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DECEMBER 2023, VOL. 29, NO. 8

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DECEMBER 2023, VOL. 29 NO. 8

features

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RECIPE INDEX

RECIPE STANDARDIZATION

EXTRACT EFFICIENCY: 65%
(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one U.S. gallon of water, would yield a wort of 1.024.)

EXTRACT VALUES FOR MALT EXTRACT:
liquid malt extract (LME) = 1.033–1.037
dried malt extract (DME) = 1.045

POTENTIAL EXTRACT FOR GRAINS:
2-row base malts = 1.037–1.038
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033–1.035
chocolate malts = 1.034
dark roasted grains = 1.024–1.026
flaked maize and rice = 1.037–1.038

HOPS:
We calculate IBUs based on 25% hop utilization for a one-hour boil of hop pellets at specific gravities less than 1.050. For post-boil hop stands, we calculate IBUs based on 10% hop utilization for 30-minute hop stands at specific gravities less than 1.050. Increase hop dosage 10% if using whole leaf hops.

Gallons:
We use U.S. gallons whenever gallons are mentioned.

Brew Your Own — THE HOW-TO HOMEBREW BEER MAGAZINE

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Cover Photo:
Revolution Brewing Co.

Q What style of music most often accompanies your brew days?

Not sure if this is cliché … but I love me some great hair metal or yacht rock. Stuff that, without thinking, you know the lyrics word for word. It makes the time pass more quickly while brewing and cleaning … and gets you one step closer to enjoying that post-brew beer.

When we brew and bottle our Christmas beer every year, we always listen to Christmas music. So I guess it depends on what I'm brewing. With extract brewing it might be some light pop, folk, or jam bands. Given the intensity, complexity, and length of all-grain brewing (there is usually many things going on) I find that rock music really helps me focus. It seems to help with mashing as well.

Especially at the brewery, I tend to prefer quiet since there are so many sounds that are important to be listening for (kettle not firing up, CO_2 or water running, etc.). When I do have a more monotonous task (e.g., packaging, cleaning) I'm usually listening to an audiobook; I'm working my way through Stephen King's Dark Tower series now.

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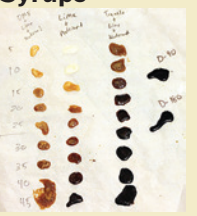
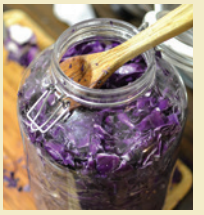
Candi Sugars and Syrups



Malt contributes most of the Maillard reaction products in beer, but in this column we take a look at the other ingredients affected by Maillard reactions. Plus: Make your own Belgian candi syrup. www.byo.com/article/candi-brewing-sugars/

Fermented Foods



We all love fermented beverages, but fermented foods are another hobby that can bring a lot of enjoyment (and rewarding deliciousness when done). As homebrewers, we likely have the equipment and most of the knowledge to jump right in. www.byo.com/article/eat-your-fermented-veggies/

Cleaning Your Draft System

Clean draft lines and faucets are key to any properly maintained draft beer system. Knowing the tools and methods to achieving this goal is critical for anyone pouring beer through a faucet; home or professional. We present to you Mr. Wizard's guide to cleaning your draft components. www.byo.com/mr-wizard/mr-wizards-guide-to-cleaning-your-draft-system/

Advancements in Dry Hopping

Dry hopping has come a long way since it was used to ship beers to India from Britain two centuries ago. With research changing previous assumptions, let's check back in on a topic that is ever evolving. www.byo.com/article/techniques-10/

MAIL

CHEERS TO PRESIDENT CARTER

It was a pleasure to read Gary Fisk's "Last Call" article in the October 2023 issue on President Jimmy Carter's governmental assistance and passage of exemption of taxes in the homebrewing industry, which was a fact that I was not aware of. There is another piece of brewing-related history tied to the Carter Family that was not mentioned and I thought I'd pass along in case others didn't know. President Carter's brother, Billy, had a beer brewed and sold by that name — Billy Beer. I have a pristine six pack ratholed away and it's often brought out and put on display to my beer drinking and brewing friends.

On our next brew fest, I will hoist my glass along with my fellow brewers and thank President Carter for his service to his country and to his fellow homebrewers and share Mr. Fisk's article with those unfamiliar with this piece of historical beer knowledge.

Tim Mannett • *Glendale, Arizona*

Thanks for sharing, Tim. Billy Beer was first brewed in 1977 by Falls City Brewing Co. (Louisville, Kentucky); however, the beer wasn't as successful as hoped and Falls City closed the following year after 70 years of business. There are several tellings of the story of Billy Beer's demise available online for those interested. I think the website Mental Floss summed it up well, noting that the beer tasted so bad that even Billy Carter didn't drink it (mentalfloss.com/article/26695/billy-beer-reason-billy-carter-quit-drinking). With that, it probably makes more sense to keep that sixer on display for a great story than cracking open those cans now!

UPDATED TAP HANDLES

I wanted to follow up to my "E-Ink Faucet Handles" article (published in the "Projects" department of the January-February 2023 issue of *BYO* and available online at byo.com/project/e-ink-faucet-handles). Since building the prototype, which was unfinished aluminum and a good learning experience, I've reoriented my milling techniques and finished two additional tap handles that are much nicer. Beyond the improved milling, I used green Scotch-Brite pads lubricated with WD-40 to scour off the machining marks to give all the surfaces a brushed finish. From there, I just send them off to a local anodizing shop for the coating.

contributors

Dan Jablow is a self-taught, all-grain homebrewer with a passion for brewing beer in single-gallon (3.8-L) batches. He is a graduate of the Beer Brewing Professional Certificate program at the University of Richmond, as well as a formally trained chef and graduate of the Cambridge School of Culinary Arts. Dan's first business, a smoked meat company called Jablow's Meats, was voted in 2012 by *SF Weekly* as having one of the best sandwiches in San Francisco (pastrami). Today, Dan can be found tinkering with recipes, experimenting with ingredients, and sharing a behind-the-scenes look into small-batch brewing at home on his Instagram feed @small.batch.brewing.

Beginning on page 30, Dan combines his knowledge of cooking and beer to serve up a 4-course menu plus a cocktail that all include beer as an ingredient.

Chip Walton is a beer writer and producer/host of Chop & Brew, a webshow about homebrewing, craft beer, and cooking. As the Digital Content Producer for Northern Brewer Homebrew Supply, Chip produces instructional videos for the company's YouTube channel as well as Northern Brewer University online courses. Chip is a former member of the AHA Governing Committee and is a BJCP Certified judge.

Chip wrote this issue's cover story beginning on page 36 in which he takes readers behind the scenes of Chicago's Revolution Brewing Co. and gleans advice from the brewers on how to create our own revolutionary brews.

Dan Russo began working for Oakshire Brewing in 2013 as the opening manager of its Eugene, Oregon, Public House. In 2014 he was awarded a scholarship to the American Brewers Guild from the Glen Hay Falconer Foundation. Upon completing the program, he moved onto Oakshire's production team to chase his dream of creating delicious fermented libations. Dan took the helm as Director of Brewing Operations at the beginning of 2017 and curated a brewing program that creates over 50 new beers a year. He was recently named Chief Operations Officer of Oakshire. In his spare time he loves to camp, see live music, and run a burger pop-up with his partner, Diane.

From honey and maple syrup to Belgian candi sugar and rice syrup solids, to name a few, Dan has incorporated many sugars into unique brews at Oakshire. Starting on page 48 he shares what he's learned about brewing sugars.

MAIL

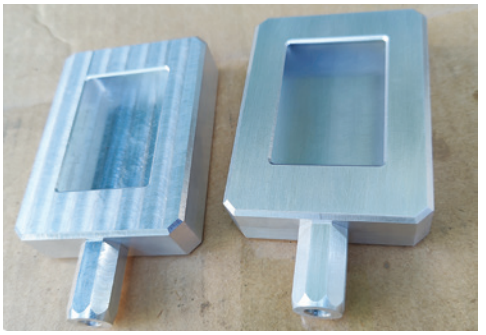
I've outlined all the milling procedures in a PDF document. There's a timelapse of the milling process (from various stages of the learning process, so it doesn't follow the PDF exactly). I've also got some photos of the new, improved, and finished projects that are clear anodized for a really nice surface finish. Hard anodizing is a good alternate look too, or any variety of anodized colors are a possibility. I'd like to try to make one out of brass too, one day. Check out the pictures: Below with the original to the left of the revised model, and at right a finished new tap handle.

PDF Procedure: https://bit.ly/BYO-e-ink-tap3

PDF Drawings (updated): https://bit.ly/BYO-e-ink-tap4

Timelapse video: https://bit.ly/BYO-e-ink-video2

Greg Paterson • *Saskatoon, Saskatchewan*



BEGINNER'S BLOCK

BY DAVE GREEN

THREE-VESSEL BREWING SYSTEMS

In a traditional three-vessel brew system, homebrewers will have a hot liquor tank or HLT (note that brewers call water "liquor"), a mash/lauter tun or MLT, and finally their brew kettle or BK. Strike water (water used for the mash) is initially heated in the HLT up to a pre-determined temperature before being transferred into the MLT where the mash converts the starch in the grains to sugar. The liquid, now called wort, is drained from the MLT either through a screen, slotted manifold, or false bottom into the BK where boil and hopping takes place. The grains will be washed with more water from the HLT in a process referred to as sparging.

HLT AND BK

These two roles can be filled by one large stock pot, but a third vessel, such as a cooler, will be needed to hold the sparge water while the first wort is drained, or run off, from the mash. But many three-vessel brewing systems will have two dedicated stockpots to serve these two distinct roles. In some brew systems, the hot liquor tank will serve not only as a place to heat water that gets directly added to the mash, but also a place for indirect heating of the mash through a heat-exchange system known as HERMS (Heat Exchange Recirculating Mash System). In this style of setup, a brew pump is utilized to send wort from the mash tun through copper or stainless tubing that is submerged in the hot liquor tank's hot water. Step mashing (raising the mash temperature through a series of "rests") or mashing out can be done with this setup.

THE MLT

This is the backbone of a three-vessel brew system and where a lot of focus of the brewer's attention lies. There are many iterations of homebrewing mash/lauter tuns — from a simple cooler retrofitted with a braided stainless steel hose to double-walled stainless steel tanks with slotted false bottoms and a bottom drain — what a homebrewer chooses must speak not only to their budget but the style of sparging they are looking to do. As an example, I'm going to spin through all my iterations of MLTs.

My first MLT was the classic Charlie Papazian-designed Zapap tun where two food-grade plastic buckets are nested together with lots of little ⅛-in. (3-mm) holes drilled into the bottom of the upper bucket. The mash sits in the upper bucket, which acts like a false bottom and wort drains out from the lower bucket. It worked well enough, but I found stuck mashes (when wort drains much slower than it should) was my arch nemesis. So, I moved up to a 5-gallon (19-L) Igloo cooler with a stainless false bottom manufactured specifically for that size cooler. After a few years, I found the size too small as the ABV kept creeping up on my homebrewed beers. So, I purchased a 12-gallon (45-L) rectangular cooler to upgrade. I built a manifold drain system for it with ½-in. (12-mm) copper piping with slits cut into the bottom using a hacksaw. Between these two mash tuns I could brew any style of beer I wanted, and I happily brewed for years on them.

But when a nice 20-gallon (76-L) stainless steel mash tun designed specifically for homebrewing came up for sale, I couldn't resist the temptation. While I considered a HERMS, I opted for a RIMS (Recirculating Infusion Mash System), which pumps wort over a heating element before it is returned to the MLT. The heating element is like what many would find in their home's hot water tank, enclosed in piping, and controlled by an external device that will prevent the element from scorching the wort. This is just one of many potential downsides to an ill-designed RIMS tube. If you do go this route, we highly recommend you purchase one from a reputable manufacturer unless you are adept in electrical systems.

SPARGING

Are you going to batch sparge or fly sparge? This is a question you will want to answer before you design your MLT. Fly sparging implies that as wort drains into the BK, sparge water is sprinkled on top of the mash bed. Fly sparging requires either a false bottom or purpose-built manifold for consistent drainage. Batch sparging implies that the brewer drains the wort entirely from the MLT and then fills it back up with sparge water. This can be done more than once. Batch sparging is more forgiving in the design. You can always batch sparge on a system designed for fly sparging, but it's not recommended to fly sparge on a system designed for batch sparging. There are arguments for both and I will leave that up to your own research and desires, but I'll note I'm a dedicated fly sparger (shhh, don't tell Denny Conn).

When it comes to three-vessel brew systems, your budget will be one of the biggest factors that decides how you approach your design. They come in three styles: 3-tier, 2-tier, and single-tier. 3-tier systems for the most part utilize gravity for the sparging system. The HLT sits at the top of the system, which drains down to the MLT, and the BK sits at the bottom. 2-tier systems require a pump for fly sparging and there are different iterations of the 2-tier system, but I found that having the HLT and BK on the upper tier and the MLT on the lower tier worked best for me as the HLT drains in to the MLT via gravity (I have a float switch for sparging) and pump out of the MLT. Single-tier systems often require two pumps for fly sparging, but batch spargers can get away with just one.

BYO READER TIP

ALTERNATIVE LID FOR WIDE-MOUTH FERMENTERS

DAVID KOHLWEY • MADISON, WISCONSIN

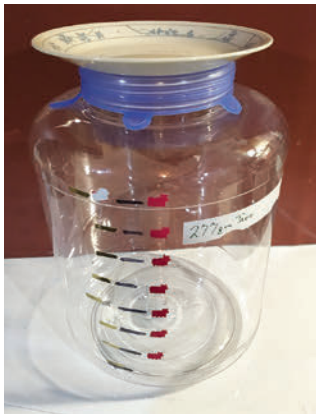
I love my Big Mouth Bubbler, but one frustration with it was I didn't have enough hand strength to snug down the screw cap properly for a good seal. After trying a new gasket and making an acrylic lid with O-rings, my next test was to try some stretchy 120-mm (4⅜-in.) silicone bowl covers and then snug the cover tight with a small bungee cord. This setup proved to work really well.

Since finding bowl covers, I have found other sizes of food-grade wide-mouth containers to use as in-between size fermenters as well.

Example 1: Active fermentation, silicone like a balloon.

Example 2: Fermentation has stopped, silicone pulled in.

Example 3: A glass "pickle jar" purchased at a big box store.



Example 4: Silicone can transmit oxygen, so for longer storage I add a small plate on top to reduce the exchange.

Photos by David Kohlwey

Photo courtesy of Yakima Valley Hops

HOPS CAN IMPROVE OUR HEALTH?

A new study has shown that the compounds found in hops reduce the abundance of a gut bacterium associated with metabolic syndrome (MetS). A study published in the journal *Microbiome*, expressed that hop compounds aid in helping suppress these compounds that are important in their deleterious effects, since an estimated 35 percent of the U.S. adult population suffers from the syndrome, a common and serious condition linked with cognitive dysfunction and dementia as well as being a major risk factor for cardiovascular disease and type 2 diabetes. Metabolic syndrome is associated with abdominal obesity, hypertension, dyslipidemia, and impaired glucose tolerance. The results on mammalian vectors coincides with a decrease in pro-inflammatory gene expression in the gut and adipose tissue, together with alterations in the gut microbiota and bile acid composition. All told, those hoppy beers and hop waters may be positive for your health. www.microbiomejournal.biomedcentral.com/articles/10.1186/s40168-023-01637-4

WHAT'S NEW

BLICHMANN ENGINEERING 10-GALLON (38-L) GRAIN BASKET

Crafted from heavy-duty stainless steel with a 400-micron precision mesh, the new grain basket from Blichmann Engineering ensures you achieve clear wort from your mash tun. The grain basket features a comfortable handle and side catches that secure on most 10-gallon (38-L) kettles, including the proprietary BoilerMaker™ brew kettles. This basket will allow for pairing with their BoilCoil™ electric brew kettle element. Whether you prefer BIAB (Brew-In-A-Bag) or sparge-style brewing, the 10-gallon (38-L) grain basket positions you to capture every drop of wort. The dimensions are as follows: Top diameter of 12.8 in. (32.5 cm), bottom diameter of 8.3 in. (21 cm), and a height of 14.8 in. (37.6 cm), with a bottom allowance of 0.4 in. (10 mm). www.blichmannengineering.com/grain-basket.html

Ss BREWTECH HOP SPIDER

Hop material in the kettle, whether pellet or whole-cone hops, can be a pain for brewers by clogging transfer lines, heat exchangers, and outlets. Hop spiders have served the role of containing the hop particulates within a confined space that wort can move through. A new hop spider from Ss Brewtech utilizes 400-micron photo-chemical etching to provide the mesh character keeping the hop matter contained. The basket sits inside a custom-designed ring mount with silicone adjustment arms that allow you to set wings of the hop spider to fit on your kettle. Note that the minimum width is 15 in. (38 cm) and the max is 18 in. (46 cm) and the depth of the basket is 15.5 in. (39 cm). The basket width is 6 in. (15 cm) and is made of 304 stainless steel with high-temperature silicone. www.ssbrewtech.com/products/hop-spider

KEGLAND SABER REFRACTOMETER

A new refractometer with ATC (Auto Temperature Correction) functionality and triple scale means it can be used for brewing, winemaking, and distilling. Water-resistant casing means that brewers can dip the refractometer directly into the wort to obtain a sample. The Saber refractometer will operate when ambient temperature ranges from 50–86 °F (10–30 °C). Since your sample is just a few drops, the liquid will quickly adjust to the temperature of the refractometer, so the temperature of the sample is irrelevant. A manual calibration knob is secured with a lock nut. An LED light helps illuminate the sample to make the scale easier to read in low-light environments. Scale ranges from 1.000–1.130 SG (0–32 °Brix). Includes refractometer, pipette, carrying case, and USB charging cable. www.morebeer.com/category/refractometers.html

BYO REPLICATOR

BY DEREK DELLINGER

DEAR REPLICATOR, The first rice lager I ever had was Silk Robes and Kimonos from a brewery in eastern Oregon called 1188 Brewing Company. I had never even heard of the style before! I'm curious what goes into it and how one might go about brewing such a thing. I could have drank that beer all night. I am always looking for a new experiment to tackle. Cheers!

Jeff Berry
Boise, Idaho

The 1188 Brewing Company started out with two families in search of a hobby. Naturally, homebrewing soon came to satisfy that role. 1188 Brewing is owned by Jeremy and Shannon Adair, as well as Ken and Jennifer Brown — Jennifer and Shannon are sisters. The hobby soon evolved, and before too long, the group had decided to start a brewpub in the town of John Day, Oregon.

For a business centered around family, the group knew that the name must speak to their long history together as well — as well as the outdoorsy lifestyle that's shared by many in their community.

"Ken's family and ours raced snowmobiles in the late 70s when we were kids and our families became fast friends, with Ken and Jennifer eventually marrying in their late 30s," Shannon says. "11 was the snowmobile racing number of mine and Jennifer's dad and 88 was the snowmobile racing number of Ken's dad. These numbers have always meant something to all of us and remind us of all the adventures we had with our families together. Jeremy added the tag line 'Time Well Spent,' which turned our story into family, tradition, and 'Time Well Spent' at 1188."

Growth has remained an ongoing puzzle to be solved in the increasingly competitive beer market of the Pacific Northwest. Shannon says they had always planned to grow into a distribution brewery one day but began to see more and more obstacles in the way of that goal. By the time they'd been in operation for several years, they decided to shift their focus once again.

"In 2017 we bought our building, doubled our space and created a larger restaurant. We continued with a 2-BBL system, offering eight of our beers on tap at all times."

Eight taps have proven just enough to allow for the right amount of experimentation. Being in eastern Oregon, far from the brewery hubs that typically get most of the attention on the West Coast, Shannon says they often find their customers aren't as familiar with novel beer styles, presenting them with both a challenge and an opportunity.

"There isn't a lot of exposure to certain beer styles out here, so many times the beers people try here at 1188 are their first experience with a style," she says. "Pouring samples and flights is a big part of getting people to taste and enjoy the many varieties we have available."

As a result, Shannon says they've been able to avoid a list dominated by IPAs. "I think IPAs have been getting more and more competition here from our lagers, blondes, and fruited wheat beers, and that's a welcome sight for us. It's more in line with our drinking preferences. We usually try not to follow trends, especially IPA trends. It's our experience here that what's old will be new again. You can't beat quality classics."

Given their rural location, Shannon says, many drinkers in their community are still macro lager drinkers.

"Having a solid light lager on tap that can work as a bridge into other styles is extremely important to us," she says. "Our servers often offer a taster of our lager when someone orders the one macro we have in bottles and a good percentage of the time the customer will pick ours over the macro."

Due to their small system, 1188 rarely does any test brewing. According to Head Brewer John Spencer, "We do a lot of sampling other beers of a style we want to brew and pick apart what we like and don't like. There are hops and yeast that are our go-to ingredients. Plus, our system steers us in different ways. We have our own little way of doing things."

According to Spencer, careful research tends to pay off. This is especially true with an extra-light beer like a rice lager — a challenging beer for any brewery, given the difficulty of mashing with rice. Rice has a relatively high gelatinization temperature (153–196 °F/67–91 °C), with some variation between rice varieties. Since this temperature range exceeds the typical mash temperature range, rice must be cooked separately in order to ensure gelatinization. Otherwise, the starches will not be soluble, and the rice will therefore be useless in the brewing process.

In order to get around this, 1188 utilizes flaked rice in their recipe. Like other flaked grains, flaked rice is pre-gelatinized, making for a far simpler brew day. Flaked rice still might not see the most efficient conversion all on its own, however. Spencer recommends adding liquid alpha amylase enzymes to the mash to help to increase fermentability.

Beyond this, the challenge is really one of process. The ingredients are simple, but it's all in how you showcase them.

"With our system and the way we brew, process runs the show," Spencer says. "You can't hide very many poor ingredient decisions in a delicate beer."

1188 BREWING CO.'S SILK ROBES AND KIMONOS RICE LAGER CLONE

(5 gallons/19 L, all-grain)
OG = 1.041 FG = 1.006
IBU = 30 SRM = 2 ABV = 4.6%

INGREDIENTS

5.5 lbs. (2.5 kg) Pilsner malt
2.25 lbs. (1 kg) flaked rice
10 oz. (284 kg) flaked corn
½ tsp. Amylo 300 (liquid alpha amylase enzyme)
6.5 AAU Sorachi Ace hops (first wort hop) (0.5 oz./14 g at 13% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (30 min.) (1 oz./28 g at 3.5% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (15 min.) (1 oz./28 g at 3.5% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (5 min.) (1 oz./28 g at 3.5% alpha acids)
Imperial Yeast L17 (Harvest Lager), White Labs WLP830 (German Lager), or SafLager W-34/70 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

With the goal of creating a highly fermentable wort, mash in with 12.5 quarts (12 L) of 157 °F (70 °C) strike water to achieve a single infusion rest temperature of 146 °F (63 °C). Add liquid alpha amylase enzyme. Hold at this temperature for 60 minutes.

Recirculate and raise the mash temperature to 168 °F (76 °C). Recirculate for 10 minutes.

Add first wort hop addition. With sparge water at 170 °F (77 °C), collect about 6.5 gallons (25 L) of wort. Set timer for 90 minutes at start of boil. At 30, 15, and 5 minutes, add Mittelfrüh hop additions.

Chill wort to around 54 °F (12 °C). Pitch yeast, making sure fermenter is topped off to 5.25 gallons (20 L). Begin fermentation at 55 °F (13 °C) and hold there until gravity reaches 1.020, then raise to 59 °F (15 °C). After holding at this temperature for one week, lager for three weeks at near-freezing temperatures (32–40 °F/0–4 °C). Bottle and prime or keg and force carbonate to 2.5 v/v.

1188 BREWING CO.'S SILK ROBES AND KIMONOS RICE LAGER CLONE

(5 gallons/19 L, partial mash)
OG = 1.040 FG = 1.006
IBU = 30 SRM = 2 ABV = 4.6%

INGREDIENTS

2.5 lbs. (1.13 kg) Pilsen dried malt extract
1 lb. (0.45 kg) Pilsner malt
1 lb. (0.45 kg) flaked rice
0.5 lb. (230 g) Weyermann CaraFoam® malt
14 oz. (400 g) table sugar
½ tsp. Amylo 300 (liquid alpha amylase enzyme)
6.5 AAU Sorachi Ace hops (first wort hop) (0.5 oz./14 g at 13% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (30 min.) (1 oz./28 g at 3.5% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (15 min.) (1 oz./28 g at 3.5% alpha acids)
3.5 AAUs Hallertau Mittelfrüh hops (5 min.) (1 oz./28 g at 3.5% alpha acids)
Imperial Yeast L17 (Harvest Lager), White Labs WLP830 (German Lager), or SafLager W-34/70 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Mash the Pilsner, CaraFoam®, and flaked rice in a muslin bag in 2 gallons (8 L) of water at 152 °F (68 °C). Once mash temperature has settled to about 146 °F (63 °C), add liquid alpha amylase enzyme and hold for 30 minutes. Afterwards, place the grain bag in a colander and wash with 1 gallon (4 L) of warm or hot water. Remove, then add water to reach a total volume of 6 gallons (22.7 L). With the heat turned off, carefully stir in the malt extract, first wort hops, and table sugar. Once fully dissolved, bring wort to a boil.

At start of boil, set timer for 60 minutes. At 30, 15, and 5 minutes, add Mittelfrüh hop additions.

Chill wort to around 54 °F (12 °C). Pitch yeast, making sure fermenter is topped off to 5.25 gallons (20 L). Begin fermentation at 55 °F (13 °C) and hold there until gravity reaches 1.020, then raise to 59 °F (15 °C). After holding at this temperature for one week, lager for three weeks at near-freezing temperatures (32–40 °F/0–4 °C). Bottle and prime or keg and force carbonate to 2.5 v/v. BYO

BY DAWSON RASPUZZI

DRY HOPPING

To maximize hop aromas

Most homebrewers understand that dry hopping is necessary to maximize hop aroma in a beer; however, there are several considerations to this step. Add hops during active fermentation or after, or both? How long do you leave hops in contact and at what temperature? At what rate do you dry hop to get the biggest impact? We asked three pros known for their IPAs to answer these questions and more. Their answers varied.

I tend to think of whirlpool hopping as the start of aroma and the base of flavor needed to balance a heavy dry-hopping load. Dry hopping is where you can get that "wow" jump of aroma out of the glass that only a handful of whirlpool hops alone can even come close to (like Riwaka™ and Idaho 7™).

We've settled on a rate of ~4.4 lbs./barrel (2.25 oz./gallon or 17 g/L) for dry hopping IPAs at Sapwood Cellars. Going higher with the use of something like Cryo™ can lead to a punchy beer, but going much higher with all T-90 pellets has the potential of an aggressive vegetal-like bite to the beer that's not enjoyable (especially if the heavy dry-hopping load is done at warmer temperatures and rousing the hops, which might over extract).

We like to dry hop post-fermentation and post-crashing down to about 34 °F (1 °C) for both ales and lagers. We typically dry hop everything in two stages (split the additions in half, leaving Cryo™ hops for the second addition). The first addition goes into the fermenter in the morning and gets burped (sending a shot of CO_2 into the fermenter from the bottom to rouse the hops) that day and burped again the next morning. The tank gets dropped towards the end of that second day and again at night. The following day we repeat with the second dry-hop addition. We hope breaking the charges in half gives the hops a better chance at extracting upon contact with the beer. There is some research that would back this up, but that research was not done on larger brewing tanks.

We've always favored dry hopping at cooler temperatures, using the literature as a guide that the colder temperature still extracts the compounds from hops we are after with good efficiency (monoterpenes, thiols) but more importantly doesn't extract more woody, spicy, and resinous compounds (hydrocarbons). The colder you dry hop, I think the more important it is to rouse the hops because they will want to drop to the cone quicker and their contact time is reduced, which is why we burp the fermenters.

In addition to the hazy IPAs, we dry hop some of our sours too. We have become fans of aging a pale ale base (before dry hopping) in wine barrels with various microbes that can work on the hop compounds, creating a fruity/funky base over the course of 6–12 months, which will then get a healthy dry-hop addition before bottling. Cryo™ hops seem to work especially well with these beers to reduce astringency, which is extra important if the beer's pH lowers significantly during aging. Bioengineered thiol-producing strains can be fun choices for primary fermentation in these situations to maintain a fun fruitiness during aging.

The most important thing to consider in your dry-hopping routine is oxygen! Nothing will negate all your efforts so quickly in a hoppy beer (especially hazies) as oxygen introduction during transferring, dry hopping, or packaging. Consider tossing a gram of metabisulfite into your dry-hop bag for some added insurance to oxygen. Look into the science of mash hopping and the ability of hops' alpha acids to complex problematic metals that are prone to oxidation. Essentially, lowering these concentrations of metals before dry hopping and potential oxygen ingress can help the shelf life of IPAs.

We like to dry hop post-fermentation and post-crashing down to about 34 °F (1 °C) for both ales and lagers.

Scott Janish is Co-Founder of Sapwood Cellars, a brewery specializing in hazy hop-forward ales and barrel-aged sour beers in Columbia, Maryland. He is also a beer researcher, blogger, and author of The New IPA: Scientific Guide to Hop Aroma and Flavor.

Oli Banks is a Brit with an engineering degree who has made beer at numerous breweries across Europe and is now the Head Brewer at Stigbergets Bryggeri in Göteborn, Sweden.

For me, dry hopping lends a much more bright and intense aroma from the hops that can't be replicated from whirlpool additions alone. I like to add from 0.67–2.1 oz./gallon (5–16 g/L) of T-90 pellets as a dry-hop addition — the lower end for hoppy lagers and pale ales, and the higher end for IPAs, double IPAs, and triple IPAs. Going above this rate I find you end up bringing out more of the vegetative character of the hops rather than the lupulin and oils that most people are aiming for. You can go above this with the use of Cryo™ hops or liquid hop products like Spectrum from Barth Haas or Hop Kief from Freestyle.

For 90% of our beers we dry hop post-fermentation and at a lower temperature to minimize scrubbing, (having the fermentation blow off the more volatile compounds). These are added at around 57–61 °F (14–16 °C) depending on the beer, mainly to minimize time for hop creep to start to set in.

Then we normally keep the dry hops in contact for 36–48 hours, max. We mix the tank during hop additions to increase extract rate so we try keep the beer actually on the hops for as little time as possible. Sometimes for double dry-hopped beers we'll add Cryo™ hops or Spectrum towards the tail end of fermentation to encourage the biotransformation a bit more before adding the main charge after fermentation. I'm not yet personally convinced it makes a great deal of difference compared to adding it all at the end. It's definitely an area where more research needs to be done.

In addition to the hop-forward styles that are always dry hopped, we sometimes dry hop lagers that may be lacking a little top note with as little as 0.1–0.25 oz./gallon (1–2 g/L) with a noble hop just to make the aroma pop. With some saisons we've also found dry hopping can be a nice addition, but generally we leave the hops to the hop-forward beers.

One last piece of advice for homebrewers: Try get out as much yeast prior to dry hopping as possible. This is easiest if you have a conical fermenter and can dump the yeast, but even transferring off of the yeast to a second vessel should be considered. It definitely helps with extraction of hops and helps them shine a lot more.

Jesse Ferguson is Co-Founder, Head of Product, Brewer, and Distiller at Interboro Spirits & Ales in Brooklyn, New York. Jesse helped found Carton Brewing and brewed at Other Half before opening Interboro in 2016.

Dry hopping extracts just the oils and almost no bitterness, so adding hops post-fermentation is the best way to add a punchy hop aroma to your beers without any additional bitterness. We dry hop our hazy IPAs with roughly 3–4 kg per barrel (3.4–4.5 oz./gallon or 25–34 g/L). Our West Coast IPAs get more like 2–3 kg per barrel (2.3–3.4 oz./gallon or 17–25 g/L). Both beers end up with roughly the same weight of hops per barrel; the West Coast IPAs just get more in the kettle, either as a late-boil or whirlpool addition.

We've found hop oils are extracted more readily at warmer temperatures, so we dry hop at post-fermentation temperature. For dry-hopped lagers we ensure the beer passes a diacetyl test, then dry hop at that diacetyl rest temperature (typically 60 °F/16 °C) prior to cold crashing. Dry-hop additions are made immediately upon reaching terminal gravity (after we remove yeast), or for double dry-hopped beers we like to add a small amount of hops during fermentation, on day one usually, prior to the second addition post-fermentation. Dry hops are left in contact with the beer warm for two days prior to crashing, when we dump the hops from the cone.

Beyond technique and choosing hops with a great aroma, selection of hop varieties and even pellets is also important. Look for hops with lower alpha, higher oil content, and selecting a softly packed pellet that will easily "dissolve" (fall apart) in the beer for max extraction.

Lastly, think beyond just IPAs for dry hopping — any beer that you want an additional hop zing can be dry hopped — for us this has included saisons and even session stouts.

BY ASHTON LEWIS

ADJUSTING BOIL TIMES

Also: Ice requirements for wort chilling

Q I JUST READ YOUR EXCELLENT ARTICLE ON POTENTIALLY REDUCING MASH TIMES FOR MODERN MALTS. THERE SEEMS TO BE THE SAME ARGUMENT FOR POTENTIALLY REDUCING BOIL TIMES, BASED ON MODERN MALT DESIGN, DOWN FROM THE TRADITIONAL 60 MINUTES TO 30 MINUTES. I UNDERSTAND THAT THE SHORTER BOIL TIMES MAY AFFECT BITTERING HOPS REQUIREMENTS, GIVEN THAT THEY ARE NOT IN CONTACT WITH THE WORT FOR AS LONG, BUT THE ADDITIONAL AMOUNT NEEDED IS EASILY CALCULATED BY BREWING SOFTWARE (OR IS IT?). IS A SHORTER BOIL TIME LEGITIMATE WHEN USING "MODERN" MALTS? I APOLOGIZE IF YOU'VE ADDRESSED THIS, AS I AM STILL SIFTING THROUGH EVERYTHING YOU HAVE, HAVING JUST PICKED UP HOMEBREWING AGAIN AFTER A LONG HIATUS.

DARRELL ROSE
CALGARY, ALBERTA

The crazy thing about wort boiling is that trub formation continues to increase as boil duration is increased, so it's hard to know when enough is enough.

Photo by Charles A. Parker/Images Plus

Boiling wort can serve many functions other than just sterilizing it for your brewing yeast.

A Thanks for the great question, Darrell! This is not a topic I recall addressing and is certainly a modern brewing topic of interest. Before digging into your specific question about the relation of malt to boiling times, I want to review the textbook goals of wort boiling. You can skip to the end if you already know all of this and just want to read the part about malt.

The primary reasons for boiling include wort sterilization and denaturing mash enzymes, removal of colloidally unstable proteins and polyphenols, removal of DMS (dimethyl sulfide) and other undesirable volatiles, extraction and isomerization of hop alpha acids, wort color and flavor development, and wort concentration. How long is long enough when it comes to boiling? Let's run through this list in a bit more detail and address the time requirement.

Sterilization and Enzyme Denaturation: Wort boiling sterilizes wort, effectively killing off any unwanted microorganisms present in the wort, and denatures enzymes carried forward from mashing into the kettle. One special brewing challenge is cooling and transferring wort to the fermenter without contamination, but that's a different question. Wort sterilization is essential for modern brewing where selected microbes are introduced during fermentation. Although wort boiling is a handy method used to sterilize wort, boiling times and temperatures far exceed the requirement for producing "sterile wort." I am using quotes here because the proper food science term used to describe this process is "commercially sterile" in contrast to aseptic. The bottom line is that wort sterilization can be accomplished at sub-boiling temperature in a matter of minutes.

Protein and Polyphenol Coagulation: During the boil, proteins from malt and other grain sources coagulate and form larger particles (colloids). Although proteins coagulate during boiling in the absence of polyphenols, the hot-break trub formed during wort boiling is a combination of proteins, polyphenols, and lipids. Vigorous wort boiling increases the formation of hot-break and improves finished beer clarity, especially when coupled with the use of kettle finings like Irish moss (a cold-water seaweed) or finings extracted from warm-water seaweeds. The crazy thing about wort boiling is that trub formation continues to increase as boil duration is increased, so

it's hard to know when enough is enough. We'll get back to this in a bit.

Elimination of Undesirable Compounds: Boiling helps volatilize and remove unwanted compounds in the wort, especially Dimethyl Sulfide (DMS). In the case of DMS, its precursor (S-Methyl Methionine, or SMM) converts to DMS when heated followed by DMS removal with water evaporation. This is arguably the biggest driver of wort boiling duration. More to come there too . . .

Color and Flavor Development: Wort color and flavor both increase during boiling. Maillard reactions between sugars and amino acids are the primary causes of the changes. Because different beer styles benefit from more or less of these reactions during boiling, brewers may select a shorter or longer boiling time that may not be optimal for other boiling goals.

Hop Bitterness: Alpha acids from hops are extracted from lupulin glands during boiling before the heat of boiling causes the chemical rearrangement, or isomerization, of the alpha acid molecule (there are several different types all based on the same general structure) into a different form known as an iso-alpha acid. Iso-alpha acids are more soluble and bitter than alpha acids. Although hop isomerization plateaus after approximately 60 minutes of boiling, there is little difference between boiling for 30 minutes versus 60 minutes. And as you point out, brewing software can be used to adjust hopping rates to account for the reduced rate of isomerization. It's also noteworthy that boiling is not required for this reaction to occur and sub-boiling temperatures in the 205–212 °F (95–100 °C) range result in similar isomerization rates to boiling.

Wort Concentration: Boiling increases wort gravity by evaporating water. This is a critical step in the production of strong beers because wort concentration removes excess sparge water used to minimize extract losses. And with no-sparge brewing, there is a practical limit to wort gravity because extract production during mashing requires a minimum volume of mash water that makes the no-boil max gravity somewhere around 25 °P (1.106 specific gravity). Outside of strong beer production, it's hard to argue that wort must be concentrated during wort boiling because slightly overshooting target gravity and dilution with water is a great way to produce consistent wort.

This really leaves us to dive into DMS removal, colloidal stability, color, and flavor. Brewers have settled into some rules of thumb that can be an obstacle to improvements and the "required" 60- to 90-minute boiling time is a great example. DMS removal has been the benchmark for kettle performance during the last 30+ years of continual improvement in wort boiling technology. In general terms, advancements in wort boiling are aimed at reducing energy use while having no negative effect on the key objectives of boiling. Because DMS is undesirable in Pilsner-type beers, the most common style commercially brewed, DMS in straw-colored beers brewed with Pilsner malt is a great metric to monitor.

The typical brew kettle used by most craft brewers evaporates about 4% of the wort volume per hour and typical boil times are 60–90 minutes. If the boil time decreases, straw-colored beers brewed with Pilsner malts start to show DMS, thereby reinforcing the validity of the rule of thumb.

However, this is a big contrast to the 10–15% hourly evaporation rates common to homebrewing. Questioning the 60- to 90-minute rule of thumb is a very smart question because the commercial rule is misaligned with homebrew kettles. The next time you brew, consider choosing a lighter style you like and have brewed before and try reducing your boil time to 45 minutes. The proof is in the pint, and you can determine for yourself if the change makes a difference. But be aware that not all beer consumers have the same ability to detect DMS and we all don't use the same malt, so what works for you may not work for someone else. That's why rules of thumb are not absolute.

If 45 minutes works for you, try reducing to 30 minutes. Or if you really want to reduce the length of your brew day, consider no-boil brewing. The catch-22 with boiling and DMS is that boiling increases wort DMS before reducing it through evaporation. Remember, DMS reduction is only one of the goals of boiling. As you consider reducing boil time, be sure to review the topics discussed earlier to keep your eyes open to all changes that may accompany your trials.

For me, colloidal stability is important because we first drink and eat with our eyes. Colloidally stable beers are not always clear, but they don't fall apart during storage. Haze particles that develop during storage, often causing beer to appear like a snow globe, are a common manifestation of colloidal instability. These beers may taste OK, but the appearance is simply off-putting. If you go too far and notice unwanted changes in clarity, consider increasing your kettle fining dosage rate and/or increasing boil time.

Malt selection is absolutely an important part of this topic. Maltsters produce malt to satisfy brewers and reducing SMM and DMS is one of the things modern maltsters monitor. SMM serves an important role in plant biochemistry and is not something that can be removed from barley, but fertilizer application and barley protein both influence SMM in green, or un-kilned, malt. During malt kilning, SMM is partially converted to DMS and is removed with the hot air used to dry malt. As malt color increases, SMM and DMS levels reduce. Because Pilsner-style beers use very pale malt, these brewers are particularly concerned about SMM and DMS. If you primarily brew styles with more color, choosing a slightly darker base malt takes much of the load of SMM and DMS reduction off your shoulders. And the differences are not big; increasing your base malt color from about 1.5 °Lovibond (3 EBC) to 2 °Lovibond (4 EBC) makes a significant difference in malt SMM and DMS levels. Once you get into the 3–4 °Lovibond (6–8 EBC) color range of Vienna, pale ale, and Munich malts, DMS is really a non-issue.

This leaves us with color and flavor. Yes, wort boiling can be used to develop desirable colors and flavors. However, wort boiling also contributes to wort thermal stress, usually measured using the thiobarbituric acid index (TBI). As TBI increases with boiling, beer flavor stability is reduced. Reducing TBI is of major interest to commercial brewers always looking for ways to ward off the onset of beer staling. While this may not be a concern to homebrewers, we can look at how commercial brewers use specialty malts to de-

velop wort color and flavor as a substitute for wort boiling and decoction mashing. Because extending boiling and extended kilning both lead to more Maillard reaction products, brewers can find a wide range of these flavors and colors in specialty malts. Reduce your boiling times by seeking biscuit, toast, vanilla, nutty, caramel, and dried fruit aromas from malt along with golden and deep amber color hues.

Thanks again for the great question and I hope this information allows you to reduce your boil times without sacrificing beer quality!

Q I RECENTLY WATCHED A BYO+ VIDEO ABOUT USING A GLYCOL CHILLER TO MAKE COLD WATER FOR WORT COOLING PURPOSES AND WANT TO SIMPLIFY THIS APPROACH BY MAKING COLD WATER USING ICE. IF THIS MAKES SENSE, HOW DO I GO ABOUT DETERMINING HOW MUCH ICE TO USE? I DO KNOW THAT 7.5 GALLONS (28.4 L) OF 40 °F (4 °C) WATER WILL COOL 5 GALLONS (19 L) OF WORT TO ABOUT 52 °F (11 °C) USING MY COUNTERFLOW CHILLER. I LIKE BREWING TRADITIONAL LAGERS AND STRUGGLE HITTING MY WORT TEMPERATURE WHEN MY WATER TEMPERATURE IN THE SUMMER IS ABOUT 80 °F (27 °C). WINTER IS APPROACHING, BUT IF I DON'T ASK THIS NOW, I WILL FORGET WHEN I NEED THE INFORMATION NEXT YEAR.

MARC SAVARD
BENTONVILLE, ARKANSAS

A Cold water tanks are commonplace in commercial breweries because they are handy reservoirs of cooling potential and help to spread the cooling load on refrigeration systems associated with wort cooling from as few as 30 minutes up to 3 hours or more, depending on the brewing interval of the brewery. Some breweries also use devices known as ice banks to provide cold "brine" (glycol or salt solutions) from refrigeration systems to wort coolers; warm brine flows back to the ice bank, melts ice, cools down, and is pumped back to the wort chiller in a loop. Both devices spread the cooling load from wort cooling over a longer time range; the difference is that the cold water from cold water tanks is converted to hot water and captured for future brews, where the cold brine from ice banks flows back to the ice bank. When breweries use ice banks, ground water is always used to take the heavy hit and to produce high-temperature brewing water. Cold water tanks are sometimes sized to handle the full cooling load and other times are used in conjunction with ambient water. The takeaway is that your question makes total sense.

Let's jump into the nuts and bolts of your question. You know that 7.5 gallons (28.4 liters) of water at 40 °F (4 °C) works in your system to chill 5 gallons (19 L) of wort to about 52 °F (11 °C). And you want to prepare this volume of cold water to use for wort cooling by mixing 80 °F (27 °C) water with ice. I am assuming you are pumping the water through your counterflow, but if you don't have a pump, you can elevate your cold water reservoir and siphon through your cooler. I am also going to slightly over-estimate the amount of ice required for this problem by assuming the ice temperature is 20 °F (-7 °C), warmer than the setting on most freezers. Skipping the energy balance math, 4 parts of water at 80 °F (27 °C) plus 1 part 20 °F (-7 °C) ice will give you with water at 39 °F (4 °C). Simply mix 6 gallons (22.7 liters) of 80 °F (27 °C) water with 12.5 pounds (1.5 gallons or 5.7 kg) of 20 °F (-7 °C) ice in a cooler, allow the ice to completely melt, and the resulting temperature should be a bit under 40 °F (4 °C) and provide the cooling needed for your system.

There are free online calculators that you can use to calculate different scenarios; check out this link as an example: www.onlineconversion.com/mixing_water.htm

I do want to point out that quick cooling of your homebrewed wort is not required to brew great beer. The quick cooling rule, like many homebrewing rules, came out of commercial brewing where large batch sizes make some sort of heat exchanger, whether a coolship, Baudelot cooler, or plate heat exchanger, a necessity. Homebrew batches cool quickly enough when wort in an uninsulated fermenter is simply allowed to chill out, no pun intended, until cooler than about 80 °F (27 °C).

Efficiency, a question you did not ask about, is a totally different topic, but a very inviting rabbit hole for me to hop into. Each cooling scenario depends upon how much energy is transferred from the cooling or heating medium to the product. In the case of wort cooling at home, we are typically looking at energy transfer from cool water to hot wort. You have empirically found that 7.5 gallons (28.4 liters) of 40 °F (4 °C) water cools 5 gallons (19 L) of your wort to about 52 °F (11 °C). How can the practical brewer reduce the volume of cooling water without changing water temperature?

One way to improve cooling performance is to change the cooling surface area by increasing the length of the cooling coil. This works until the water temperature leaving the chiller is nearly the same as the wort temperature entering the chiller. Another option is to increase liquid turbulence and the associated Reynolds Number (let's save this discussion for another day) by changing the surface of the cooling area and/or increasing the flow rate of wort, cooling water, or both. Simply denting a cooling coil increases turbulence when water-like liquids flow through the tube. And as turbulence as measured by the Reynolds Number increases, so does the overall heat transfer coefficient. Plate heat exchangers are another example of how turbulence increases heat flow. The real upside with turbulence is a decrease in cooling area to provide the same coiling duty. Changing the heat transfer surface from stainless steel to copper and reducing material thickness are other design details used to improve cooling efficiency. Hope this information is useful, stay chill, and enjoy those old-school lagers! BYO

BY GORDON STRONG

IRISH RED ALE

Closer to pale ale than you think

I have to confess that I dread judging Irish red ales in competitions. Not because I don't like them, but because judges often give feedback to brewers with oxidized, vaguely amber-colored beers to enter them as Irish reds because they seem caramelly. Never mind that caramel flavors from oxidation aren't clean and fresh or that the oxidation can cause other problems, like a harsh bitterness. While possibly true that the beer might score better in that category, that doesn't mean it's actually a good beer or a representative example of the style. Judges trying to be nice are just punishing other judges later.

Many American beer enthusiasts are confused about the style as well, because most beers called Irish red ales in the U.S. bear only passing resemblance to those in Ireland. I had held many of these beliefs myself until a couple of trips to Dublin cleared up my confusion. I found the beers a bit like English pale ales when cold, but gaining some graininess and body as they warmed. They were often drier and more bitter than the ones in the U.S., of lower strength, and often without the strong caramel flavors and sweetness we know.

Irish red ale is style 15A in the BJCP (Beer Judge Certification Program) Style Guidelines. It is part of category 15, Irish Beer, along with Irish stout and Irish extra stout. The style describes the beers like those in Ireland, but drinkers should know that many in the U.S. have higher alcohol and more sweetness – I think of those like export versions, since it mirrors what English breweries do with beers for export. Or maybe they are just Irish-American red ales.

HISTORY

Irish red ale does not have a well-documented history, which has led some to say that it isn't really a style. I think it has existed as a style for some time, but the name is much more recent. Michael Jackson mentioned it in his earlier books, but always just as Irish ale, which was a way of distinguishing it from the more popular stout (and previously, porter). The independent ale-brewing tradition in Ireland essentially died out in the 1950s and 1960s, with Guinness purchasing the remaining brands, including Smithwick's. Lett's Brewery brewed Enniscorthy Ruby Ale from 1864 until the brewery closed in 1956. However, the brewery licensed its name to Pelfrey in France in the 1960s, and to Coors in the U.S. (where the beer is known as George Killian's Irish Red) in 1981.

Smithwick's is most closely associated with the surviving ale brewing in Ireland and it makes perhaps the best-known example. It claims a brewing history dating back to 1710, but it seems implausible that it was making the same beer during this entire time. It is also unknown whether Guinness reformulated the product when it purchased them in 1965 or when it subsequently closed the brewery in Kilkenny and moved production to Dublin in 2013.

The popularity of Killian's Irish Red in the U.S. during the 1980s and 1990s led to the establishment of the style in craft culture, as the beer was described in the formative Michael Jackson books and it came from a country with a legitimate and well-known brewing heritage. This also helped divide the style as Killian's is essentially an amber lager, not an ale, a phenomenon that would be repeated when other major multinational industrial breweries looked to broaden their portfolios. Murphy's Irish Red, owned by Heineken, also produces an amber lager with a similar profile. This creates the ironic situation where two of the better-known examples of Irish red ale aren't Irish, aren't red, and aren't ales.

In the U.S., craft breweries began interpreting the style as stronger and more flavorful than those found in Ireland, often with an increased caramel

Many American beer enthusiasts are confused about the style as well, because most beers called Irish red ales in the U.S. bear only passing resemblance to those in Ireland.

IRISH RED ALE
BY THE NUMBERS

OG:	1.036–1.046
FG:	1.010–1.014
SRM:	9–14
IBU:	18–28
ABV:	3.8–5.0%

Photo courtesy of Shutterstock.com

IRISH RED ALE

(5 gallons/19 L, all-grain)
OG = 1.045 FG = 1.011
IBU = 22 SRM = 14
ABV = 4.4%

INGREDIENTS

7 lbs. (3.2 kg) mild malt
1 lb. (454 g) flaked corn
1 lb. (454 g) crystal malt (40 °L)
4 oz. (113 g) flaked oats
4 oz. (113 g) roasted barley (300 °L)
6.25 AAU Golding hops (45 min.) (1.25 oz./35 g at 5% alpha acids)
1.2 AAU Golding hops (10 min.) (0.25 oz./7 g at 5% alpha acids)
White Labs WLP004 (Irish Ale), Wyeast 1084 (Irish Ale), or SafAle S-04 yeast
¾ cup corn sugar (for priming)

STEP BY STEP

This recipe uses reverse osmosis (RO) water. Adjust all brewing water to a pH of 5.5 using phosphoric acid. Add 1 tsp. of calcium chloride to the mash.

This recipe uses an infusion mash. Use enough water to have a moderately thick mash (1.5 qts./lb. or 3.1 L/kg). Mash in the mild malt and flaked grains at 151 °F (66 °C) and hold for 60 minutes. Begin recirculating, add the dark grains and crystal malt, then raise the mash temperature to 169 °F (76 °C) for mashout. Continue to recirculate for 15 minutes.

Sparge slowly and collect 7 gallons (26.5 L) of wort in the brew kettle. Bring wort to a boil.

Boil the wort for 90 minutes, adding hops at the times indicated.

Chill the wort to 68 °F (20 °C), pitch the yeast, and ferment at this temperature until complete. Allow the beer to settle for at least one week to give the beer time to clear. Consider adding a fining agent or lagering if haze is slow to clear.

Rack the beer, prime and bottle condition, or keg and force carbonate to 2.4 v/v.

IRISH RED ALE

(5 gallons/19 L, extract with grains)
OG = 1.045 FG = 1.011
IBU = 22 SRM = 14
ABV = 4.4%

INGREDIENTS

4.6 lbs. (2.1 kg) extra light dried malt extract
1 lb. (454 g) crystal malt (40 °L)
4 oz. (113 g) Carapils® malt
4 oz. (113 g) roasted barley (300 °L)
6.25 AAU Golding hops (45 min.) (1.25 oz./35 g at 5% alpha acids)
1.2 AAU Golding hops (10 min.) (0.25 oz./7 g at 5% alpha acids)
White Labs WLP004 (Irish Ale), Wyeast 1084 (Irish Ale), or SafAle S-04 yeast
¾ cup corn sugar (for priming)

STEP BY STEP

Use 6.5 gallons (24.5 L) of water in the brew kettle; heat to 158 °F (70 °C). Steep the grains in a mesh bag for 30 minutes, then rinse gently, removing the grains.

Turn off the heat. Add the malt extract and stir thoroughly to dissolve completely. Turn the heat back on and bring wort to a boil.

Boil the wort for 45 minutes, adding hops at the beginning of the boil and a second addition with 10 minutes remaining.

Chill the wort to 68 °F (20 °C), pitch the yeast, and ferment at this temperature until complete. Allow the beer to settle for at least one week to give the beer time to clear. Consider adding a fining agent or lagering if haze is slow to clear.

Rack the beer, prime and bottle condition, or keg and force carbonate to 2.4 v/v.

TIPS FOR SUCCESS:

Since malt is the focus of this style, be sure to source a quality base malt with biscuit character. Look for a pale ale malt if mild malt is not available. Also, use fresh crystal malt to avoid oxidative notes.

flavor. Great Lakes Brewing in Cleveland, Ohio, has long made Conway's Irish Ale that weighs in at 6.3% ABV, bigger than many examples but still retaining some similarities in flavor profile. Many other craft breweries followed suit, including those in countries developing their own new craft culture.

Back in Ireland, imported versions of Irish red ales became better known and may have inspired newer craft breweries (such as Sullivan's and O'Hara's) to develop their own examples. These are the ones I think of as modern Irish red ales, those made by craft breweries in Ireland with Irish ingredients by Irish brewers. These beers have something in common with pale ales, but with more body and flavor (and often color). Yet craft breweries in Ireland also are making pale ales and marketing Irish red ale as a different product. So, while Irish ale may have common roots, probably derived from the English brewing tradition, in the craft era there does seem to be a difference between amber (red) and pale (golden) products.

When trying to describe beer styles, it is a fallacy to think that all commercial beers should fit into a style, and also that all beers with a certain name match the same style. I made this mistake early when trying to document Irish red ales, as I encountered examples in what I now see as the Irish-craft, multi-national, and U.S.-craft Irish red ale. Trying to treat them all as one broad style leads to many problems in describing their sensory profile, production methods, and histories. I think taking the more nuanced approach better explains how the style developed, splintered, and continued to evolve in three distinct locations. They all do share some common elements that are recognizable, but judges should allow some leeway when trying to understand what is intended by the brewers.

SENSORY PROFILE

The malt flavor is the most common element between versions but each have different balances and strengths. The color can vary considerably, but is always something between pale and brown. Typically, something in the amber to copper range is found, but the beer does not necessarily have an overtly reddish color.

Irish red ale is an average-strength beer in its markets. The mass market version is about 5 to 5.5% ABV, like most international lagers. Irish versions are usually less strong, maybe 4.5% or less. Export versions are stronger, at least 5%. U.S. versions are often 5 to 6.5%. The lesson I take from this is that the strength is what is perceived as average, more than something universal across all versions.

The two phrases most often used by Irish breweries to describe the flavor profile of Irish red ales are caramelly and biscuity. The examples I tried in Ireland tend to have a grainy flavor, as well as a bitter balance. As the samples warm, the beers develop more body and malt flavor and the malt grows into balance with the hop bitterness. Smithwick's has more of a toasty flavor than biscuity and, when combined with their yeast, gives a buttered toast impression (a phrase I first used in previous versions of the guidelines and subsequently saw that Michael Jackson had also used). I think this character is mostly a brand-specific attribute, but a related toffee aspect can be found to the caramel flavors in some examples.

The yeast character obviously varies by variety. The mass market examples are often lagers, so they have a clean, smooth character. The Irish versions can have a character like English ales, with a fruity aspect. Some versions are lightly buttery (from diacetyl produced by yeast). American or craft versions have a more neutral ale character, with specialty malts providing additional flavors instead. Hop flavor and aroma is minimal, often absent. When present, it usually has an English character, earthy or floral. Craft versions often have more hop character, up to moderate levels.

The body of the beer can be medium-light to medium, although export and U.S. versions may be a touch fuller. The finish is typically dry, enhanced with a very slight roasty note that is more sensed than tasted. Bitterness varies from medium-low to medium, with more bitter versions often seeming grainy in flavor. The aftertaste can be grainy and dry to slightly malty and sweet, depending on the version. The international lager versions have lower bitterness, as does Smithwick's. The more modern craft Irish versions have higher bitterness, almost to the pale ale level.

As a judge, be open to the different interpretations and know that a single example doesn't define the style. Sweeter examples tend to seem that way due to lower bitterness, but will usually have a touch of roast to provide a dry counterpoint. The more bitter and grainy versions tend to taste better to me when allowed to warm slightly. Look for an interesting ester profile and how it works with the caramelly flavors.

BREWING INGREDIENTS AND METHODS

The Irish brewing tradition shares similarities with the nearby English (and Scottish) methods, particularly in ale production. Ireland is a fertile island and does grow and malt its own barley, so some minor differences can exist. Pale ale malt is the base of this style and it can have a higher kilning so it has more color, flavor, and dextrins. Much of the flavor is due to the base malt. Caramel or crystal malts can provide some flavor, color, and sweetness. A touch of roasted barley or perhaps a type of black malt adds a grainy dryness and a touch of red color to the finished beer. Irish barley can prove hard to source here in the States, so I would suggest using something from a Scottish or northern English maltster if none are available from your supplier.

Smithwick's uses some corn in the grist, so adjuncts are certainly allowable, as they are in English ales. Corn can add a more rounded flavor and the impression of sweetness. Infusion mashing typical for ales is used, although the beer can be adapted easily to whatever production methods are used by the brewer making the beer.

Irish or English ale yeast is most traditional, but a warm-fermented lager or more neutral ale yeast can give enough esters to the beer. Yeast used for stouts and porters could also be used, as these would be typical in Ireland. If the strains produce a trace of buttery character, that is acceptable but by no means required. An estery profile is much more desirable.

Hopping is done as is typical in Ireland, England, or Scotland regarding the varieties used. Most of the hop emphasis is on the bittering addition, but some flavor and aroma hops can be used in up to moderate quantities.

If these comments seem vague, it's because the style can be so widely adopted for use on different brewing systems and made in many regional sub-styles. There are few hard-and-fast rules about making this style. As a judge, the most important one for me is that the flavors should be pleasant and result in a highly drinkable beer.

HOMEBREW EXAMPLE

My recipe is a middle-of-the-road example for Ireland. It uses a rather dextrinous base malt (mild malt) with a little bit of oats to increase the mouthfeel. The caramel flavor comes from crystal 40 malt, along with some flaked corn to increase the impression of sweetness. The color and dry bite come from roasted barley, which gives a reddish color when used in lighter quantities. There isn't really a need to mash at higher temperatures to get more body since we are relying on a dextrinous base malt with the addition of flaked oats.

I'm aiming for around 22 IBUs, which probably seems on the high side for many Americans, but it actually represents a low side of the style in Ireland. If it seems a bit too bitter for you when you are drinking it, let it warm up a bit and the beer will come into more of a balance with the richer malt flavors becoming noticeable. Any hops from Britain or Ireland will work, but Golding hops are quite common, so they are a reliable choice. A touch of hop flavor isn't out of place in the style, so I do have a light flavor addition.

I'm calling for a classic Irish ale yeast, but a fruity English-type yeast would also work in this style. A little bit of esters complements the caramel sweetness quite well. If the yeast does happen to throw a touch of diacetyl, that slight buttery flavor can also complement caramel in low doses so don't let it bother you too much.

When you try this recipe, taste it first at a cooler temperature and then again closer to cellar temperature. See if you taste the difference in balance as it warms. I do like some of the stronger, less bitter American interpretations (and so do many American judges — keep this in mind if you intend to compete in this style), but I think you should also appreciate the style for what it is in its homeland. Sláinte.

Holiday GIFT GUIDE

This holiday season give the gift of beer! Check out all of the great beer gear on the next few pages for some gift ideas for friends and family, or to make your own homebrew holiday wishlist...

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When I graduated Auburn University's brewing science and operations program in 2018, I was excited to have gained the tools to fine-tune the quality of our product and aid in the launch of our expansion.

In 2020, I realized the program also provided me with the knowledge necessary to enhance the survivability of our small business during a global pandemic.

Kate Russell — Graduate Certificate '18, Master of Science '23
Hopkinsville Brewing Company, Founder and Brewer

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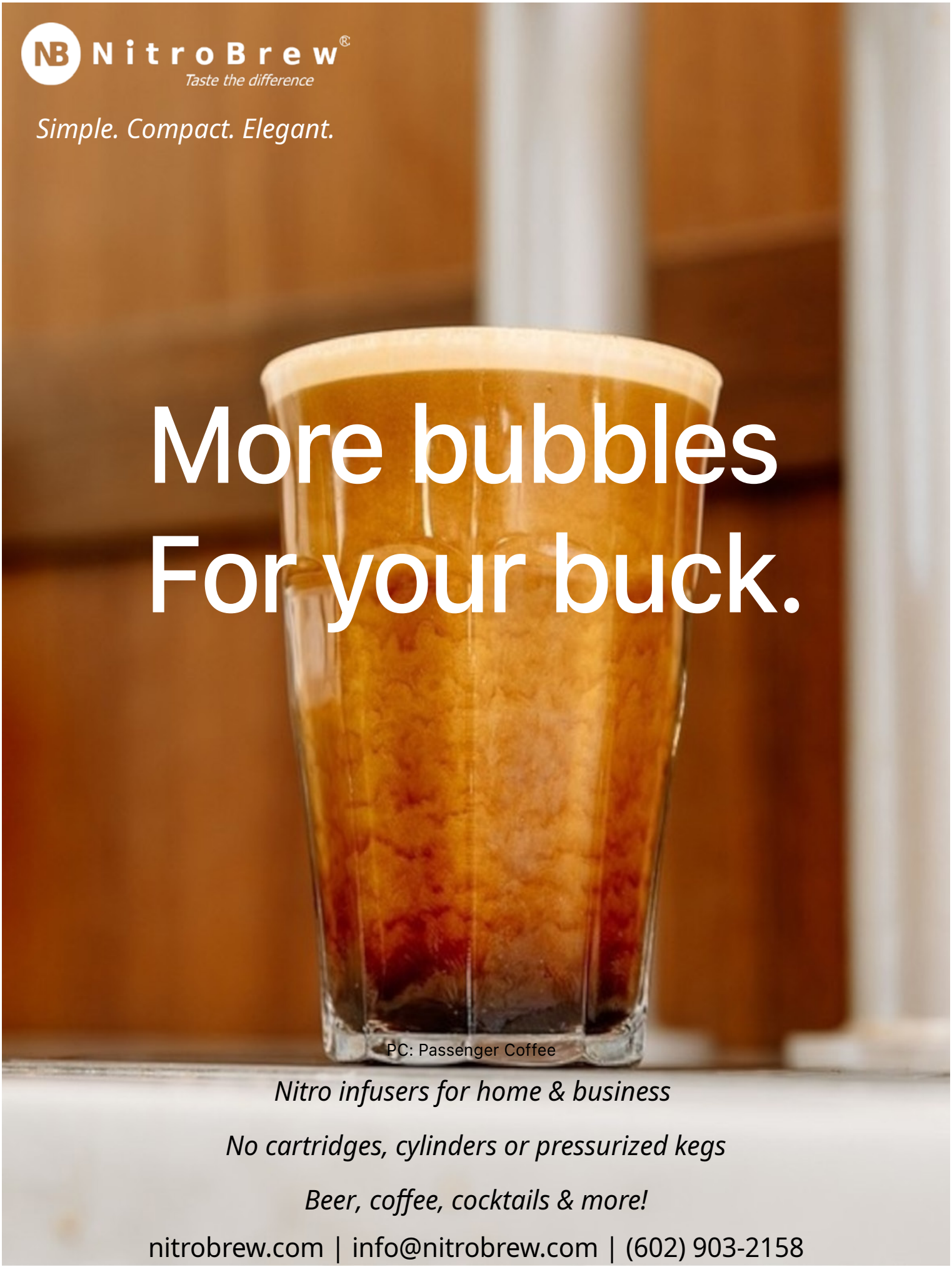
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LET THEM EAT BEER!

Cooking up a multi-course beer-inspired meal for the holidays

by Dan Jablow

Food photos by Dan Jablow
Beer photo by Charles A. Parker/Images Plus

As devoted readers of *Brew Your Own,* you probably already know that beer is one of the world's oldest and most beloved beverages. Beer is a pretty special drink in that it is both delicious and refreshing, but it has for centuries also brought families, neighborhoods, and communities together.

Beer is also a lot of fun to brew at home. If you're reading this magazine, then, like me, you've taken your love of beer to the next level by diving deep into the world of homebrewing — creating your favorite styles and experimenting with new brews from the comfort of your home or garage.

Beyond being something to enjoy at the end of a long day at the office or amongst friends while cheering on your favorite team, there's another place where we can harness the power and flavor of beer — in the kitchen. Not only can we pair our favorite foods with our favorite brews, but there are also many ways to incorporate beer during the cooking process to add depth, aroma, flavor, and a unique character to a wide variety of dishes from sweet to savory.

With so many diverse styles and flavor profiles, beer is a highly versatile ingredient in the culinary world. To think about how to use beer when cooking, it's helpful to think about what beer is at its most basic level, which is a flavorful liquid. There are many times when a recipe will call for the addition of a flavorful liquid — for example, the addition of beef stock to a beef stew. In my opinion, there's no reason why some, or even all, of this liquid can't be beer. Something to consider is that different beers are going to have different flavor properties. While both lagers and ales can be malty and/or hoppy, lagers will generally be lighter and drier while ales can be fuller-flavored and bodied and have stronger fruity or earthy notes. I recommend taking notes of the characteristics of some of your favorite beers before considering how they may be used in culinary applications.

Let's next review a few different culinary techniques in which beer can easily be incorporated.

Steaming

Replace some or all of the cooking liquid with beer. Light lagers pair really well with mussels, clams, or shrimp in this application.

Poaching / Simmering / Boiling

Same with steaming, some of the cooking liquid in any of these options can be replaced with beer. I love to poach sausage in beer before finishing on the grill or sautéing. Almost any kind of seafood or shellfish can also be cooked in this way.

Stewing / Braising

Adding beer to the cooking liquid is a great way to add new flavors to your dishes, especially if you use a style that is malty or dark. This works really well for chili and soup. The natural acidity of beer will help tenderize meat, which is why I'm a huge fan of using it when I make beef stew and short ribs. Think of beer here as a complement to whatever type of cooking stock your dish calls for.

Marinating

Because it can help tenderize meat, beer is a great addition to a marinade. And if you're going to marinate something, then you might as well think about applying more beer through the next technique too.

Grilling / Roasting

Beer can be used here as a basting liquid in addition to a marinade.

Smoking / BBQ

I've often used beer as an ingredient when I baste, or "wet-mop," ribs, chicken, or pork, and my favorite BBQ sauce recipe of all-time features a healthy addition of one of my all-time favorite beers, Anchor Steam (I'm still in mourning . . . guess I know what needs to be brewed in time for barbecue season).

Baking

That's right, beer most definitely has a place in baked goods, especially darker beers like stouts and porters, which can lend all kinds of roasty, chocolatey, and rich notes to desserts and breads.

BEER-INSPIRED FOOD RECIPES

Let's get into some actual recipes to demonstrate how you can make use of this amazing elixir in your own kitchen. As we're closing in on that time of year, I thought it'd be fun to build a menu showcasing a wide variety of beer with a number of different cooking techniques all in a loosely holiday-themed four-course meal with a happy-hour drink to kick things off. Add the ingredients to your shopping list, invite some guests over, and be ready to impress them.

Cranberry Orange Ginger Shandy

Let's kick off this loose holiday-themed menu with a beer cocktail. Hopefully you aren't all cranberried-out after Thanksgiving because we're going to use them to make a slightly tart, vibrant simple syrup that will give this cocktail a healthy dose of seasonal cheer. The cranberry/orange/ginger combination plays perfectly with a hefeweizen/wheat beer, especially one that swings more towards the fruity, as opposed to the banana/clove side, though that will work as well.

Makes about 8 cocktails

INGREDIENTS

2 cups fresh or frozen cranberries
1 cup granulated sugar
1 cup water
¼ cup fresh-squeezed orange juice
Peel of one orange (no pith)
Pinch of salt
16 oz. (475 mL) ginger beer
(6) 12-oz. (355-mL) hefeweizen or wheat beers
Ice cubes

SYRUP-MAKING DIRECTIONS (PRE-MAKE THIS)

The bulk of the prep here is in making the cranberry orange simple syrup, which can easily be made a day in advance. Combine all ingredients (except for the ginger beer, hefeweizen, and ice cubes) in a medium saucepan. Stir ingredients well, bring to a boil, then reduce the heat to low and simmer for about 15 minutes, stirring occasionally.

Place a fine-mesh strainer over a bowl and pour the cooked mixture through it. Discard the solids and transfer the syrup to an airtight container. Cool the mixture for at least three hours, or even overnight, before use.

FINAL DRINK ASSEMBLY

Ensure all components (both beers and the cranberry orange syrup) are cold. Fill a pint glass with ice and add 2 oz. (60 mL) ginger beer and 2 tablespoons cranberry orange syrup to the glass. Fill the remainder of the glass with your hefeweizen or other wheat beer. Stir everything well to combine.

When the bubbles subside, fill to the top with additional wheat beer and enjoy.

Note: This recipe will yield about a cup's worth of simple syrup. If stored in an airtight container and kept refrigerated, it will keep for a few weeks and can be used as a flavoring for other cocktails and mocktails, and is also great served over vanilla ice cream or pancakes.

Kentucky Beer Cheese

If you're anything like me, you'll want something to munch on while indulging in pre-dinner festivities and I've got something that'll go perfectly with the Cranberry Orange Ginger Shandys — Kentucky Beer Cheese. It's reminiscent of a Pimento cheese spread, just with a slightly different ingredient list and one key addition — beer! Beer cheese, which as the name suggests was popularized in Kentucky, is salty and savory, great for dipping crunchy things like pretzel sticks, hearty crackers, veggie slices, or even thick-cut salami pieces; however, I must warn you, it's quite addictive. Like the cranberry orange simple syrup, it's got a relatively short list of ingredients and can also be made a day or two in advance. I recommend using a food processor here to do the dirty work. In lieu of that, a blender will suffice.

Makes about 2 cups

INGREDIENTS

8 oz. (225 g) extra-sharp cheddar cheese, cut into roughly 1-inch (2.5-cm) cubes, at room temperature
2 oz. (56 g) cream cheese (full-fat), at room temperature
1 oz. (28 g) unsalted butter, at room temperature
¼ cup white or yellow onion, roughly chopped
2 tsp. Worcestershire sauce
1 tsp. Dijon mustard
⅛ tsp. cayenne pepper (optional)
4 oz. (118 mL) of a "full-flavored" beer (think brown ale, porter, etc.) at room temperature
Salt, to taste

DIRECTIONS

Put the cheddar cheese, cream cheese, and butter into a food processor or blender and mix until combined — about 60 to 90 seconds. Add onion, Worcestershire sauce, Dijon mustard, and cayenne pepper to the cheese and butter mix. Process until combined, about another 30 seconds. Scrape down the sides of the food processor bowl if needed. Omit the cayenne pepper if a little heat is not your thing. While the food processor is running, slowly add the beer and process until the mixture is completely smooth and there's no visible beer remaining. This should take 30 to 60 seconds. Season with salt.

This can be served immediately or prepared a day or two in advance. Prior to serving, let the dip come up to room temperature to bring out its flavor and make it easier to spread. Serve in a bowl alongside your favorite accompaniments, such as pretzel sticks, crackers, assorted veggies, and hard salami.

Short Ribs

To me, there are few things more satisfying on a cold and dark winter's evening than short ribs. Hearty and full of flavor, short ribs are a cut that require a long and slow cooking time to fully cook and tenderize the meat. This is best done using a heavy Dutch oven (with a lid) placed in an oven at a relatively low temperature. I prefer to use bone-in short ribs here as I believe that adds some extra flavor to the finished dish. Don't skip the step of browning the short ribs either as that will also add a real depth of flavor to the dish. The finished dish will be reminiscent of beef stew but so much more luxurious.

Makes 4 servings

INGREDIENTS

4 lbs. (1.8 kg) bone-in short ribs (boneless will also work if preferred)
2 Tbsp. canola oil
2 medium onions, diced finely
4 carrots, diced finely
4 celery ribs, diced finely
4 garlic cloves, crushed
2 Tbsp. tomato paste
2 cups beef stock, low- or no-sodium
12–16 oz. (350–475 mL) beer (Anything dark or malty and not super hoppy works well here. I'm particularly fond of a Mexican dark lager in this dish.)
4 whole bay leaves
Kosher salt, to taste

DIRECTIONS

Season the short ribs liberally with Kosher salt on all sides. Heat up a Dutch oven or heavy-bottom pot over medium-low heat. Add the oil to pan and then slowly brown the short ribs on all sides. Keep a close eye on your stove as you want the meat to brown evenly without burning. You also may need to do this over a few batches to not crowd the short ribs in the pan as that will impede browning. Once the meat has finished browning, set it aside for later.

Pour off a little of the excess fat and oil, then add the onions to the pot. Stir well, making sure to scrape up any brown bits from the bottom of the pot. Cook about 10 minutes until the onions start to appear translucent and take on a slight brown color. Add the carrots and celery to the onions and cook for 10 minutes, stirring frequently. Add the crushed garlic, stir, and cook 3 minutes.

At this point, preheat your oven to 250 °F (121 °C).

Add the tomato paste to the vegetables and stir thoroughly to combine. Cook 2 minutes, stirring frequently so the tomato paste doesn't burn. Add the beef stock and stir to combine, once again scraping any brown bits off the bottom of the pot. Add the beer and bay leaves and stir to combine. Then place the short ribs and any meat juice that has collected into the pot. Bring the contents of the pot up to a simmer, then cover with a piece of aluminum foil, pressing it down onto the surface of the meat and liquid.

Cover the pot with a lid and place it into the preheated oven. Cook the short ribs covered in the oven until they are tender — about 4 hours or so.

Remove the short ribs from the pot and place them into a container or bowl and cover.

Place the pot onto a burner set to medium-high. Reduce the liquid volume in the pot by about a third to thicken and concentrate its flavor, then remove the bay leaves.

Once reduced to a volume you are happy with, season with salt to taste. Set the heat to low and place the short ribs back into the pot, turning them to cover them with sauce. Cover and keep warm until you're ready to serve.

These pair well with mashed or roasted potatoes, grits, wild rice, or polenta.

Roasted Beer and Bacon Brussels Sprouts

Makes 4 servings

Brussels sprouts used to have a bad reputation. I think that's before people realized that rather than boiling the heck out of them and serving them when they are all bland and mushy, that they can be roasted until brown and crispy in an oven. The beer will add a slight amount of bitterness and brightness to the Brussels sprouts, which I find helps to round out their flavor nicely.

INGREDIENTS

8 oz. (235 mL) beer (pale ale or IPA works well here)
¼ cup beef or chicken stock
2 Tbsp. apple cider vinegar
1 Tbsp. brown sugar
2 lbs. (0.9 kg) Brussels sprouts, root-end trimmed, quartered or halved depending on size
2 shallots, peeled, halved, and sliced thinly
4 slices of bacon, preferably thick-cut
2 Tbsp. olive oil
Salt and freshly-ground black pepper, to taste

DIRECTIONS

Add the beer, stock, apple cider vinegar, brown sugar, and a pinch of salt to a small saucepan. Stir well and cook over medium heat until the mixture reduces to about 3 Tbsp. in volume. Remove from the heat and set aside to cool.

At this point, preheat the oven to 425 °F (218 °C).

Line a baking sheet or cookie pan with aluminum foil and set aside.

Trim off the bottom of the Brussels sprouts. Depending on the size of your Brussels sprouts, you'll either want to halve or quarter them. Place the cut Brussels sprouts into a large bowl.

Cook the bacon in a sauté pan over medium-low heat until rendered and crispy. Remove the bacon from the pan, roughly chop it into bits, then add it to the bowl with the Brussels sprouts. Pour the rendered bacon fat over the Brussels sprouts.

Peel, halve, and thinly slice the shallots. Add them to the bowl with the Brussels sprouts along with the olive oil and reduced beer mixture, and toss well to combine. Pour out onto the prepared baking sheet and spread into an even layer.

Bake 25–30 minutes, until the Brussels sprouts are tender and brown in color. Increase the heat to 450 °F (232 °C) and further cook the Brussels sprouts until crispy. This will happen quickly so keep a close eye on the sprouts.

Once browned to your liking, remove the Brussels sprouts from the oven and serve immediately.

Stout Gingerbread Cookies

Makes ~28 cookies

Gingerbread cookies are not only seasonally appropriate, they're also quite a tasty dessert to cap off this meal. I've got a way that you can really level up the flavor of these holiday stalwarts — naturally, by adding beer to the dough! But not just any beer — you're going to want to break out the heavy hitter here by grabbing one of your favorite full-bodied stouts. Any stout. A flavor-packed pastry stout, a nice dry Irish stout, a huge Russian imperial stout. Any of these will nicely complement the molasses and spices and will help provide these cookies with another flavor dimension that will make you ask why you haven't been adding beer to your cookies all along. To further intensify the beer flavor, I like to reduce the beer before using it in the cookie dough.

INGREDIENTS

6 oz. (175 mL) stout beer
275 g (1¾ cups) all-purpose flour
155 grams (1 cup) whole wheat flour
1½ tsp. ground cinnamon
1 tsp. ground ginger
½ tsp. baking soda
¼ tsp. ground nutmeg
¼ tsp. salt
⅛ tsp. ground cloves
½ cup unsalted butter, room temperature
1 cup dark brown sugar, packed
½ cup granulated sugar, divided
1 large egg, room temperature
⅓ cup molasses

DIRECTIONS

The first step here is to reduce the beer by about ⅔ of its volume. You'll want to do this an hour or so in advance to allow the beer time to cool before adding it to the cookie dough mixture. Pour the beer into a small pot, turn the heat up to medium-high and cook until it has reduced to about ¼ cup (2 oz./60 mL). Once it has reached that volume, turn off the heat and set aside for later.

In a medium bowl, whisk to combine the flours, ginger, cinnamon, baking soda, nutmeg, salt, and cloves. Set this aside for later.

Add butter, brown sugar, and a ¼ cup of granulated sugar to a stand-mixer bowl and beat on high speed with the paddle attachment for about 60 seconds until the mixture is light brown in color and has a smooth texture. In lieu of a stand-mixer, you can use a large bowl with a hand-held electric mixer.

Reduce mixer speed to medium, add the egg, and mix for about 30 seconds until all ingredients are thoroughly combined. Repeat this same procedure with the molasses, then the reduced and cooled stout beer.

Add the mixed dry ingredients to the wet ingredients and mix at low speed just until everything is combined and there are no streaks of flour remaining. Cover the dough with plastic wrap and chill in the refrigerator for 60 minutes.

After 60 minutes, pre-heat oven to 325 °F (163 °C) and line two baking sheets with parchment paper.

Take the ¼ cup of granulated sugar and pour it into a small bowl. Using your hands, form dough roughly into the size and shape of a golf-ball. Once formed, roll each cookie dough ball into the sugar, then place onto the prepared baking sheet. Press the dough balls gently with the palm of your hand — this will help to ensure even cooking. Don't crowd the cookies onto the pan as they will spread out some while cooking — keep about 2 inches (5 cm) of space between each cookie dough ball.

Bake at 325 °F (163 °C) for roughly 12 minutes, rotating and switching the pans halfway through.

Remove the cookies from the oven and transfer the cookies to a wire rack to allow them to cool. Repeat with remaining dough, sugar, and prepared pans.

Let cool at least 10 minutes before eating. Any extra cookies, once they've completely cooled, can be placed into a plastic freezer bag and stored in your freezer to be enjoyed at a later date.

Brewing Up a REVOLUTION

Tips and clone recipes from Revolution Brewing Co.

by Chip Walton

When Revolution Brewing Company started making beer in and for Chicagoland 13 years ago, Founder Josh Deth might not have known what an absolute IPA powerhouse he was setting into motion. However, he wouldn't have to wait long to see the signs. The first IPA out of the tanks in 2010, Anti-Hero IPA, was extremely popular right from the beginning. Considered by many a quintessential Midwest IPA, Anti-Hero is now Illinois' highest-selling independent India pale ale. The East and West Coasts often get all the hype and love when it comes to IPAs, but Revolution has planted its flag firmly in the Midwest, with Anti-Hero leading the charge.

As the largest independent brewery in Illinois and 39th largest U.S. craft brewer in 2022 according to the Brewers Association, Revolution has put a laser focus on brewing innovative hoppy beer, but it isn't only about the hops. Head Brewer Jim Cibak has a philosophy that prioritizes balance above anything else, whether that's in the brewery's hop-forward IPAs, easily approachable ales and lagers, collection of kettle-soured fruit beers, or big, boozy beers from their award-winning Deep Wood barrel program.

The brewing and barrel teams at Revolution have shared brewing advice and opened up their recipe books for us to pass along to our readers five of their most popular beers, including pro tips to help homebrewers make their own versions of these fan-favorite beers.

Photos courtesy of Revolution Brewing Co.

Josh Deth (pronounced "deeth") founded Revolution in 2010 as a brewpub, but it has grown exponentially since that time into the 39th largest independent craft brewery in the U.S. a dozen years later.

ORIGIN STORY

Josh Deth came up with the idea for Revolution Brewing while working as a cellarman and brewer at Goose Island in the late 1990s. It took a while, but eventually his vision became reality, and the brewery opened in Chicago's Logan Square neighborhood in early 2010 as a brewpub. There were only a few brewpubs in the city limits at that time — with a relatively larger number of breweries in the area more focused on packaging and distribution — and Deth was determined it was the right way to start.

"I knew I wanted to go direct to the people," he said. "Make our beer and present it and taste it with you. The brewpub was a great model for that."

Two years later, Revolution leased space to open its Kedzie production brewery facility and taproom, now home to three brewing systems: The main workhorse 120-barrel, four-vessel brewhouse, a medium-sized 45-barrel system (the original brewhouse of the Kedzie location), and a 1-barrel pilot system. Having multiple brewhouses of varying capacity allows for plenty of opportunity to experiment with ingredients and styles.

A decade later, in 2022, the brewery was able to purchase the Kedzie production facility, firmly establishing its brewing future in Chicago. The current distribution footprint is 11 states, centered in the Midwest with a large focus on its home state of Illinois. Its hometown pride is always on full display in beer branding and packaging with names and visual references to the city's iconic four-star Chicago flag, historical figures, and art/architecture.

The need to expand beyond the brewpub was in large part due to the support of its flagship beer, Anti-Hero IPA. An excellent example of a Midwest IPA, the recipe, which the brewery has shared with us, has been brewed under the same name since the very first days of the brewpub. The success of it has not wavered, as Anti-Hero is now the beer that keeps many of the 800-barrel fermenters consistently full at the production brewery.

Early variations of the beer were simply named for showcased hop varieties: Galaxy-Hero IPA, Citra-Hero IPA, etc. Over the years there have been spin-offs of varying strengths and clarity such as Hazy-Hero and Every Day-Hero Session IPA. The beer has also provided the inspiration and foundation for hop exploration at Revolution that resulted in innovations like the League of Heroes mixed 12-packs, recent editions of which included beers like Subz-Hero Cold IPA, Jukebox-Hero Black IPA, and Soul-Hero West Coast IPA.

LIFE IS A BALANCING ACT

Even though Revolution is often hyped as a hop-forward brewery, the main goal in any Revolution beer is drinkability. Cibak has been with Revolution since the very first brews at the brewpub and now oversees brewing operations at both locations. He says their beers' high drinkability comes from a dedicated focus on balance.

"No matter if we're brewing a 3.5% ABV English mild ale or a 17% ABV triple-barreled barleywine," said Cibak, "we're always trying to achieve balance in those beers and make them drinkable; a well-rounded experience. We want it to be as refined as we possibly can, even though sometimes the intensity level gets pushed about as far as you can go."

ROLL OUT THE BARRELS!

The flavor intensity levels reach stratospheric heights in the brewery's barrel program and the beers of the Deep Wood Series. Managed by Marty Scott, the barrel program produces limited release and highly sought after barrel-aged beers like imperial oatmeal stout, barleywine, imperial Scotch ale, ryewine, and their many variants. As you'll read more about in the sidebar on page 41, Marty has developed an intricate analysis and sensory program that is both art and science, working closely with the brewing team to produce different threads of each base beer that result in a complex selection of barrels to choose from when it comes time to blend them for packaging.

'TIS THE SEASON!

Like many beer lovers, Cibak finds seasonal beers very exciting because he loves to brew and drink seasonally. "I think a lot of beer drinkers are the same way," he said. "When it's a particular time of year, they look forward to a certain beer. Sometimes it's beneficial for something to come and go away. It makes you appreciate it a little more as opposed to being there all the time." Revolution's seasonal catalog includes Repo Man Rye Stout for late-winter release; Sun Crusher, a summer ale dry hopped with Amarillo®, Mosaic®, and Cryo™ Mosaic®; a decadently malty yet crisp finishing Oktoberfest for fall; and their festive Fistmas Holiday Ale, the recipe for which they shared with us. It's a Christmas beer for hopheads spiced with ginger and sweet orange peel, a really fun beer to brew and share with those on your "nice list."

RECIPE BREAKDOWN WITH TIPS FOR HOMEBREWERS

Note: Revolution Brewing uses Lake Michigan water, and as such suggests homebrewers refer to the Chicago water profile on your brewing or water calculation software. Any references to brewing chemical adjustments are based on that water profile as a starting point.

Anti-Hero IPA (Midwest IPA)

What makes a beer a great Midwest IPA? According to Cibak, Revolution's goal with Anti-Hero IPA is brewing a sessionable hoppy beer with a firm malt foundation (but not overly sweet) and layered "C-hop" flavor and aroma. A beer where there's enough malt to balance out all the wonderful kettle and dry-hop additions you're throwing at it.

"We use very small amounts of specialty malt, if any, in these beers," said Cibak. "If you have a high percentage of caramel malts in there, as that beer slowly oxidizes and the hop aroma fades, those malts really come to the forefront and take over the beer. We love to focus on pale malts, 2-row, sometimes we've even used Pilsner as a base malt in IPAs, and minimize the caramel additions."

Bittered with Apollo™ and stacked towards the end of boil, whirlpool, and dry hop with Centennial, Cascade, Chinook, Crystal, and Citra® hops, Anti-Hero IPA has a clean, balanced bitterness and pushes citrus rind, piney, and floral notes. The brewery provided detailed amounts for hopping in the homebrew recipe, which is a perfect place to start. But, Cibak also suggests homebrewers might need to overshoot the IBU calculation on paper to achieve the target 60 IBUs in the finished beer, based on your process and compensating for loss during fermentation, yeast dumping, dry hopping, and packaging.

Revolution ferments the wort with Wyeast 1968 (London ESB Ale) at 68 °F (20 °C) until day 4 when the temperature is raised to 70 °F (21 °C) and dry hops are added. Dry hopping is essential to the flavor profile of Revolution's IPAs. See the sidebar on page 40 for more details about the brewery's dry hopping process with advice for dry hopping at home.

Infinity-Hero IPA (New Generation IPA)

Revolution calls Infinity-Hero IPA a *New Generation IPA*. "The whole intention of Infinity-Hero is to create more of a new-school IPA using unique hop varieties and different processes," explains Cibak.

On paper, the beer might look like a cross between a classic American IPA and a Hazy IPA, but it's not quite that easy as that on the technical side. "We didn't want this to be a crystal-clear IPA, but also don't want it to be full-on hazy. We aimed for partial haze and that biotransformation character from the interaction of fermenting yeast with hop pellets during fermentation," says Cibak.

Infinity-Hero IPA is built upon a hop bill of Apollo™, Citra®, Amarillo®, Nectaron®, Strata®, HBC #0586, and HBC #1019. This combination pushes a huge stone fruit character with notes of peach, tangerine, and other fruity aromatics you don't get in an IPA every day. Revolution also wanted to create a unique drinking experience of a silky mouthfeel but not as heavy or full like many hazy IPAs. Again, the goal here is balance and drinkability. An increase in calcium chloride (compared to Anti-Hero IPA) helps create a smoother mouthfeel and soften the bitterness of the brewhouse hop additions.

Unlike many hazy IPAs, the grist for Infinity-Hero does not include any flaked adjuncts or even ingredients like malted wheat or malted oats; it is 2-row, Carapils®, and honey malt. The haze is created by the interaction of the yeast and hops added during fermentation. Infinity-Hero IPA is fermented with Omega Yeast Labs OYL-011 (British Ale V), a classic hazy IPA yeast. It is dry hopped following the regimen described in the sidebar on day 3, versus day 4 for Anti-Hero IPA, due to the different performance of the British Ale V yeast strain. Dry hopping during the end of active fermentation is crucial to maximize biotransformation of hop oils and produce the unique fruit aromas in the beer.

To achieve its target level of haze, Revolution centrifuges the beer to a specification that removes yeast and hop solids but leaves behind an amount of that biotransformation haze. On a homebrew scale, Cibak suggests that it could be fun for homebrewers to see the results of using this haze-inducing yeast, but using a smaller than usual dose of silica-based finings like Biofine Clear once the beer is completely cold-crashed. This should help create the haze level you're looking for, while maintaining those tropical biotransformation notes the brewery knows this yeast pulls from the hops. To aid in producing this soft semi-haze, note that finings should not be used in the kettle for this beer.

Freedom of Speach (Kettle Sour with Peach)

Revolution's Freedom Series of fruited sour beers brings together the tartness of a lower-ABV kettle sour beer with a wide range of fruit flavors in a way that is unique to beer brewing.

"We weren't trying to make seltzers or get into the seltzer game," says Deth. "Instead, we wanted to focus on and develop Freedom sours to have a bold dimension of fruit. We de-emphasize malt and hops, and we emphasize fruit on that family of beers."

The Freedom Series includes mouth-puckering fruit beers like Freedom of Press (black currant), Freedom of Expression (strawberry and rhubarb), and Freedom Lemonade (fruited with lemon and back sweetened with a cane sugar simple syrup).

Jim Cibak has been brewing at Revolution since its start and now oversees all brewing operations.

Revolution's Pro Tips on

DRY HOPPING

Dry hopping is a key element to elevate hop aromatics in Revolution's many IPAs. Coincidentally, the brewers say, smart dry hopping begins with your yeast. "Know your yeast" is a mantra I heard repeated many times while talking with the Revolution team. Knowing a yeast strain is more than understanding its flavor profile or what alcohol content you can expect to achieve. It's essential to be familiar with your yeast and know its timeline for fermentation because at Revolution, most IPAs are dry hopped based on percentage of fermentation before terminal gravity. So, knowing the performance of your yeast will help you better plan for dry hopping. Following are dry-hopping tips directly from Revolution's brewing team.

It is important to dry hop when there is still fermentation activity to help break up the hop pellets, keep them from clumping or forming a layer on top of the beer, and encourage interaction with yeast to extract the cleanest aromatics from your hops as possible. At Revolution, this means dry hopping at specific parameters during fermentation — about 2–4 gravity points above terminal gravity and at 70 °F (21 °C) to get the most impactful aromatics from hops. (The brewery also considers this increase in temperature dual-purpose for a diacetyl rest, especially since they lean heavily on English yeast strains.) Dry hopping much earlier in fermentation or too close to high kräusen could result in a hoppy beer geyser or more aggressive fermentation that might scrub aromatics.

If at all possible, likely easiest with a conical fermenter, Cibak recommends rousing the vessel with carbon dioxide. "Just to hedge our bets, 24 hours after we add the dry hops, we always hook up CO_2 and gently rouse the tank from the bottom. The CO_2 bubbling up breaks up that thick layer of hops floating up there at the top of the tank, then the hops can drop through the beer." Keeping CO_2 pressure in the headspace when the fermentation and dry hopping are complete will also help preserve hop aromatics.

Try to use unopened bags of the varieties for your dry hops. Partial or previously opened bags of hops are better suited for kettle additions.

Removing yeast and hops 3–4 days after the initial dry hop is crucial to retain the clean hop aromatics so the yeast doesn't autolyze and the vegetal hop matter doesn't begin to break down. Again, this is more easily accomplished with a conical fermenter using the dump port. Alternatively, if using buckets or carboys, stay on top of your fermentation timeline to make sure you're racking the beer off yeast and hops before any detrimental effects occur.

Lastly, gently carbonating your beer to prevent foaming will also aid in your foam stability and let those hop aromatics you worked so hard to extract shine in your finished beer.

But the brewery's original Freedom beer is Freedom of Speach, a peach sour beer.

All of these beers are built from the same base sour beer recipe with an original gravity (OG) of 1.040 wort made of 2-row, red wheat malt, and acidulated malt that is kettle soured with Omega Yeast Labs OYL-605 (Lactobacillus Blend), a blend of *L. brevis* and *L. plantarum*, before it's fermented with Wyeast 1968 (London ESB Ale). Cibak says his team has found that *Lactobacillus* is very temperature-dependent; you don't want to be over 100 °F (38 °C) or you start deactivating/killing the *Lacto*. It's also very intolerant of hops, so all hop additions in Revolution's kettle sours are added post-souring and additional precautions are even taken to protect the *Lacto*. "We'll do the Freedom brewing at the very beginning of the week in a freshly CIP'd (Cleaned-In-Place) brewhouse from the week before, so we don't have residual iso-alpha acids in any of our vessels."

After mashing and running off the wort, it is boiled only briefly to sterilize it. The hot wort is then transferred to a heat exchanger and cooled to around 85 °F (30 °C), then moved back into the boil kettle and mash mixer (they do two 120-barrel batches of Freedom base beer at a time by souring in these two vessels), where it will sour for about 24 hours. For homebrewers, this can also be achieved by using an immersion or counterflow chiller (set up to recirculate wort back in the kettle) to bring the wort down to *Lacto*-pitching temperature.

To increase the *Lacto* population and get it ready for souring your wort, the brewing team suggests homebrewers prepare a 1-quart (1-L) starter with unhopped 1.040 wort cooled to 85 °F (30 °C) and allow this prop to incubate 24 hours prior to pitching into your brew kettle. After adding *Lacto*, cover, seal, and insulate your kettle to maintain temperature for souring. Add a blanket of CO_2 to the headspace to prevent any contact with oxygen, which can create off-flavors and aromatics.

Give the *Lacto* 24 hours to drop the pH of the wort down to 3.3–3.5. Cibak recommends always taking a sample of wort for measuring pH during the souring phase with a sterile pipet because sticking your pH meter directly into the souring vessel can introduce brewer's yeast to the souring wort. After reaching the target pH the wort is boiled 30 minutes with a small addition of hops, chilled to a fermentation temperature of 68 °F (20 °C), and pitched with London ESB Ale yeast, which Revolution's brewers have found drops out very quickly and compactly once fermentation is complete. One other thing to note with this yeast is that it requires yeast nutrient to give it everything it needs to conduct a strong, complete fermentation in a lower pH environment.

At the brewery, all Freedom Series beers are dosed with the fruit component — in Speach's case, a high-Brix peach concentrate — and flash pasteurized to

inhibit any further fermentation in cans. For homebrewers who can't pasteurize, the brewers recommend this be a draft beer only for concern of re-fermentation in bottles or cans. They say once you get your process down and can produce a clean kettle sour beer the sky's the limit for fruit, spice, or botanical additions. You can even produce hoppy versions through dry hopping. Cibak has one word of warning, though, if you use fruit purees. "A lot of times you're incorporating a lot of fruit solids in there and that could create pectin haze issues, or lots of loss and particulate that you might have to deal with and rack several times to avoid. By using a fruit concentrate, we keep 100% of the volume; half of it isn't going to be fruit solids that we have to try to separate out."

Deth's Tar (Barrel-Aged Imperial Oatmeal Stout)

Describing this beer (part of the Deep Woods Series barrel program at Revolution) could fill a whole separate article, but we'll try to do it justice here and in the related barrel program sidebar. The base beer of Deth's Tar is an English-style imperial oatmeal stout that Revolution ages in whiskey barrels. To create Deth's Tar, Revolution actually brews numerous batches that are treated as components for the final blended beer months or even years apart, aging them separately in barrels, then blending to brewery specifications for release. "There are usually about a dozen different components ranging from sweet, dry, young, and old," Scott said.

While some homebrewers might have a barrel (or barrels) and can go that route, we know there are many more out there looking for a way to make something close to Deth's Tar using oak alternatives, namely chips or cubes. Here we have tips from Cibak and Innovation Brewer Andy Lautner, whose all-grain homebrew recipe for the beer is built as a double mash process.

You will conduct two separate mashes and run off half the desired kettle-full volume for each mash. Munich liquid malt extract (LME) is called for to help bump up the huge

Art Meets Science with BARREL-AGED BEERS

A large piece of Revolution's reputation and relevancy is its massive barrel program and the Deep Wood Series of barrel-aged beers that are born from it. All of this is managed by Marty Scott, who worked his way through various cellar, brewhouse, and quality positions before taking on full responsibility for the barrel program. He works in the world of flavors created not only by the base beer, but also by time, the wood and spirit of the barrel, and the evaporative concentration of sugars. One of the most popular Deep Wood Series releases is Deth's Tar, an imperial oatmeal stout aged in and blended from a plethora of Bourbon barrels. Revolution shared the recipe for the beer with us using oak alternatives (which you will find on page 46), but we wanted to take a look at how the beer is crafted on a professional scale as well.

Aging in a barrel is a whole different beast than aging in steel or glass. Thus, Scott works closely with the brewing team to adjust brews for what is needed in blending later in the process. Sweeter finishing versions of the beers are brewed first so, as Scott puts it, there is "more aged sugar in the stacks" for months or years. Drier finishing batches are brewed closer to the expected date of blending and aged on their own for some time — maybe just weeks — but won't build up quite the complex cosmos of flavors the sweeter brews will. Scott describes this staggered process as part of the brewery's principle of dynamic aging.

"What established our concept of dynamic aging is really what's happening in the barrel. Let's make a sweet version as early in the season as possible, get it in the barrel, get it oxidizing and evaporating, developing new flavors. Then we can surgically brew and implement and blend in drier components," he said.

The magic happens as the team selects specific barrels of both sweet and dry versions to create a balanced blend worthy of the Deep Wood Series name. Well, it's not magic. It's a unique kind of Revolution barrel science in which each barrel is assigned in-house data points that help Scott and crew make experienced decisions when devising a blend. Data such as:

MCV(m) *[or Malt Complexity Value (expressed in months)] = Finishing gravity of a particular barrel x months in that barrel.* This number gives Scott an idea of how much of that fig, dark fruit, jammy malt character he'll establish with the base beer as it's aging.

Balance Value *= Finishing Gravity in °Plato ÷ ABV.* Essentially, the relationship between sugar and alcohol; the sugar making the alcohol component more palatable. For example, the target balance value for Deth's Tar is 0.45. That means for every unit of alcohol there is 0.45 units of sugar.

These are two important internal metrics (Revolution-isms, if you will) that each barrel of beer is designated in an effort to hit an overall target for a brand's blend in a given year. Blending by these numbers just gets you in the ballpark and makes sure there is enough sugar in the stacks for blending. But we all know that numbers alone cannot replace sensory analysis. Each barrel is tasted and assessed for flavor, which might be more concentrated in some barrels and less in others, before drawing up a final blending plan and beginning blending trials.

With a barrel program of this size lending so many barrels and flavors to work with, creating the final blends is as much an art as it is a science.

original gravity in the kettle to 1.134, if needed. If you have the opportunity to grind your own dark grains it is extremely beneficial to relax your mill setting so you don't pulverize them into dust. Grinding these grains too finely can cause problems with your wort runoff, which will reduce your efficiency of sugar extraction from the grain bed.

Begin each mash with just the pale malt and rice hulls. Save the flaked oats for sprinkling on top of the mash to keep them as high and as far from your false bottom as possible. The brewers say you have to get a bit savage when you brew a big beer like this, but you also have to make calculated steps to prevent major issues with your lautering process. This also includes adding the separately milled dark grains towards the end of the mash to make sure you don't extract any harsh tannic flavors from them and they don't drop the pH down too far and create starch conversion issues. Once you run off both mashes you should have about 9–10 gallons (34–38 L) of wort. You start with a larger amount to offset the volume lost from a three-hour boil. Boil bittering hops for only 90 of the 180 minutes.

The yeast is going to be extremely stressed in this high sugar concentration wort, so providing it with nutrients and a lot of oxygen (if using a liquid yeast) in solution before going into battle is crucial for strong and complete fermentation. This is going to be a vigorous fermentation, and Revolution uses an anti-foam addition to reduce the mess and preserve as much volume in the fermenter as possible.

Stay on top of yeast dumps or racking from primary to secondary vessels. This is a high-gravity fermentation and high-ABV beer, so the yeast will be extremely stressed and start to quickly create off-flavors if beer is left to rest on spent yeast. You want to make sure the beer is as clean and clear as possible before aging it on oak; expect unpleasant results if you age yeasty beer on oak for a year.

When it is time to prepare your oak alternatives to simulate time in a Bourbon barrel, Lautner suggests either American oak chips, spirals, or cubes. If you would like to replicate the heavy char that a Bourbon barrel contains inside, you can take a torch and char the oak. Once cooled, soak it in a container of your favorite Bourbon or American whiskey. After added to the beer, Lautner suggests aging it on the oak for up to a year at 50–60 °F (10–16 °C).

The issue using oak alternatives in lieu of a barrel is you'll never really achieve the oxidation and evaporation components of a true barrel. With that in mind, Barrel Program Manager Marty Scott has two suggestions for homebrewers. "If the head space is 100% relative humidity," said Marty, "it can't take anymore alcohol and water vapor. So, there's no more concentration of flavor and aroma components. However, if you replace that headspace with CO_2, now you're going to reduce the relative humidity and headspace and you're going to allow that evaporation to resume on a small scale. But, doing that is going to arrest your oxidation. I would recommend you pull your airlock and take a tiny sensory sample, which will introduce a bit of oxygen. Maybe even wait a day or two and then re-blanket it with CO_2. You could do these things that gently, very gently, encourage these two actions to happen."

The key to finding success with barrel- or wood-aged imperial stout is harmony between ABV, IBU, final gravity (residual sweetness), aging time, roasted malt astringency, and your charred American oak. If done properly it can be a balanced symphony of aromatics and flavors. Gently carbonating your beer to prevent foaming will also aid in foam stability and spotlight those beautiful aromatics you've created.

Revolution's barrel program houses its most prized beers that often are blended prior to release.

Fistmas Holiday Ale
(Hoppy Christmas Beer)

Appropriate for the season, Fistmas is a holiday beer for hopheads!

"As a homebrewer, I always would do spiced ales around the holidays," Cibak said, "but honestly, they just wore out my palate. Fistmas goes more with Revolution's theme of brewing hoppier beers. I kind of broke my own rule on this one — of not using many caramelized malts in the grist of hoppier beers — but the resulting reddish color does remind you of Christmas."

Kettle, whirlpool, and dry-hop additions of Cascade, Chinook, and Citra® hops combine with whirlpool additions of crystallized ginger and sweet orange peel to result in a beautiful red-hued beer with a festive hop punch described by Cibak as reminiscent of holiday fruit cake with its layers of citrus, spice, and fruitiness — perfect for family get-togethers and cozy nights by the fire. Using a straining bag to contain the crystallized ginger and sweet orange peel is key to contain them and allow for easy removal from the whirlpool when steeping is complete.

REVOLUTION BREWING CO.'S ANTI-HERO IPA CLONE

(5 gallons/19 L, all-grain)
OG = 1.065 FG = 1.014
IBU = 60 SRM = 7 ABV = 6.7%

INGREDIENTS

10 lbs. (4.5 kg) North American pale ale malt
2 lbs. (0.9 kg) Weyermann Munich Type 1 malt
10 oz. (283 g) Briess Carapils® malt
9 oz. (255 g) red wheat malt
2 oz. (57 g) Simpsons Naked Golden Oats™ malt
8.5 AAU Apollo™ hops (80 min.) (0.5 oz./14 g at 17% alpha acids)
9.2 AAU Centennial hops (30 min.) (0.7 oz./20 g at 13.1% alpha acids)
6 AAU Cascade hops (10 min.) (1 oz./28 g at 6% alpha acids)
1 oz. (28 g) Centennial hops (0 min.)
1 oz. (28 g) Chinook hops (0 min.)
2 oz. (57 g) Centennial hops (dry hop)
0.5 oz. (14 g) Cascade hops (dry hop)
0.5 oz. (14 g) Chinook hops (dry hop)
0.5 oz. (14 g) Citra® hops (dry hop)
0.5 oz. (14 g) Crystal hops (dry hop)
1 tsp. Irish moss (10 min.)
1 oz. (30 mL) Biofine Clear (or similar fining)
Wyeast 1968 (London ESB Ale), White Labs WLP002 (English Ale), or Mangrove Jack's M15 (Empire Ale) yeast
¾ cup corn sugar (if priming)

STEP BY STEP

This recipe uses a single-infusion mash at a ratio of 3:1 water-to-grain. Add 4.8 gallons (18.3 L) of water at 163 °F (73 °C) to the mash/lauter tun and stir in ½ tsp. each of gypsum and calcium chloride. Mash in grains targeting a temperature of 153 °F (67 °C) and rest there for 40 minutes. Vorlauf slowly for 20 minutes to complete starch conversion and clarify wort before collecting in the brew kettle.

Begin collecting first runnings in kettle. Start sparging 170 °F (77 °C) water when the grain bed is beginning to become exposed. Fill your kettle to 7 gallons (26.5 L) of wort, cutting your sparge when about 6 gallons (23 L) is collected to allow the sparge water to pull through the grain bed. Total boil time is 80 minutes. Add hops according to schedule.

Add the final kettle hop addition at the end of the boil and use a spoon or paddle to get your wort spinning to break up the hop pellets. Once you are done stirring your wort, start a 20-minute timer to allow your trub pile to form.

After your whirlpool, cool wort to 66 °F (19 °C) and pitch yeast. If using a liquid strain and you have an oxygen tank and regulator, Revolution targets their oxygen flow at 8 L /minute during the entire transfer of wort to the fermentation tank. Transfer as much clean wort away from your trub pile as possible to maximize the volume you are sending to the fermenter. Ferment at 68 °F (20 °C) and follow the fermentation timeline:

Day 4: Check the gravity. When it is 1.016–1.018, 2–4 gravity points above terminal gravity, harvest or dump thick yeast that has settled to the bottom of the fermenting vessel (or rack to another carboy), add the dry hops, then raise the temperature of the fermenter to 70 °F (21 °C) to begin a diacetyl rest.

Day 8: Fermentation should be complete. Dump the trub that has settled to the bottom of your fermenter or rack to another carboy. Set temperature to 32 °F (0 °C) to further drop yeast and hop matter.

Day 10: Add Biofine or similar fermentation fining agent and gently swirl (or CO_2 rouse your fermentation vessel from the bottom if you have a conical fermenter) to ensure good mixing. Within a few days of fining you should see a major improvement in clarity.

Day 12: Transfer to a keg and force carbonate or prime and bottle condition to 2.5–2.6 volumes of CO_2.

Extract with grains option:
Replace the pale ale, light Munich, and red wheat malts with 6.25 lbs. (2.8 kg) pale ale dried malt extract and 1 lb. (0.45 kg) Munich dried malt extract. Place the crushed grains into a muslin bag and steep in 5 gallons (19 L) water as it heats up to 170 °F (77 °C). Remove the grains, allowing them to drip back into the kettle. Remove from heat and stir in the dried malt extract. Once fully dissolved, turn the heat back on and bring to a boil.

Follow the remainder of the all-grain recipe instructions, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation.

Tips For Success:
Target a yeast pitch rate of 1 million cells/mL/°Plato. When using a liquid strain, having a healthy active yeast pitch going into fermentation and a yeast propagation before brewing this beer is helpful.

The brewers at Revolution stress the importance of dry hopping at 0.5–1 °P (0.002–0.004) above terminal gravity and at 70 °F (21 °C) to get the cleanest citrus, pine and floral aromatics in this beer.

Removing the yeast and hops 3 to 4 days after the initial dry hop is crucial to retain the clean hop aromatics so the yeast doesn't autolyze and the vegetal hop matter doesn't begin to break down.

Keeping CO_2 pressure in the headspace of your beer when the fermentation and dry hop are complete will help preserve hop aromatics, which is key to a beer like Anti-Hero.

Gently carbonating your beer to prevent foaming will also aid in your foam stability and let those hop aromatics you worked so hard to extract really shine!

REVOLUTION BREWING CLONES

REVOLUTION BREWING CO.'S INFINITY-HERO IPA CLONE

(5 gallons/19 L, all-grain)
OG = 1.065 FG = 1.013
IBU = 45 SRM = 5 ABV = 7%

INGREDIENTS

12 lbs. (5.2 kg) North American 2-row pale malt
14 oz. (397 g) Briess Carapils® malt
6 oz. (170 g) Gambrinus honey malt
8.5 AAU Apollo™ hops (80 min.) (0.5 oz./14 g at 17% alpha acids)
3.9 AAU Citra® hops (20 min.) (0.3 oz./8.5 g at 13.1% alpha acids)
0.5 oz. (14 g) HBC 586 hops (0 min.)
0.5 oz. (14 g) Amarillo® hops (0 min.)
2.6 oz. (74 g) HBC 586 hops (dry hop)
1.6 oz. (45 g) Nectaron® hops (dry hop)
1 oz. (28 g) HBC 1019 hops (dry hop)
0.26 oz. (4.5 g) Strata® hops (dry hop)
0.5 oz. (15 mL) Biofine Clear (or similar fining)
Omega Yeast Labs OYL-011 (British Ale V), Wyeast 1318 (London Ale III), or LalBrew Verdant IPA yeast
¾ cup corn sugar (if priming)

STEP BY STEP

This recipe uses a single-infusion mash at a ratio of 3:1 water-to-grain. Add 4.4 gallons (16.7 L) of water at 162 °F (72 °C) to the mash/lauter tun and stir in ½ tsp. gypsum and ½ tsp. calcium chloride and 0.7 mL phosphoric acid. Mash in grains targeting a temperature of 152 °F (67 °C) and rest there for 40 minutes. Vorlauf slowly for 10 minutes.

Collect first runnings in brew kettle (take a first wort gravity and pH reading). Start sparging 170 °F (77 °C) water when the grain bed is beginning to become exposed. Fill your kettle to 7 gallons (26.5 L) of wort, cutting your sparge at about 6 gallons (23 L) to allow the sparge water to pull through the grain bed.

Total boil time is 80 minutes. Add hops according to schedule. At the end of the boil, add the whirlpool hops and use a spoon or paddle to get your wort spinning to break up the hop pellets. Once you are done stirring your wort, start a 20-minute timer to allow your trub pile to form.

After your whirlpool, cool wort to 66 °F (19 °C) and pitch yeast. If using a liquid strain and you have an oxygen tank and regulator, Revolution targets their oxygen flow at 15 L/minute during the entire transfer of wort to the fermentation tank. Transfer as much clean wort away from your trub as possible to maximize the volume in the fermenter. Begin fermentation at 68 °F (20 °C) and follow the fermentation timeline:

Day 2: Raise the temperature to 72 °F (22 °C) after 24 hours of active fermentation.

Day 3: Check gravity. If it is 1.015-1.017, 2–4 gravity points above terminal gravity, harvest or dump thick yeast that has settled to the bottom of the fermenting vessel (or rack to another carboy) and add the dry hops.

Day 5: Dump all thick trub out of fermentation tank, if possible. Revolution says this is a critical step if you have the ability in order to preserve hop aromatics from interaction of yeast and hop oils during dry hopping.

Day 6–8: Confirm a stable terminal gravity and then set temperature to 32 °F (0 °C) to further drop yeast and hop matter when terminal gravity has been seen for multiple days.

Day 9–10: Add fining agent and gently swirl (or CO_2 rouse your fermentation vessel from the bottom if you have a conical tank) to ensure good mixing. Within a few days of fining you should see a major improvement in clarity.

Day 12: Transfer to a keg or bottle condition to 2.5–2.6 volumes of CO_2.

Extract with grains option:
Replace the pale malt with 7 lbs. (33.2 kg) extra light dried malt extract. Place the crushed grains into a muslin bag and steep in 5 gallons (19 L) water as it heats up to 170 °F (77 °C). Remove the grains, allowing them to drip back into the kettle. Remove from heat and stir in the dried malt extract. Once fully dissolved turn the heat back on and bring to a boil.

Follow the remainder of the all-grain recipe instructions, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation.

Tips For Success:
Target a yeast pitch rate of 1 million cells/mL/°Plato. When using a liquid strain, having a healthy active yeast pitch going into fermentation and a yeast propagation before brewing this beer is extremely helpful. Oxygenation prior to fermentation is crucial with British Ale V and Revolution targets twice the oxygen flow rate when using it vs. London ESB.

The brewers at Revolution stress the importance of dry hopping at 0.5–1 °P (0.002–0.004) above terminal gravity and at 70 °F (21 °C) to get the cleanest, brightest biotransformation characteristics from the interaction of actively fermenting yeast and hop oils for this beer.

Removing the yeast and hops 5 days after the initial dry hop is crucial to retain the clean hop aromatics so the yeast doesn't autolyze and the vegetal hop matter doesn't begin to break down.

Achieving a faint, stable haze in a finished beer is tricky. Skipping any kettle finings and cutting your Biofine Clear in half (compared to Anti-Hero IPA) should get you in the ballpark.

Keeping CO_2 pressure in the headspace of your beer when the fermentation and dry hop are complete will help preserve hop aromatics, which is key to a beer like Infinity-Hero IPA.

Gently carbonating your beer to prevent foaming will also aid in your foam stability and let those hop aromatics you worked so hard to extract really shine!

REVOLUTION BREWING CLONES

REVOLUTION BREWING CO.'S FREEDOM OF SPEACH CLONE

(5 gallons/19 L, all-grain)
OG = 1.040 FG = 1.006
IBU = 7 SRM = 4 ABV = 4.5%

INGREDIENTS

5.5 lbs. (2.5 kg) North American 2-row pale malt
1 lb. (0.45 kg) red wheat malt
9.5 oz. (269 g) acidulated malt
10 fl. oz. (296 mL) peach concentrate (60 °Brix)
1.5 AAU Herkules hops (80 min.) (0.1 oz./3 g at 15.1% alpha acids)
3 AAU Crystal hops (10 min.) (0.6 oz./17 g at 5% alpha acids)
1 Whirlfloc tablet
½ tsp. yeast nutrients
Omega Yeast Labs OYL-605 (Lacto) or favorite strain of *Lactobacillus*
Wyeast 1968 (London ESB Ale), White Labs WLP002 (English Ale), or Mangrove Jack's M15 (Empire Ale) yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Prepare a 1-quart (1-L) *Lactobacillus* starter with unhopped 1.040 SG wort. After boiling, cool starter wort to 85 °F (30 °C) and pitch the *Lacto*. Allow this to incubate 24 hours prior to pitching it in your brew kettle. This will increase the *Lacto* population and get it ready to get to work souring your wort.

This recipe uses a single-infusion mash at a ratio of 3:1 water-to-grain. Add 2.3 gallons (8.8 L) of water at 160 °F (71 °C) to the mash/lauter tun and stir in ½ tsp. gypsum and ¼ tsp. calcium chloride. Mash in grains targeting a temperature of 150 °F (66 °C) and rest there for 50 minutes. Vorlauf slowly for 10 minutes to complete starch conversion and clarify wort before collecting in the brew kettle.

Collect first runnings in brew kettle. Start sparging 170 °F (77 °C) water when the grain bed is beginning to become exposed. Fill your kettle to 7 gallons (26.5 L) of wort, cutting your sparge at about 6 gallons (23 L) to allow the sparge water to pull through the grain bed.

Bring wort to a boil and add 1 fluid oz. (30 mL) of food-grade phosphoric acid to the kettle. Target pre-souring pH of 4.8–5.

Cool wort to 85 °F (30 °C) while minimizing any splashing of wort. Add *Lacto* starter to kettle and blanket souring wort with CO_2. Give your *Lacto* about 24 hours at 85 °F (29.5 °C) to drop the pH of your wort down to 3.3–3.5.

When it reaches the desired pH, bring wort to a boil for 30 minutes. Add finings and hops as indicated. At end of boil, use a spoon or paddle to get your wort spinning and rest for 20 minutes to allow trub pile to form.

After your whirlpool, cool wort to 66 °F (19 °C) and pitch yeast. If using a liquid strain and you have an oxygen tank and regulator, Revolution targets their oxygen flow at 12 L/min. during the entire transfer of wort to the fermentation tank. Transfer as much clean wort away from your trub as possible to maximize the volume in your fermenter.

Ferment at 68 °F (20 °C) and follow the fermentation timeline:

Day 4: Dump thick yeast that has settled to the bottom of the fermenting vessel (or rack to another carboy). Raise the temperature to 70 °F (21 °C) to begin the diacetyl rest.

Day 8: Fermentation should be complete. Dump the trub that has settled to the bottom of your fermenter or rack to another carboy. Set temperature to 32 °F (0 °C) to further drop yeast and hop matter.

Day 10: Add fining agent then gently swirl (or CO_2 rouse your fermentation vessel from the bottom if using a conical) to ensure good mixing. After fining your beer it should take a few days to see a major improvement in clarity.

Day 12: Transfer to a keg and add peach concentrate, keeping the temperature at or as close to 32 °F (0 °C) as possible. Gently CO_2 rouse the vessel to make sure peach concentrate mixes evenly. Keep constant CO_2 pressure on the headspace of the keg (8–10 psi) to gently force carbonate up to 2.5–2.6 volumes of CO_2 for serving via draft.

Extract only option:
Replace the pale, red wheat, and acidulated malts with 4 lbs. (1.8 kg) extra light dried malt extract and 0.5 lb. (230 g) wheat dried malt extract. Add 1 tsp. 88% lactic acid to 5 gallons (19 L) of water and heat to ~170 °F (77 °C). Remove from heat and stir in the dried malt extract. Once fully dissolved, turn the heat back on and bring to a boil.

Follow the remainder of the all-grain recipe instructions, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation.

Tips For Success:
Revolution flash pasteurizes their fruited kettle sours before canning to avert the risk of secondary fermentation in the can. Homebrewers should only keg this beer. Adding fruit to the primary or secondary fermentation tends to drive off a great deal of fruit aroma and flavor, especially with a delicate fruit like peach.

Revolution brewers state that "using fruit concentrates for our Freedom-series kettle sours is easier and more efficient than aseptic fruit purees, which tend to carry high levels of solids. If you use puree, you will require extra steps to strain or settle fruit solids out, so expect some loss."

With your *Lacto* culture, it is crucial to use unhopped wort for propagation and souring. The OYL-605 *Lacto* blend is very hop-sensitive. If you have a lid with a spray ball, that is a great place to hook up a CO_2 line for blanketing your wort during wort souring in the kettle.

REVOLUTION BREWING CLONES

REVOLUTION BREWING CO.'S DETH'S TAR CLONE

(5 gallons/19 L, all-grain)
OG = 1.134 FG = 1.040
IBU = 30 SRM = 80 ABV = 12.7%*

* ABV is calculated prior to barrel aging or aging on whiskey-soaked oak alternatives, which may bring the actual ABV up to 13.5–14.5%

INGREDIENTS

Mash #1

15 lbs. (6.8 kg) North American 2-row pale malt
1.5 lbs. (0.68 kg) Thomas Fawcett's roasted barley
1.3 lbs. (0.59 kg) flaked or rolled oats
14 oz. (397 g) oat malt
9 oz. (255 g) Thomas Fawcett's chocolate malt
8 oz. (227 g) Thomas Fawcett's Dark Crystal II malt
1 lb. (0.45 kg) rice hulls

Mash #2:

15 lbs. (6.8 kg) North American 2-row pale malt
1.5 lbs. (0.68 kg) Thomas Fawcett's roasted barley
1.3 lbs. (0.59 kg) flaked or rolled oats
14 oz. (397 g) oat malt
9 oz. (255 g) Thomas Fawcett's chocolate malt
1 lb. (0.45 kg) rice hulls

Post-Mash:

Munich dried malt extract (optional)
7.5 AAU Magnum hops (90 min.) (0.5 oz./14 g at 15.1% alpha acids)
0.6 oz. (16 g) Centennial hops (0 min.)
1 tsp. yeast nutrients (15 min.)
Whirlfloc (10 min.)
1 oz. (30 mL) Biofine Clear (or similar fining)
American oak chips, spirals, or cubes
Wyeast 1968 (London ESB Ale), White Labs WLP002 (English Ale), or Mangrove Jack's M15 (Empire Ale) yeast
LalBrew CBC-1 (if priming)
¾ cup corn sugar (if priming)

STEP BY STEP

It is recommended that you repitch yeast from a previous batch of beer for adequate pitch rates. If that is not easily attainable, a large yeast starter (if using a liquid yeast strain) or pitching 3 sachets of dried yeast, is recommended. Revolution targets a pitch rate of 3 million cells/mL/°Plato.

We are conducting two separate, 60-minute, single-infusion mashes and running off half the desired kettle volume from each mash. Have Munich malt extract on-hand to help bump up the gravity in the brew kettle to 1.134 near the end of the boil, but only if needed.

Begin the first mash at a water-to-grain ratio of (3.5:1). Add 5.7 gallons (21.6 L) of water at 161 °F (72 °C) to the mash tun and stir in 1 tsp. calcium chloride and ½ tsp. calcium carbonate (if using soft or reverse osmosis water). Add the Mash #1 grains except the roasted barley and chocolate malt targeting a temperature of 151 °F (66 °C). Rest at this temperature for 40 minutes and then stir in the roasted barley and chocolate malt gently, keeping them as close to the top of the mash as possible. You may have to add additional hot liquor to hydrate dark grains properly. This grist:water ratio will yield a thicker mash and higher first wort gravity.

Vorlauf or recirculate wort for 10 minutes to clarify. Collect first runnings in brew kettle. Start sparging 170 °F (77 °C) water when the grain bed is beginning to become exposed. Fill your kettle to 5 gallons (19 L) of wort, cutting your sparge at about 4 gallons (15 L) in kettle to allow sparge water to pull through the grain bed. Simmer the wort in your kettle the whole time you are mashing and vorlaufing Mash#2.

Repeat the same steps from the first mash with Mash #2. Once you run an additional 5 gallons (19 L) of wort from the second mash to your kettle you should have between 9–10 gallons (34–38 L) of wort in your kettle. We are starting with a larger quantity to offset the volume lost from a 3-hour boil. If you need to boost the gravity to 1.134, add malt extract 30 minutes prior to flameout. Add the Magnum hops, yeast nutrient, and kettle finings at times indicated.

At the end of the boil add the whirlpool hops and use a spoon or paddle to get your wort spinning and break up all of your hop pellets. After a 20-minute rest, cool wort to 66 °F (19 °C).

Ferment at 68 °F (20 °C) and follow the fermentation timeline:

Day 2: Raise tank temperature to 72 °F (22 °C).

Day 4 or 5: Dump yeast that has settled or rack into another clean, sanitized, CO_2-purged carboy.

Day 7: Dump the trub that has settled or rack to another carboy. Set temperature to 32 °F (0 °C) to further drop yeast and hop matter.

Day 10: Gently stir in 1 fluid oz. (30 mL) of a fining agent. Begin preparing your oak alternatives by adding them to a jar of your favorite Bourbon or American whiskey, unless you have a Bourbon barrel to age this beer in. (Optional: To simulate the char of a Bourbon barrel consider charring your oak alternatives and cooling prior to soaking them.)

Day 14: Transfer beer into a cleaned, sanitized, and CO_2-purged tank containing the oak alternatives and age the beer for up to a year at 50–60 °F (10–16 °C).

If kegging post-aging, transfer your clear beer off the oak to a Corny keg that has been cleaned, sanitized, and purged with CO_2, and set the temperature at or as close to 32 °F (0 °C) as possible and force carbonate up to 2.4–2.5 volumes.

If bottling directly from the carboy, pitch a cask-conditioning yeast such as LalBrew CBC-1.

See the Recipe Breakdown section in this story for more tips on brewing this monster of a beer.

REVOLUTION BREWING CLONES

REVOLUTION BREWING CO.'S FISTMAS CLONE

(5 gallons/19 L, all-grain)
OG = 1.068 FG = 1.018
IBU = 30 SRM = 21 ABV = 6.5%

INGREDIENTS

12 lbs. (5 kg) North American 2-row pale malt
15 oz. (425 g) Weyermann CaraMunich® III malt
7 oz. (198 g) Weyermann CaraRed® malt
6.8 oz. (193 g) red wheat malt
2.4 oz. (68 g) Weyermann CaraMunich® II malt
1.2 oz. (34 g) Weyermann Special W® malt
0.2 oz. (6 g) Weyermann Carafa® Special Type III malt
1.5 AAU Herkules hops (80 min.) (0.1 oz./2.8 g at 15.1% alpha acids)
0.3 oz. (8.5 g) Cascade hops (0 min.)
0.7 oz. (20 g) Chinook hops (0 min.)
2 oz. (57 g) Chinook hops (dry hop)
1.6 oz. (45 g) Citra® hops (dry hop)
0.24 oz. (6.8 g) crystallized ginger (0 min.)
1 oz. (28 g) sweet orange peel (0 min.)
1 oz. (30 mL) Biofine Clear (or similar fining)
Wyeast 1968 (London ESB Ale), White Labs WLP002 (English Ale), or Mangrove Jack's M15 (Empire Ale) yeast
¾ cup corn sugar (if priming)

STEP BY STEP

This recipe uses a single-infusion mash at a ratio of 3:1 water-to-grain. Add 4.6 gallons (17.4 L) of water at 164 °F (73 °C) to the mash/lauter tun and stir in ¼ tsp. gypsum and ¾ tsp. calcium chloride. Mash in grains targeting a temperature of 154 °F (68 °C) and rest there for 40 minutes. Vorlauf slowly for 10 minutes to complete starch conversion and clarify wort before collecting in the brew kettle.

Collect first runnings in kettle (take a first wort gravity and pH reading). Start sparging 170 °F (77 °C) water when the grain bed is beginning to become exposed. Fill your kettle to 7 gallons (26.5 L) of wort, cutting your sparge at about 6 gallons (23 L) to allow the sparge water to pull through the grain bed.

Total boil time is 80 minutes, with the first hop addition added at the beginning of the boil. At the end of the boil, place ginger and orange peel in a nylon bag and add it plus the whirlpool hops and use a spoon or paddle to get your wort spinning to break up all of the hop pellets. Once you are done stirring your wort, start a 20-minute timer to allow your trub pile to form.

After your whirlpool, cool wort to 66 °F (19 °C) and pitch yeast. If using a liquid strain and you have an oxygen tank and regulator, Revolution targets their oxygen flow at 8 L/min. during the entire transfer of wort to the fermentation tank. Transfer as much clean wort away from your trub as possible to maximize the volume you are sending to your fermentation tank. Ferment at 68 °F (20 °C) and follow the fermentation timeline:

Day 4: Check the gravity. When it is 1.020-1.022, 2–4 gravity points above terminal gravity, harvest or dump thick yeast that has settled to the bottom of the fermenting vessel (or rack to another carboy), add the dry hops, then raise the temperature of the fermenter to 70 °F (21 °C) to begin a diacetyl rest.

Day 8: Fermentation should be complete. Dump the trub that has settled to the bottom of your fermenter or rack to another carboy. Set temperature to 32 °F (0 °C) to further drop yeast and hop matter.

Day 10: Add Biofine or similar fermentation fining agent and gently swirl (or CO_2 rouse your fermentation vessel from the bottom in you have a conical fermenter) to ensure good mixing. Within a few days of fining you should see a major improvement in clarity.

Day 12: Transfer to a keg and force carbonate or prime and bottle condition to 2.5–2.6 volumes of CO_2.

Extract with grains option:
Replace the pale and red wheat malts with 7 lbs. (3.2 kg) extra light dried malt extract. Place the crushed grains into a muslin bag and steep in 5 gallons (19 L) brewing water as it heats up to 170 °F (77 °C). Remove the grains, allowing them to drip back into the kettle. Remove from heat and stir in the dried malt extract. Once fully dissolved turn the heat back on and bring to a boil.

Follow the remainder of the all-grain recipe instructions, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation.

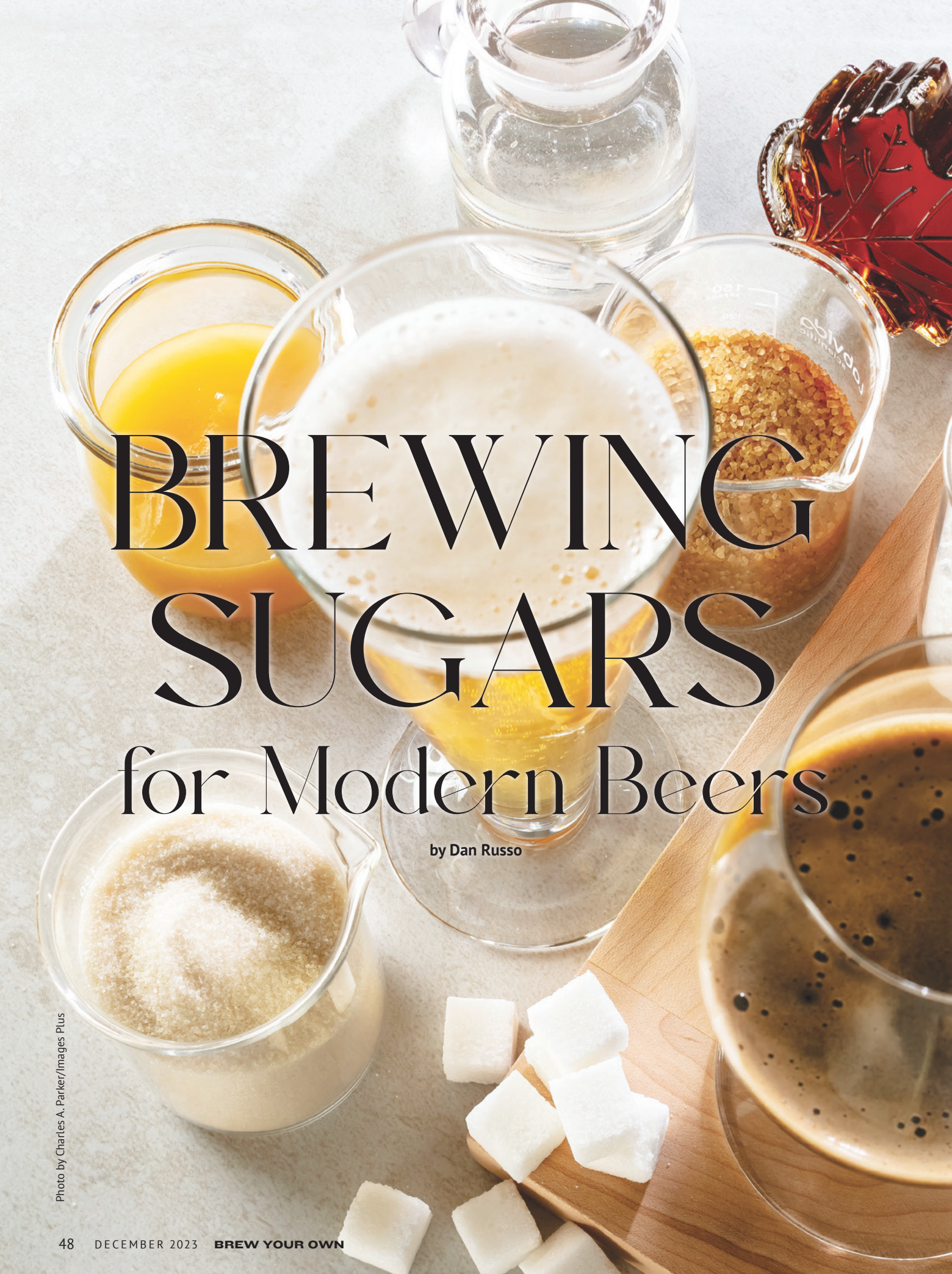
Tips For Success:
Target a yeast pitch rate of 1 million cells/mL/°Plato. When using a liquid strain, having a healthy active yeast pitch going into fermentation and a yeast propagation before brewing this beer can be extremely beneficial.

Using the straining bag to contain the crystallized ginger and sweet orange peel makes it much easier to contain them and allow for easy removal from the whirlpool once transfer of wort to the primary fermenter is complete.

Removing the yeast and hops 3 to 4 days after the initial dry hop is crucial to retain the clean hop aromatics so the yeast doesn't autolyze and the vegetal hop matter doesn't begin to break down.

Keeping CO_2 pressure in the headspace of your beer when the fermentation and dry hop are complete will help preserve hop aromatics, which is key for a beer like Fistmas.

Gently carbonating your beer to prevent foaming will also aid in your foam stability and let those hop aromatics you worked so hard to extract really shine!



BREWING SUGARS for Modern Beers

by Dan Russo

Photo by Charles A. Parker/Images Plus

Sweet tips for brewing with sugar

Many years ago, when I began homebrewing and a quest to brew beers similar to those created in the Trappist tradition, one common thread that became apparent the more I read about these renowned styles was their inclusion of Belgian candi sugar. For a long time, this was only spoken about in the depths of homebrew clubs. The thought of using additional sugar, outside of what is brought to us by our grain, was seen by much of the larger craft beer-loving public as taboo. It was too closely related to the way that mass-produced lagers are made. A cheat code of sorts.

The reality was that for centuries brewers had gone beyond relying solely on malt to create beer full of flavor, using various sugars to increase the original gravity in order to achieve exactly the beer that they were setting out to create. Malt is very finicky. Every mash and resulting beer is a mix of an intricate process that requires for every step to be hit in the right stages. And they were able to fine-tune those stages; but malt was not as refined as we have now. So, the use of added sugar helped to create a beer exactly as the brewer intended. And that tradition continued. Even as malt improved, new styles emerged that could only exist with the use of brewing sugar, even if that use of sugar wasn't widely discussed.

The fun part is that brewing sugar isn't taboo anymore; however, its many uses are misunderstood by many brewers and consumers. As brewers, sugars should be viewed as a tool to boost fermentables, lighten body, improve drinkability, and, at times, even build upon a beer's flavor. In some cases, the impact to the flavor profile can be the primary reason we add sugar and the increase in gravity is secondary, yet must still be accounted for.

How and why to use sugar in your brewing is the basis of this article.

BREWING SUGAR AND WHY WE USE IT

Brewing sugar and its entire existence is linked back to European brewing culture. The primary source for brewing with sugar that many of us brewers use as guidance is Belgian Trappist brewing. The use of candi sugar and syrups has been used for nearly a century by Belgian Trappist brewers. Where the modern American brewing culture really came into existence is with the advent of what we now call American light lager. How do you make a beer dry and flavorful? Rice and corn were the answer. Corn gave us the so-called why. It is widely available and gave a great mouthfeel to the direction of beer during the 1960s and 70s. The how was rice, which is a starch that can be converted to sugar. Though both were widely available and used pre-Prohibition; it wasn't until the macro-lager movement of the time that they took such a prevalent place in brewers' minds around the world as the style of light lager spread from continent to continent. Adjuncts were (and still are) used to dilute the

high protein content of North American barley. Breeding programs have greatly improved today's barley, but the original reasons for adjunct use relate to improving beer flavor and colloidal stability.

As American craft beer culture continued to gain traction during the 90s, brewers began to use various sugars in their beer to recreate classic styles, particularly those of Belgian influence. You can look at the likes of Steven Pauwels (Boulevard Brewing) and Tomme Arthur (Pizza Port/Port Brewing/The Lost Abbey) for helping to start the craze for brewing sugars in and around the late 90s. For more modern craft brewing styles, it wasn't until a little article that the legendary Russian River Owner/Brewmaster Vinnie Cilurzo wrote explaining how to make double IPA that our world of brewing sugars was changed. That corn sugar, dextrose, was being used to make an IPA that was upwards of 8% ABV yet drying out and coming to a final gravity that was recognized as normal was eye-opening to many brewers entering the craft brewing scene at the time. Sugar was being used to build ABV and character into the beer. The sheer dryness from the sugar was the character. Crisp, clean, and hoppy, the beers created by Russian River helped push the stigma of using brewing sugars in beer out of brewers' minds and into a place of acceptance. Brewing sugars have now become so ingrained into the culture that there is no taboo talk.

Most sugars should be added on the hot side for the fear of refermentation after the beer is finished. There are a couple that we can also give life to as a tertiary sugar; ones that finish the beer with flavor, add a residual sweetness that rounds out the beer, and generally brings the beer back to the original concept.

So let's now dig into some of the most recognized sugars being used today and the best way to utilize them in your homebrews.

TYPES OF BREWING SUGAR AND THEIR USE

Belgian Candi Sugar

Used extensively by the Trappist brewers of Belgium; candi sugar is generally made from beet sugar (sucrose) that is heated and cooled repeatedly to different depths of color and flavor.

It is available in rock or syrup form from a range of light to dark. The light will add nearly no color and a very minimal flavor component to your beers. Amber and brown candi sugar adds notes of mild dark fruit and some molasses character while adding some color to a beer. Dark candi sugar will add deep molasses, raisin, and chocolate character to a beer. It will also add a large amount of color.

The range of light to dark (whether rock or syrup) will also have an impact on fermentation character. The lighter versions of candi sugar help dry out the beers they are used in. As you progress to the amber and dark versions you see much less drying out from the sugar; yet a significant flavor component on top of the added color. Using amber and dark candi sugar is one of my favorite additions to imperial-strength beers, but also needs to be tempered to allow for a proper fermentation. Used properly and in the right proportions — Belgian influenced or not — you can make use of it to create beautiful beers of nearly any style.

Corn Sugar

Commonly known as dextrose, corn sugar has arguably become the most used sugar in brewing. Being 100% fermentable to brewer's yeast, corn sugar adds original gravity to your wort while providing a stable fermentation profile and no flavor.

Corn sugar can fit into nearly every style of beer that you want to boost the ABV and finish drier, but has found its place in the world of IPAs, and more specifically double/imperial IPA. With its fermentability, a brewer is able to build a solid and soft malt backbone, while using dextrose to grow the gravity to a level that helps balance the alcohol and the malt presence, and really letting the hops shine. As you want to make hoppy beer that traverses the 7.5% ABV range, look at dextrose as an addition to your malt/sugar bill. Generally, shoot for 6–7% when used in your brews and look for a 1–2 °P (4–8 gravity points) pick-up from an addition that size. If you want to head to the very big IPA (9%+) don't shy away from increasing the corn sugar to make up 10–12% of fermentables. As with all big beers, make sure you factor in extra yeast, yeast nutrient, and oxygen. But at the end of the day, done right, brewer's yeast will eat through all sugar that dextrose throws at it.

Rice Syrup Solids

Escaping the light lager was why so many of us decided to embrace craft beer and homebrewing, but after enough time spent drinking IPAs and big, rich beers, many find their way back to seeking out these lighter beers. The hardest part about using rice is that you need to cook the rice to extract the sugars that are produced. On a home scale, utilizing a rice cooker can make that happen; but you also have the option of rice syrup solids. You can achieve the flavor, character, and dryness without the added step of cooking the rice. It brings a light flavor and a great fermentation profile finishing dry and crisp in nearly every beer that you choose to use it in.

Rice syrup solids can easily be subbed for malt as it will yield nearly the same gravity increase and fermentable sugar, while providing a solid rice character. I've had great success subbing up to 10% in a crushable lager. Perfect for drying out lager, but also a great experiment for your next imperial beer.

Brewers Crystals

Very similar to dextrose as it is presented, but brewers crystals do not follow through in the same way during fermentation. They definitely add sugar to the original gravity (OG) in a similar way as dextrose; however, they are specialty corn sugars with a controlled enzymatic breakdown that does not allow them to fully ferment out and thus finish much higher in the final gravity (FG) after fermentation. If you are looking to dry out the

body of a beer, this is not your sugar of choice. However, it has its place.

The primary benefit of using brewers crystals in a recipe is to increase the original gravity and ABV while keeping mouthfeel and body in play. Mouthfeel and body (vs. a drier beer with many other sugars discussed) is the tradeoff when all of the sugar is not fermented out. Brewers crystals really allow a brewer to experiment with malt character and alcohol while minding the way both interplay. A balance of sorts, especially as a homebrewer.

Brewers crystals should be considered when formulating a recipe for any beer that you'd like to finish higher in gravity. Think of a mid-range alcohol beer where you don't want to add milk sugar (lactose). Stout and porter as well as hazy IPAs are all candidates that may benefit from brewers crystals.

Maple Syrup

One of the best and worst sugars to work with is maple syrup. I say it's one of the best because of the amazing flavor maple can add to beer styles from stouts and porters to golden ales, and many in between. It's one of the worst because keeping that flavor around by the time the beer is through fermenting and ready to drink is easier said than done.

We always try to source from organic farmers. The farmer and the trees and the year dictate what we receive. There is no doubt that the flavor is amazing every year, but accurately measuring the sugar content upon arrival is harder; and sometimes you just have to roll the dice.

When using maple syrup, using it in the 10–12% range of total sugar for any brew works great. The biggest problem that has been seen with maple syrup is the loss of flavor through fermentation. As fermentation happens, sometimes the intricate flavors of your ingredients can get blown off in the process. Maple is very susceptible to this. With that in mind, plan to add a bit more syrup on the back end after fermentation completes. The character builds back and really helps the final iteration of your creation stand out. You will always need to watch out for refermentation when using maple syrup on the back end of the beer you create. To limit refermentation, the suggestion would be to cold crash your beer. Once crashed, transfer off the yeast cake and onto the maple syrup. Keep cold at all times once you package, and kegging (or canning) is the safer route to avoid any possibility of exploding glass bottles.

Honey

Honey is similar in many ways to maple syrup, but to its advantage the character honey imparts holds up better through fermentation. Your provider is one of the most important parts of the ingredient. Seek out honey from local or trusted producers that care about what is being created.

When honey is added has a huge impact on what it carries over to the finished beer. Using honey early in the boil will kill the character of the honey. Transferring your honey additions to late in the boil or the whirlpool will help to keep the character of your chosen honey. Adding honey half way through your fermentation can also produce astounding results with flavor and aroma, while giving you peace of mind that you won't need to worry about refermentation. It's a "sticky" situation, but I would highly recommend it for maximum flavor and aroma additions to your beer.

The most unique part about honey is the impact from the flowers that our bee friends pollinate from. Your finished beer will have the flavor and taste of the flower honey that you choose. We've extensively used both wildflower and Mexican coffee honey at Oakshire Brewing (Eugene, Oregon) and both smell and taste exactly as they are described. Think of a flower's aroma that may complement a beer's flavor, then find a honey to match or build your wort composition around that flavor.

Other Sugars

There are so many other sugars that a brewer can talk about. We are always seeking and trying to create. For that reason, we view ingredients as our step to progress. Don't leave out molasses, turbinado sugar, or even fruit as an important source of sugar used to create beer. Sugars are all viable to us as brewers and finding the best way to use them is our way forward.

BEER AND SUGAR

Beer and sugars in a way is our next step. Our predecessors in the brewing industry decided to introduce sugars into the process and modern brewers have continued to run with it. Now we sit at the point where we get to decide what that next step is, and what the next sugar is that we can use to make the next great beer. That for everyone should be the next thought and challenge. I know it is for me.

Photo by Charles A. Parker/Images Plus

Honey is one of the more unique sugars that can be used in brewing as it comes in different colors and flavors based on the flowers pollinated by the bees that make it.

OAKSHIRE BREWING CO.'S A LIFE BEYOND THE DREAM CLONE

(5 gallons/19 L, all-grain)
OG = 1.094 FG = 1.014
IBU = 56 SRM = 7 ABV = 10.5%

Dextrose is used as the catalyst for the dryness of such a big beer while letting the malt balance out the huge hop load. Oakshire likes using the Incognito® hop oil (both of these varieties are available in smaller homebrew quantities) to get the resinous character while maintaining the mouthfeel for this triple IPA.

INGREDIENTS

13.5 lbs. (6.1 kg) North American 2-row pale malt
1.2 lbs. (544 g) Weyermann CaraFoam® malt
0.6 lb. (272 g) Gambrinus honey malt
0.6 lb. (272 g) acidulated malt
2.2 lbs. (1 kg) dextrose sugar (5 min.)
10.9 AAU Herkules hops (60 min.)
(0.75 oz./21 g at 14.5% alpha acids)
7 g Citra® Incognito® (0 min.)
7 g Mosaic® Incognito® (hopstand)
2 oz. (56 g) Strata® hops (hopstand)
2 oz. (56 g) Columbus hops (hopstand)
4 oz. (113 g) Columbus hops (dry hop)
2 oz. (56 g) Simcoe® Cryo™ hops (dry hop)
4 oz. (113 g) Strata® hops (dry hop)
4 oz. (113 g) Nelson Sauvin™ hops (dry hop)
2 oz. (56 g) Mosaic® Cryo™ hops (dry hop)
½ tsp. yeast nutrients (15 min.)
Whirlfloc tablet (15 min.)
White Labs WLP001 (California Ale), Wyeast 1056 (American Ale), or SafAle US-05 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

If using a liquid yeast strain, consider making a yeast starter two days prior to brew day. Treat soft or reverse osmosis brewing water with 1 tsp. calcium sulfate and ½ tsp. calcium chloride. Mash grains at 148 °F (64 °C) for 60 minutes before starting lautering process. During the sparge, add another ½ tsp. calcium sulfate directly to the kettle.

Boil the wort for a total of 60 minutes with the first hop addition going in at the start of the boil and the second addition added just after the heat is turned off at the end of the boil. Add yeast nutrients, Whirlfloc, and dextrose sugar per ingredients list. After the boil, begin whirlpool. After 10 minutes bring wort temperature down to roughly 175 °F (80 °C) and add the hopstand additions. Spin for another 10 minutes then let settle for 10 minutes before chilling wort down to yeast pitch temperature.

If using a liquid yeast strain, aerate the wort well as the high sugar environment will be hostile for yeast. Consider pitching two sachets of yeast if using a dry yeast strain. Ferment at 68 °F (20 °C) for one week or until signs of fermentation have ceased. Once settling has occurred, add the dry hops and let sit for three days. Keg and force carbonate to 2.5 v/v or bottle and prime with sugar.

Extract with grains option: Swap out the 2-row pale malt for 8 lbs. (3.6 kg) extra light dried malt extract and the acidulated malt for 1 tsp. 88% lactic acid. Add the lactic acid to 5 gallons (19 L) brewing water. Place the crushed grains into a muslin bag and steep in the brewing water as it heats up to 170 °F (77 °C). Remove the grains, allowing them to drip back into the kettle. Remove kettle from heat and stir in the dried malt extract. Once fully dissolved turn the heat back on and bring to a boil. Follow all-grain instructions for the remainder of the process, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation.

Photo by Charles A. Parker/Images Plus

OAKSHIRE BREWING CO.'S KEY-LIMETY KÖLSCH CLONE

(5 gallons/19 L, all-grain)
OG = 1.046 FG = 1.008
IBU = 22 SRM = 4 ABV = 5%

Brewed to include the addition of key lime puree, this Kölsch uses a semi-traditional Kölsch grist bill along with a big helping of honey. Fermented with Kölsch yeast and finishing dry, this is a very fun one. Feel free to omit the fruit or substitute another fruit for key lime, as Oakshire has done on occasion.

INGREDIENTS

3 lbs. (1.4 kg) Weyermann Cologne malt
2.5 lbs. (1.1 kg) Weyermann Pilsner malt
1.5 lbs. (0.68 kg) Weyermann Barke® Vienna malt
8 oz. (227 g) Weyermann CaraFoam® malt
4 oz. (113 g) acidulated malt
1.5 lbs. (0.68 kg) honey, any varietal (10 min.)
24 oz. (710 mL) key lime puree
4.3 AAU Nugget hops (60 min.)
(0.33 oz./9 g at 13% alpha acids)
5.6 AAU Sultana™ hops (10 min.)
(0.4 oz./11 g at 14% alpha acids)
0.4 oz. (11 g) Lemondrop™ hops (0 min.)
Whirlfloc tablet (15 min.)
¼ tsp. yeast nutrients (15 min.)
White Labs WLP029 (German Ale), Wyeast 2565 (Kölsch), or SafAle K-97 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

If using soft or reverse osmosis brewing water, add ½ tsp. 85% phosphoric acid, ¾ tsp. calcium chloride, and ¼ tsp. calcium sulfate. Mash the grains at 152 °F (67 °C) for 60 minutes before beginning the lauter process. Add ½ tsp. 88% lactic acid directly to the kettle. Bring wort to a boil and boil for 60 minutes adding the hops, honey, kettle fining agent (Whirlfloc), and yeast nutrients per the ingredients list.

At the end of the boil, turn off the heat and add the final hop addition. Create a whirlpool then let settle for 10 minutes. Chill the wort down to yeast pitch temperature then pitch the yeast. Ferment at 64 °F (18 °C). After peak fermentation has been reached and fermentation slows noticeably, add the lime puree. Raise temperature to 68 °F (20 °C) and hold for 2–3 days. Once terminal gravity has stabilized, drop the temperature to 32–40 °F (0–4 °C) for a one- to two-week lagering period. Keg and force carbonate to 2.5 v/v or bottle and prime with sugar.

Extract with grains option: Replace the Cologne, Pilsner, and Vienna base malts with 3.5 lbs. (1.6 kg) Pilsen dried malt extract and 0.5 lb. (230 g) Munich dried malt extract. Replace the acidulated malt with ½ tsp. 88% lactic acid. With 5 gallons (19 L) of water in the brew kettle, add the lactic acid. Steep the crushed CaraFoam® malt in a small muslin bag as the water heats up to 170 °F (77 °C). Remove the grains, allowing liquid to drip back into the kettle.

Off heat, stir in the dried malt extract. Once fully dissolved turn the heat back on and bring to a boil. Follow all-grain instructions for the remainder of the process, being sure to top up the fermenter to 5.25 gallons (20 L) before starting fermentation. BYO

Photo courtesy of Shutterstock.com

BY DREW BEECHUM & DENNY CONN

THE KING OF CLUBS

Making your homebrew club engaging

Brewers are a weird lot. We're engaged in a hobby that involves hours of solitary fussing around with boiling and fermenting liquids. Scrubbing, carbonating, making like a frantic hermit to prepare what has historically been a social beverage. We won't lie — the two of us are both introverts that like the comforts of our favorite comfy home chair, but beer is meant to be shared and that's why homebrew clubs are a fundamental part of this sometimes anti-social hobby. Unfortunately, clubs need our help . . .

In the best of worlds, a club serves to bring together like-minded hobbyists to explore their shared craft . . .

Homebrew clubs are one of great aspects of the hobby and nowhere is it more on display than Club Night at Homebrew Con each year.

THE CHALLENGES FACING CLUBS

In the early days of the COVID-19 pandemic, when regular folks embraced the sourdough life, there was a strong surge in the homebrewing world. A combination of time, isolation, and an inability to wander over to the brewery for beer led to a lot of kettles being fired up. But the post-pandemic picture has become bleak. Money is tight, people have shifted to drinking spirits (or are abstaining from drinking), and the excitement and buzz that surrounded brewing has receded.

A perfect example — despite being held in San Diego, California, one of the beer world's powerhouse playgrounds, the American Homebrewers Association's Homebrew Con fell short of their attendance goals. Where in pre-COVID times, the last San Diego conference attracted over 3,500 attendees, this year's repeat engagement drew less than 2,000. No matter how you slice it, that's a major decline.

The same shortfall is being felt by our local homebrew shops. Every day we wake up to news that even the big retailers are feeling the pinch. (In other words – go buy your ingredients from a shop not from Amazon!)

And as goes things rolling down the proverbial gravity well, clubs are impacted as well. Taking time out of your busy weekend (or a weeknight like many clubs) can feel like a bridge too far. Drive how far? At what time? Drive home after drinking beers? No thank you — can't this just be an email, or better yet a text?

WHY CLUBS MATTER

With the rise of the internet, Zoom calls, remote work, and talking with people from around the world — Drew's daily life for instance — one can very easily wonder, "why go to a club meeting?"

Internet-only clubs are nothing new. Even before The Brewing Network's "BN Army," homebrew club of listeners began giving national competitions the fits (Zut alors! Hue and cry galore!), online forums like the late Home Brew Digest or Rec.Crafts.Brewing provided a collegial club-like atmosphere. (If you remember either of those, please schedule a checkup and oil change with your doctor.)

But for all the vaunted ability of the internet to connect us to our fellow obsessives, no one has managed to implement a proper internet protocol for the delivery of draft beer over IP — yet. And ultimately, despite all the time spent puttering, you can't beat sharing your beer with people who aren't just in it for the free beer. Let's get serious, your neighbor Ed probably thinks Mosaic® and Galaxy® are names of new fishing lures and would drink your beer even if it tasted remotely good.

In the best of worlds, a club serves to bring together like-minded hobbyists to explore their shared craft — sharing education, experience, and providing enthusiasm to all involved. In the worst, it becomes a closed-off cesspool of in-jokes, standoffishness, or worse, pushy "know-it-all-ism." We're here today to make sure your club is solidly in the former and not the latter description.

THE BARE MINIMUM CODE OF RUNNING A SUCCESSFUL CLUB

Hold your events in public: Hosting

meetings at someone's home can not only be a draining experience for the host, but it's intimidating for most people to intrude on someone's homestead. There are obvious exceptions to this, like with smaller homebrew clubs, but it's a good rule.

Work with your local homebrew shop or a beer bar/brewery. Post signs, messages, etc., that the event is happening and make sure your hosts are OK with homebrew being poured. Being in public can also bring in new accidental members who stumble on your get-together.

Mind the new folks: Most new brewers are likely to be intimated by meeting with a well-established group of people. (If they're not, recruit them to be officers immediately!) Name tags are utterly dorky but can help. Appoint your social butterflies to act as club greeters to engage with new attendees.

Get folks active: It's easy for people to feel detached and leave a club if they're an uninvolved passive member. Find small projects, efforts ("hey, can you help pour beer?") to get them engaged. Find the skills of your people and ruthlessly (within reason) use them! This is especially true if you're terrible at social media — a vital avenue of promoting your club.

Stay focused and loose (holy contradictions, Duff Man!): You're there for the beer! Keep things focused on that subject. Keep things fun. Taking something fun too seriously is the surest way to kill people's interest. And yes, that means not every conversation needs to be about how someone didn't follow the perfect technique for making a beer. Remember your Sesame Street and Mister Rogers messaging: Kindness matters!

If that's too much or too organized for you, stick to the first principle — we're all here to enjoy learning the art of making beer. It's a non-serious, serious pursuit meant to be treated with all the frothy, friendly joy of a warm summer day sitting lakeside. Beer doesn't want to be taken seriously. It wants to be shared, talked over, laughed over, and laughed about.

MAKING YOUR CLUB GREAT

The first trick for making a great club is to figure out what the members want. Are they interested in learning styles? Quietly engaging with brewing esoterica and the minutia of their sample? Trying to brew the most medaled beer in competition history? Heartily washing down the dust of a tedious week while comparing notes?

If you try and frog march a bunch of people dedicated to exploring how they've seized the means of beer production into the arena of competition, you'll end up with disappointing results and disaffected members. The same result if you try and force a bunch of metal heads to treat every brew day like a Jimmy Buffett tailgate.

Remember, people's time and energy are precious, and patience can run short if they are not engaging in a manner that is enticing. You must figure out how to balance what they want and what they need. This should be a regular part of a club meeting's discussion.

WHAT TO DO WITH YOUR CLUB

Establish a schedule — Stick to it and shout it out! Nothing kills people's involvement faster than not knowing when things are happening. It's best to stick to a schedule (1st Sunday of the month at 11 a.m. for Drew's Maltose Falcons and last Monday at 7 p.m. for Denny's Cascade Brewers Society).

Don't assume everyone knows or remembers — put the word out there, repeatedly and often. Having a dedicated Social Media Coordinator comes in handy. If you deviate from the schedule — hammer on the communication to get it to stick!

Create a mix of events: For the Falcons we run two competitions, three festival/campouts, nine meetings, 11 happy hours, four yearly club-only competitions, a holiday tasting, a mead tasting, a variable number of brew sessions at our sponsoring homebrew shop, and we dedicate the month of March to brew sessions at member's homes on their systems.

The Cascade Brewers Society keeps things a little lighter with meetings every month with a technical presentation, five club-only competitions, brew days for Learn to Brew and Big Brew, and a campout.

And that's just our two clubs. There are tons of options — coordinate experiments, have a speaker from a local brewery (or hire Denny & Drew impersonators for $20 or the real thing for free), make people brew with funny ingredients, hold a yard sale, rent a bus and take the show on the road, raise money for charity, make artisanal free-range pretzel necklaces for your next party.

Put equal strain on all parts (aka farm out the work): Even running a barebone set of events, like meetings, is a lot of work for an individual. Spread the work, spread the love, and spread the involvement! (This has the side effect of increasing engagement as well.)

Make sure to plan: You could trust our word, but it's much better to take it from an expert in making big social efforts pay off — namely the Falcons' Treasurer and Planner of Things, like the 50th Anniversary Party, Tiffany Ashrafi. Here is her top advice for other homebrew club coordinators:

- **Don't procrastinate.** For example, when planning a brewery tour for the club: Contact the breweries as soon as possible to nail down a date that works for all. This way advertising for the event can be posted quickly to spread the word and start selling passes. Breweries appreciate it when you can give them an updated headcount a few days prior to arrival.
- **Be persistent.** There is no shame in persistence mixed with patience. If I don't hear back from a brewery, potential sponsor, or fellow club member about an inquiry right away, I'll wait a day or so then find another avenue to contact them. Sometimes Instagram direct message is checked more often than Facebook messenger or texts. But don't give up after the first point of contact.
- **Do your research & shop around.** I try to get the best price for attendees so as many of our members can join the fun as possible. But I also want to stay within budget, so the Board Treasurer doesn't get upset (the treasurer is me . . .).
- **Ask.** Ask club members for their opinions and consider all suggestions. The events I plan are for club members, after all. Work as a team to create something everyone will remember for a long time and say, "Hey, that was my idea!" Ask for help! Planning anything requires many hands and minds to make it a successful event.

"Great! You've given us a ton of planning and engagement advice, but what do we do?"

THE PRACTICAL LIST OF CLUB ACTIVITIES

Brewing Activities

Club brews — There is no better way to practice homebrewing than to brew with each other. Whether at home or some common location, make this a habit. Incorporate a challenge, a theme, share recipes, talk and be silly — heck, why not fill a barrel while you're at it.

Collaboration brews — Make a beer with a local brewery. Put the club's name on the beer. It's great to see what's different when you're not on your stove or in your garage. Even better, take some wort home and compare the batches.

Ingredient shares — Get a bunch of malt from a craft maltster or even fruit or honey from a local farmer. Everyone gets to showcase what they can do when given something unique.

Wort share — Like the collaboration brew, mash an over-sized batch of wort at one time and split the resulting liquor amongst multiple brewers and let them choose their own fate with it.

Competition Activities

Pre-judging — Have members bring their beers for evaluation and judging before they compete. Help them improve before they spend their money.

Planning — For those regions with regular competition circuits, coordinate as a group. Figure out how your club will beat the competition.

Packaging help — Have a day dedicated to packaging beer for competition. Meet up to bulk ship entries to save money and ensure your beers arrive intact.

Run a competition leaderboard — Keep track with points awarded for medals won in different competitions.

Educational Activities

Host a technical seminar — Denny's club does this during meetings. Walk people through new gear, new techniques, and new ingredients. Teach people the fundamentals of malt, water, yeast, and hops; there are so many potential lessons right there.

Walk people through a beer style — Drew does this for the Falcons. Buy a mix of 4–5 different versions of a style of beer and walk through each with notes and discuss what makes the style unique. Go through, past, and beyond the BJCP (Beer Judge Certification Program) guidelines.

Sensory kit education — Torture your club members with an off-flavor sensory kit from Siebel or BJCP. Doctor cheap beer and get them to smell/taste different compounds and walk through what causes them in actual brewing.

Frolicking Activities

Bus/train/transit brewery trip — Gather a bunch of your friends and hit the trails to stop at a handful of breweries. Work out a deal with them ahead of time and keep people rolling on.

Happy hours — Since COVID-19 hit, Drew's been doing these with the Maltose Falcons — now monthly. Buy mixed four packs from a local brewery and have everyone hop online with the brewer to taste and talk through the beers. This may get more participation than just driving to the brewery. BYO

BY VICTOR ANDUEZA

DIY KEG WASHER

A homebrewer's best friend

For every passionate homebrewer, the joy of crafting the perfect beer is often accompanied by the less glamorous task of cleaning and sanitizing our equipment. In particular, kegs can be a challenge to clean thoroughly, especially if they've housed a particularly hoppy or yeasty brew. Enter the DIY keg washer, a game changer for homebrewers looking to streamline their cleaning process without breaking the bank.

Keg washing is crucial for ensuring the purity and taste of your beer. Residual yeast, hops, or even small particles can influence the flavor of subsequent batches, leading to inconsistent results. While commercial keg washers are available, they can be prohibitively expensive for the average homebrewer. Moreover, in regions outside of North America, these specialized tools are hard to come by. This is where the ingenuity of the DIY spirit shines.

Creating your own keg washer using a domestic pump, PVC tubes, John Guest connectors, and a zip ball is not only cost-effective but also surprisingly simple. The pump serves as the heart of the system, providing the necessary pressure to circulate cleaning and sanitizing solutions through the keg. PVC tubes, known for their durability and resistance to chemicals, are ideal for directing the flow of these solutions. The zip ball, a versatile cleaning tool, acts as a scrubber, ensuring every nook and cranny of the keg is reached.

The assembly process is straightforward. Connect the PVC tubes to the domestic pump, ensuring a tight fit to prevent leaks. The other end of the tube should be fitted with the zip ball, which will be inserted into the keg.

One of the primary challenges in designing this DIY keg washer was ensuring consistent cleaning inside the input and output posts and tubes. The solution? Using two ball locks connected to the main mounting via John Guest connectors allows the pressurized liquid to efficiently clean the parts of both posts.

Once your keg is sparkling clean, the benefits are immediately apparent. Not only will your beer taste fresher and maintain consistent flavor, but you'll also extend the lifespan of your kegs, preventing corrosion, contamination, and buildup that can compromise their integrity.

A DIY keg washer is an invaluable tool for any homebrewer that uses Corny kegs. It offers an affordable, effective solution to one of brewing's most tedious tasks. With cleaner kegs, you're ensuring that each batch of beer is as delicious as the last. So, why not invest a little time and creativity into building a keg washer? Cheers to innovation and the perfect pint!

Tools and Materials

- 3.3 ft. (1 m) 1-in. (25-mm) PVC pipe
- 1-in. (25-mm) PVC coupling with four outlets
- (3) PVC coupling 1-in. (25-mm) to 1-in. (25-mm) female thread
- PVC coupling 1-in. (25-mm) to 1¼-in. (32-mm) female thread (or whatever size thread the pump has on its outlet)
- (2) PVC coupling 1-in. (25-mm) male thread to ½-in. (13-mm) female thread
- (2) John Guest connector ⅜-in. (9.5-mm) to ½-in. (13-mm) male thread
- ~4 ft. (1.2 m) ⅜-in. (9.5 mm) speed-fit tube
- Liquid ball-lock (or pin-lock) connector
- Gas ball-lock (or pin-lock) connector
- Submersible pump
- Zip ball with 1-in. (25-mm) male thread
- 1-in. (25-mm) PVC coupling T
- 1-in. (25-mm) PVC end cap
- (4) 1-in. (25-mm) PVC elbow coupling
- PVC adhesive
- (2) 3-D printed pieces (optional)

The zip ball, a versatile cleaning tool, acts as a scrubber ensuring every nook and cranny of the keg is reached.

Photos by Victor Andueza

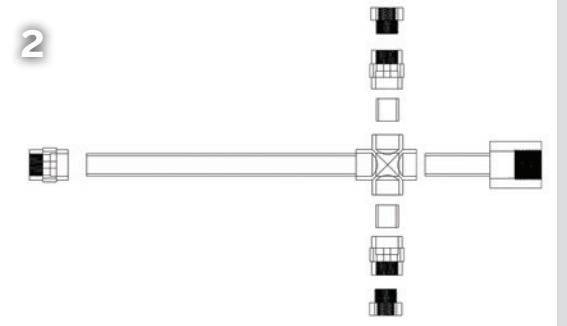
STEP BY STEP

1. CUTTING OUT THE PVC

Begin by cutting the 1-in. (25-mm) PVC tube to the following measurements: (1) 8⅔-in. (220-mm), (2) 6⅓-in. (160-mm), (1) 4¾-in. (120-mm), (1) 3-in. (75-mm), (2) 1½-in. (40-mm), and (2) 1-in. (25-mm) sections. Sand the ends to ensure a smoother surface, which will enhance the adhesive grip when gluing.

2. BUILD THE SPRAY WAND

Assemble the PVC tubes and couplings as illustrated in the diagram. You will be using the following cut PVC pieces: (1) 8⅔-in. (220-mm), (1) 3-in. (75-mm), and the (2) 1-in. (25-mm) sections to create the spray wand. These will be fit into the PVC coupling with four outlets. Ensure you use a specialized PVC adhesive to bond the pieces together as these pipes will be pressurized. Use the couplings to transition to threads. Apply plumber's tape to the threaded sections to prevent any water pressure-induced leaks. Affix the zip ball to the top of the assembly.



3. ATTACH PUMP TO THE WAND

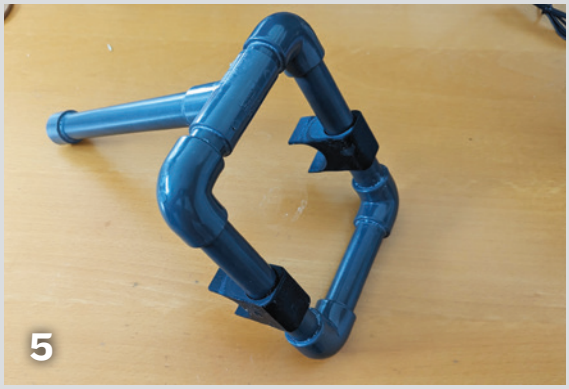
Attach the spray wand assembly to the submersible pump. It's crucial to ensure this connection is tight; otherwise, the assembly might not receive adequate pressure. Again, use plumber's tape to ensure no leakage from this connection.

4. GIVE IT WINGS

Install the John Guest connectors, the tubes, and the ball-lock connectors. These will be attached to the keg's two posts to ensure the keg inlet and outlet are fully cleaned and sanitized. Ensure the tubing is long enough to facilitate easy connections to the posts.

5. BUILD THE SUPPORT STAND

Using the same PVC adhesive, set up the separate keg support stand as depicted. You will be utilizing the remaining PVC cuts for this step. The leg section needs to be cut to size since it, along with the endcap and T sections, needs to match the height of the pump, which will serve as the stand's other leg. For an optional enhancement, consider 3-D printing the two plastic components that will rest on the spray wand wings and further stabilize this support. The link for the .stl print file is found at: byo.com/project/diy-keg-washer



6. TEST RUN

Submerge the entire assembly in a bucket filled with hot water and a detergent like PBW or similar. Connect the ball locks to the keg, position the keg downward, and activate the pump. Let the magic begin! I always run for 15 minutes for cleaning, then a quick 3-minute cycle for sanitizing.

Brew YOUR OWN THE HOW-TO HOMEBREW BEER MAGAZINE

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BY DREW JACKSON

PEN PAL BREWERS

Sharing the language of beer

There is no way I could have reached this point in my brewing arc without the experiments done through this reciprocal relationship.

Photo by Drew Jackson

The author (top) and his long-distance brew partner, Fernando (bottom).

Little did I know three years ago that my brewing path would change in such a significant way. The pandemic had torpedoed homebrew club events and four brew fests. The beer I had made to donate to a local non-profit fundraiser was no longer needed and my local homebrew supply store went dark. I couldn't even go into my local taproom to cry the blues; I had to drink outside . . . alone. I learned that worldwide pandemics can and will greatly disrupt our daily routines. It truly was a sad time in my homebrewing world and it took a much larger emotional toll than I ever could have envisioned. While my desire for brewing had a wet blanket thrown over it, the passion was not extinguished, not by a long shot.

When *BYO* published my article, "A Friendship Mushrooms" in the March-April 2021 issue (byo.com/article/a-friendship-mushrooms-brewing-brothers-from-different-mothers/), I thought to myself, "It can't get much better than this." But what I didn't know was that my pen pal brewing partner, Fernando, and I still would have so many more adventures to come. It's hard putting into words how amazing it is to have a brewing partner who is experimental, brutally honest, caring, and willing to think outside the box. Unfortunately, Fernando lives in Madrid, Spain, and speaks little English. I live in Mendocino, California, roughly 6,000 miles (9,650 km) apart. But in today's world, like-minded individuals can shrink that gap through the digital realm.

After the publication of our piece, in the very next edition of *BYO*, I found an article on "Dip Hopping" (byo.com/article/dip-hopping/). After reading the article I knew I had something new and exciting to experiment with. When I shared what little information I had with Fernando, he was very interested in hearing more about the technique and immediately launched into research of his own. Using Google Translate, he was absorbing information quickly. The sharing of what we both learned led him to make a dip-hopped beer before I could even get mine started! (Yes, I was a little jealous.) His willingness to dive into new things with both feet, even with the language challenge, was both humbling and inspiring. He wasn't simply following my lead; he was pushing me to explore new products, new processes, and to grow my craft.

In the last few years, Fernando and I have debated about water chemistry, critiqued the benefits of pressurized fermentation, and discussed the processes of closed system transfers and thiol enhancement. We have shared kveik and landrace yeast cultures and traded brewing ingredients and recipes. Despite this, we have yet to taste each other's beers. But we both agree that the beers we are producing now are better than anything we had ever made prior.

This past spring, I poured my homebrew at the first beer festival in the last four years and got constructive feedback. Chances are pretty good I would have never poured at another beer festival without the shot of enthusiasm I got from my collaboration with Fernando. I also won my first regional award at the 2023 American Homebrewers Association's National Homebrew Competition using a kveik yeast, locally foraged ingredients, and dip hopping. There is no way I could have reached this point in my brewing arc without the experiments done through this reciprocal relationship. And that beer that I made to donate to a local non-profit . . . well it improved with bottle aging and is now finding its purpose raising money for the community.

If you are lucky enough to have a like-minded friend that challenges you, whether next door or on the other side of the planet . . . nurture it. They don't come around every day. I lift a pint to my Spanish friend; here is to all the great beers we have yet to make. Prost.

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