ It should be added directly via a Brite tank or Serving Tank that has been augmented with a butterfly valve on one of it’s ports. (Figure A)

Step 2: Measure Dosage

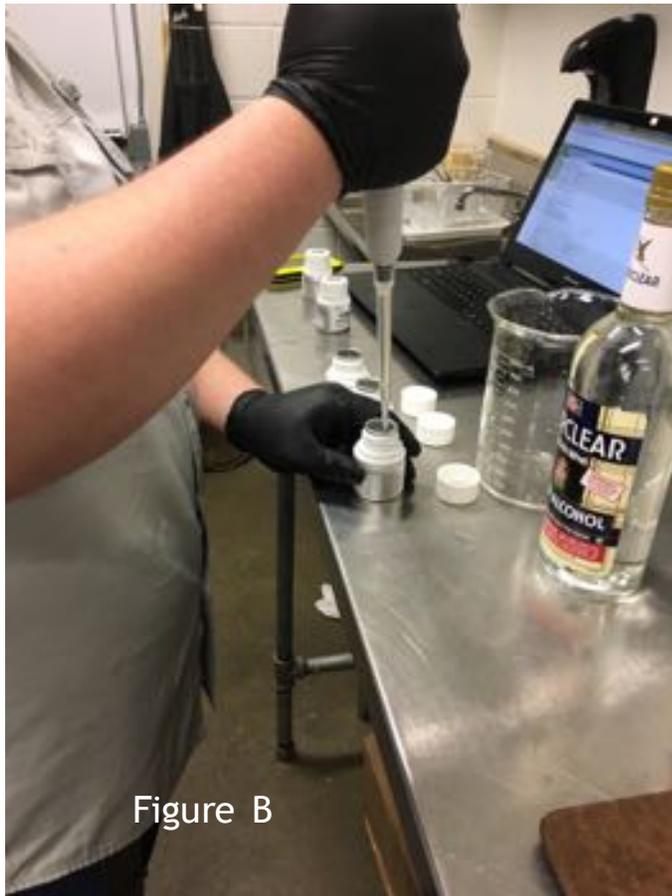


Figure B

- ▶ This really depends on the base beer. Preferably something with meaty IBUs. High dosage rates in beers with low IBUs will be too powerful and unpleasant to drink.
- ▶ At present, our magic number is about 5 ml/bbl, *but feel free to experiment*, especially with higher ABVs and IBUs. Remember: It's easy to overdo it. (Figure B)
- ▶ To compare pellets to oil equivalent, dosing ratio of about 5 ml/bbl equates to roughly 1.5 lbs/bbl of pellets in our recipes. The oil yield varies by variety, so there will be some variances to that rule-of-thumb ratio.
- ▶ We are doing more research to more accurately convert grams of pellets to microliters of oil. It may vary.

Step 3: Blend Distilled Oil with Neutral Spirits/Food Grade Ethanol

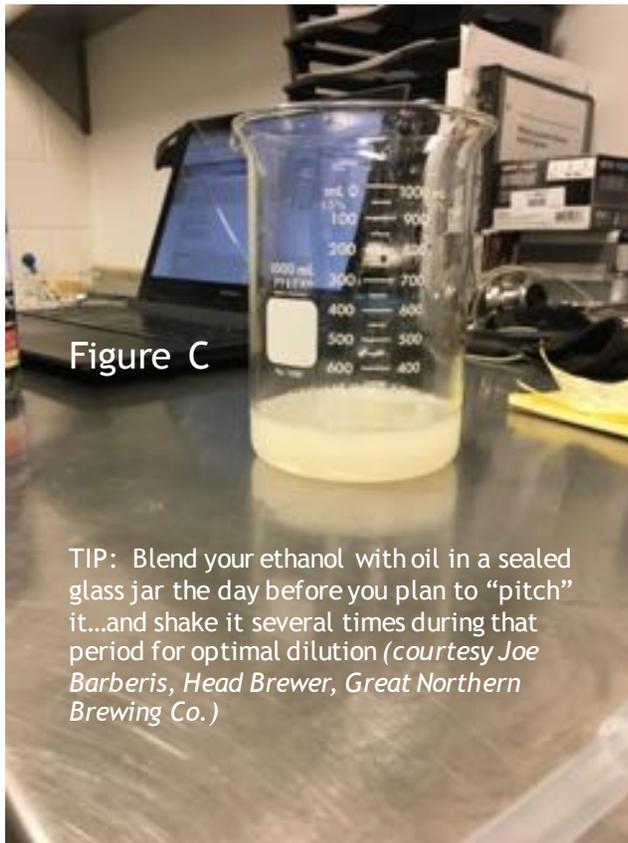


Figure C

TIP: Blend your ethanol with oil in a sealed glass jar the day before you plan to “pitch” it...and shake it several times during that period for optimal dilution (*courtesy Joe Barberis, Head Brewer, Great Northern Brewing Co.*)

- ▶ Plan to blend the same amount (1:1) of ethanol as distilled oil. (Figure C)
Example: 75 ml Oil + 75 ml ethanol = 150ml solution = 15 bbl IPA
 - ▶ FYI, this works out to .00004 ABV
- ▶ You want to be in compliance with your state and federal regulations*. You can use the same SOP without ethanol blending, and you will get good dispersion, however it must be packaged immediately.
- ▶ We feel that ethanol blending ensures total utilization of distilled oil. We are all pioneers of this technology, and we appreciate trade "openness" for the benefit of everyone.

Step 4: Build Dosing Chamber



- ▶ All parts and gaskets should be sanitized prior to use.
- ▶ The Brite tank should have a butterfly valve attached to one of its ports. (Figure A) Add a 90° elbow and a second butterfly valve. (Figure D)

Step 5: Add Solution to Dosing Chamber



Figure E

- ▶ Carefully add the solution paying particular attention to fill level, to avoid overflow. (Figure E)
- ▶ Close the chamber when finished.

Step 6: Attach Gas Fitting to Closed Dosing Chamber



Figure F

- ▶ You're also going to need a gas fitting: TC to MPT built with a gas quick-disconnect.
- ▶ We use a 1.5" TC x 0.25" MPT to male Dixon SS Quick Disconnect with check valve, but use whatever your brewery is outfitted with. (Figure F)

Step 7: Flood Dosing Chamber



- ▶ Open the butterfly valve to the Brite tank, allowing finished beer to flood the dosing chamber. (Figure G)

Step 8: Attach CO2 to Closed Dosing Chamber



Figure H

- ▶ Attach your gas (CO2) feed line to the gas fitting on the chamber. (Figure H)
- ▶ Gauge PSI should be enough to exceed tank head pressure, as we do not want the solution in the chamber to back-flow into our gas line.
- ▶ We usually set our gauge to 30 PSI.

Step 9: “Burp” the Solution into the Brite Tank



Figure 1

- ▶ Swiftly open and close the second butterfly valve to allow the CO₂ pressure to “burp” or otherwise force the solution into the Brite tank. (Figure 1)
- ▶ I typically “burp” it 4-5 times, but feel free to do more, being mindful of the tank’s pressure limits.
- ▶ When you feel satisfied that the solution has been pushed into the tank, open the second valve steadily, just long enough to close the butterfly valve to the tank, ensuring that most of the liquid in the dosing chamber has made it back into the Brite tank.
- ▶ Carefully release the pressure from the dosing chamber and disassemble it.

Step 10: Carbonate/Dissolution of Oil



- ▶ We carbonate “slow and low”, through a rotameter, which takes an average of 1 hr/bbl.
- ▶ We feel that this is enough time for the oil to dissolve completely into the beer.
- ▶ We also feel that the beer should be packaged within 24 hours of carbonation, at most.
- ▶ Pre-ethanol distilled oil solutions would end up staining our polyvinyl sight “glass” on our brites, leading us to presume that it came out of solution somehow.
- ▶ We were still able to get good aroma in our Teddy Roosevelt IPA, using the same SOP absent the ethanol and including the “staining”.

Shelf Life, Shipping, Storage

- ▶ **”Best Before” Distilled hop oil: five years**
 - ▶ Best if kept refrigerated. No need to keep frozen.
 - ▶ Container must avoid UV light, oxygen degradation
 - ▶ Reseal after using. Keep sealed.
 - ▶ Has the potential to maintain potency well beyond 5 years if stored properly
- ▶ **Shipping:** equivalent of 750 lbs fresh hops ships for **\$12.40** anywhere in USA
- ▶ **Shelf Life** (in beer) aroma/flavor in hop-forward beers tends to last longer
 - ▶ Assumes Best Practices are followed
 - ▶ Anecdotal evidence (flavor sampling) at this point



Effective Dry-Hopping

- ▶ When you dry-hop between .5# to 3#/BBL, it has proven to strip IBU's (see the MBAA Technical Quarterly #3, 2016)
 - ▶ Known dry-hopping issues with pellets:
 - ▶ Oxygen ingress (dissolved O₂ in the finished product)
 - ▶ Hop pellets have a degree of fermentable (potential re-attenuation issues)
 - ▶ These factors may cause potential diacetyl problems
- ▶ We need to stress the difference between dry-hopping at, say 3#/bbl vs. oil additions. There are quite a few factors that make oil more attractive than dry-hopping at around that rate.
 - ▶ MBAA Technical Report (2016) conclusion:
 - ▶ *"Finally, hop oil, one of the main reasons brewers dry hop, does not affect the IBU test results."*
- ▶ ***We actually suspended our dry-hopping program almost entirely***



Why We Think This is the Future

- ▶ **WOW!** Intense, Fresh-Hop Aroma & Flavor
- ▶ **PURE.** No Solvents.
- ▶ **No Biomass...ZERO** Filtration Losses
 - ▶ Increased Yield per Batch ranges from 7.5% to as high as 20%
 - ▶ Increased Profitability on every Batch
- ▶ **Reduce Shipping, Storage Costs**
- ▶ **Shelf Life...Many Years.** “Best Before” Date is 5 Years.
- ▶ **Eliminate IBU stripping** from dry-hopping
 - ▶ Reduces dissolved O², potential re-attenuation issues, potential Diacetyl problems
 - ▶ Hopzoil does not affect IBU test results
- ▶ **Reduce Carbon Footprint**
 - ▶ Significantly reduced energy from drying, pelletizing, packaging, shipping, freezer storage



Contact Information



Tim Schnars

brewmaster@meadowlarkbrewing.com

