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MILKSHAKE IPA

HISTORICAL
WITBIER

EARLY 20TH
CENTURY ALES
FROM OXFORD

VOL 43 • NO 5 SEPTEMBER/OCTOBER 2020



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HomebrewersAssociation.org



SPIKE

A handwritten signature in black ink.

Ben Caya
Owner, Spike Brewing

PURSUE WHAT'S POSSIBLE

When I started Spike ten years ago, I couldn't have predicted that one day we'd be an industry leader in the brewing equipment market. What began as a simple basement project is now a bona fide national brand with 25 employees and a 25,000 square foot facility, and it all started with a little drive and ingenuity. I see the same passion in the brewing community every day, reminding me of what got Spike started in the first place. And as we reflect on our roots, we enter our second decade with a new look, a clear mission and an unwavering commitment to our customers. Because whether you'd like to go pro or just make an awesome homebrew, we're here to help.

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A Toast to Gary Glass

To the best of our knowledge, no American Homebrewers Association staff have contracted COVID-19, but that doesn't mean we have been immune to its effects. Far from it. Cancellation of all of our in-person events in 2020—and those of our parent organization, the Brewers Association (BA)—has challenged us in ways that a year ago would have seemed unthinkable. The economic fallout from COVID-19 has meant saying goodbye to several coworkers, most recently former AHA director Gary Glass.

The AHA was lucky to have Gary on staff for two decades. Six years before I joined the AHA as a staff member, I joined it as a curious homebrewer, and I enjoyed reading Gary's column in each issue of *Zymurgy* to learn what the AHA was doing on behalf of homebrewers nationwide. Not all heroes wear capes; sometimes they wear hoodies.

As *Zymurgy* editor, it was an honor to edit Gary's columns, which demanded mercifully little of my time. In reading through his copy, I appreciated Gary's commitment to homebrewing and homebrewers as much as I appreciated his commitment to the Oxford comma.

I learned to do oxygen-free transfers from fermenter to keg using the meticulous notes Gary prepared for using the BA's homebrewing equipment on staff brew days. I know I learned from the best because Gary can detect oxidation in even the minutest of concentrations. Seriously, it's uncanny.

I liked to give Gary a bit of in-good-fun crap for not liking smoked beer, and I shall continue to do so when I see him at Homebrew Con because smoked beer is objectively wonderful. (We do agree on Weißbier.) But enough from me...

DUNCAN SAYS,

We all owe a great deal to Gary Glass and the contributions he's made to the American Homebrewers Association over the past 20

years. Gary hired me on as the AHA intern in 2013, and it was exciting times. He was working on legalization efforts in Mississippi and Alabama—the last two states that hadn't legalized homebrewing—and gearing up for Homebrew Con Philly, the biggest Homebrew Con to this day. We were also planning for him to star in a new all-grain video series. His hat collection (literally and figuratively) was impressive.

I thought there was no way possible Gary was involved in so many things at the same time, but sure enough, the man was constantly firing on all cylinders to lead the AHA, support its members, and welcome more newcomers. He fostered that same spirit in our little Boulder office, allowing staff to put our best feet forward in support of the association.

Gary was a boss, mentor, and friend through much of my formative professional career, and I owe a lot of my opportunities and achievements to his support. Gary, thank you for everything you have done for the AHA and our staff. We will continue carrying the AHA torch. See you at Homebrew Con!

JOHN SAYS,

My first interaction with Gary Glass was at the Great American Beer Festival in 2014. I was garbed in homemade jorts (jean shorts), an '80s rock band wig, a straw hat, an ugly sweater, and a very large beard. I was vying for a position with the AHA and wanted to make an impression. Turns out, I made one. Two months later, I was hired to work at the AHA.

Gary is fierce and gentle, a get-your-hands-dirty worker and mentor, brave and self-effacing, creative and methodical, proud and humble. He listens while others wanted to listen to him. Someone who wears the ethos and passion of homebrewing on his sleeve and experienced profound changes within the association and homebrewing community during his tenure. He draws fair lines but is a unifier all the time. I will forever cherish my friendship with him and carry on the work we did together.

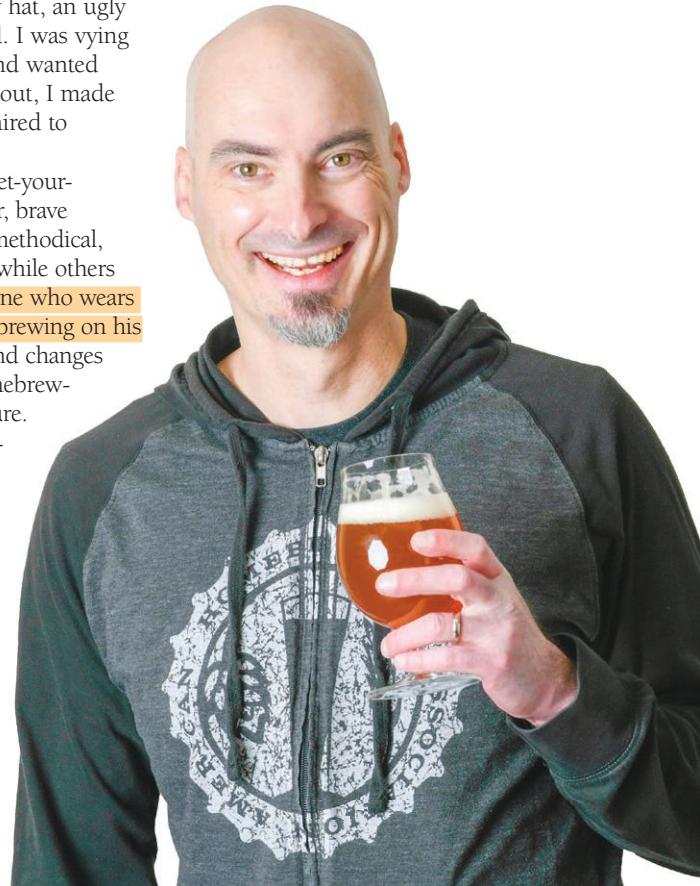
AND MEGAN SAYS,

When I was hired more than two years ago at the American Homebrewers Association, Gary Glass

welcomed me, encouraged my growth, and laughed at my jokes but not at my silly questions. Like many new *Zymurgy* readers in the last decade, the first homebrew videos I watched were Gary's "Intro to Homebrewing" series. He taught me not only the basics of homebrewing, but the ins and outs of the brewing community. His advocacy of homebrew rights, knowledge of AHA history (did you know he's a history buff?), and respect for his BA colleagues are what I continue to appreciate most. With his departure, I am thankful for the legacy and jumping blocks he has left our team and am only a little jealous of his new opportunities to fish, camp, and make more mead. Cheers to Gary!

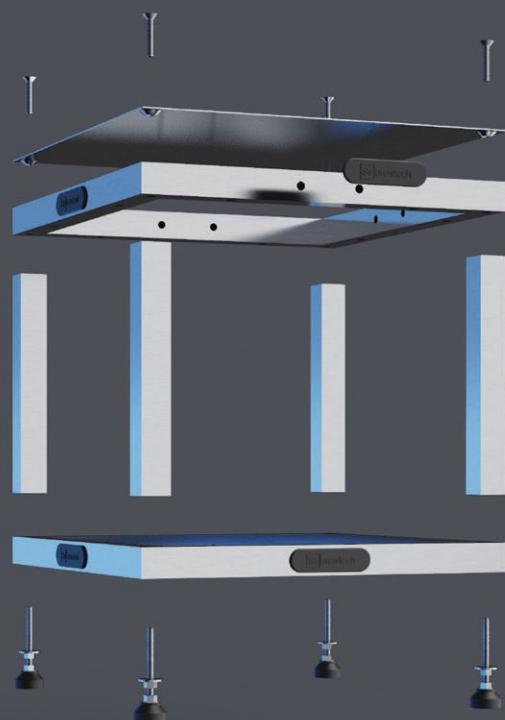
All of us at the AHA will miss you greatly, Gary. On our next staff brew day—which, thanks to COVID is currently slated for 2034—we will brew a rauchbier in your honor, bittered, of course, with only the choicest whole-cone Fuggles. Cheers to you, Gary!

*Duncan Bryant is associate director of the American Homebrewers Association, John Moorhead is AHA competition manager, Megan Wabst is AHA project coordinator, and Dave Carpenter is editor-in-chief of *Zymurgy*.*



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Features



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CIDERMAKING FOR BREWERS

From Norman *cidre bouche* and German *Apfelwein* to English scrumpy and New England cider, there's a cider for every palate. Learn to think like a cidermaker and turn apples into delicious elixirs in this overview of traditional cider methods.

By Abram Goldman-Armstrong



36

MAKING HARD CIDER

Most store-bought apple juice is made from culinary apples that lack the complexity we want for the most interesting hard ciders. Fortunately, there are tools and techniques we can use to transform these plain sources into delicious outcomes.

By Jason Phelps



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**THE LOST WHITE BEERS
OF BELGIUM**

Classic witbier is popular in Belgium and in many American taprooms, but it's easy to forget that it was almost lost for good. Its survival can be credited to one man, and its story is one of Europe's first craft brewer and of the biggest brewery in the world.

By Roel Mulder



50

MILKSHAKE IPA DEMYSTIFIED

Think of milkshake IPA, and you might think craft beer has gone too far or that it's an abomination. But it doesn't have to be! By adding a low level of sweetness, fruit acids in milkshake IPA are slightly offset, allowing fruit and hop flavors to shine through.

By Christiana Bockisch

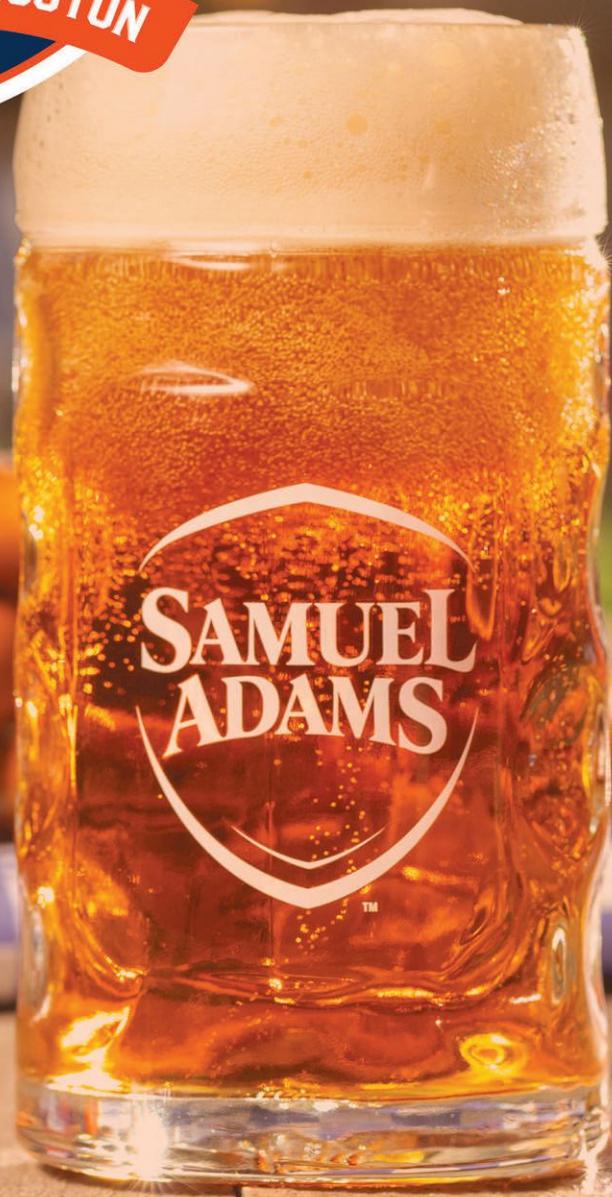


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**BRITISH HOPS:
TRADITIONAL AND MODERN**

Hops growers in Kent and Suffolk refer to hop fields as hop gardens. Those in Herefordshire and Worcestershire call them hop yards. No matter what you call the fields, British hops all benefit from the same maritime climate and terroir.

By Felicity Beaumont



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LAST DROP

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By Steve Ruch

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Cover Photo
By Luke Trautwein

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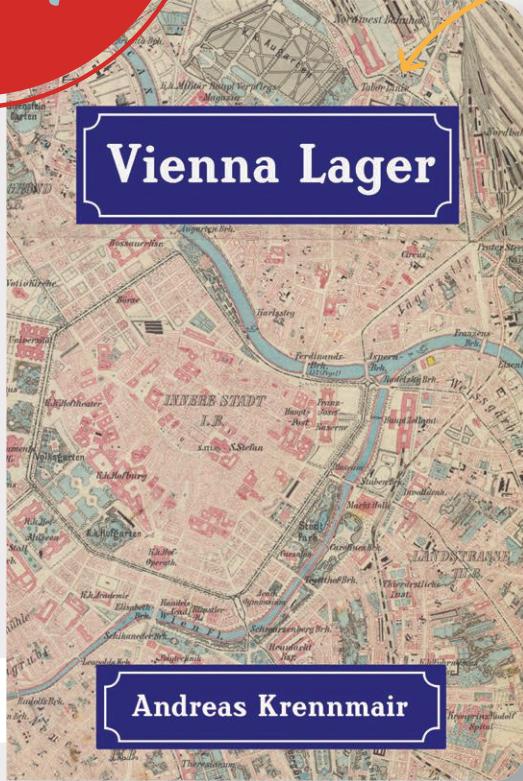
(zī'mərjē) n: the art and science of fermentation, as in brewing.



ON THE WEB

Find these homebrewing recipes and more on our website @ HomebrewersAssociation.org/homebrew-recipes

NOW ON Tap



New Books

VIENNA LAGER

By Andreas Krennmaier

Every now and then a book comes along that forces the reader to rethink everything they thought they knew about the subject. *Vienna Lager* by Andreas Krennmaier is one of those books. Through meticulous primary-source research and a critical eye, Andreas reconstructs the origins and evolution of Vienna Lager; along the way, he challenges a number of folkloric myths about the style, including the romantic-but-overstated notion that Austrian emigrants carried it with them to Mexico.

Particularly entertaining are the stories of Anton Dreher's travels with Gabriel Sedlmayr in Great Britain, where the two learned techniques and stole samples from some of the UK's most successful breweries. Taking their findings and contraband back to the Continent, Dreher and Sedlmayr introduced advanced malt kilning techniques at the Klein-Schwechat and Spaten breweries near Vienna and in Munich, respectively. Dreher's innovation gave rise to the Vienna lager we enjoy today.

Like all classic European lagers, a well-brewed Vienna lager invites you to have another. After reading *Vienna Lager*, you'll find yourself equally as thirsty.

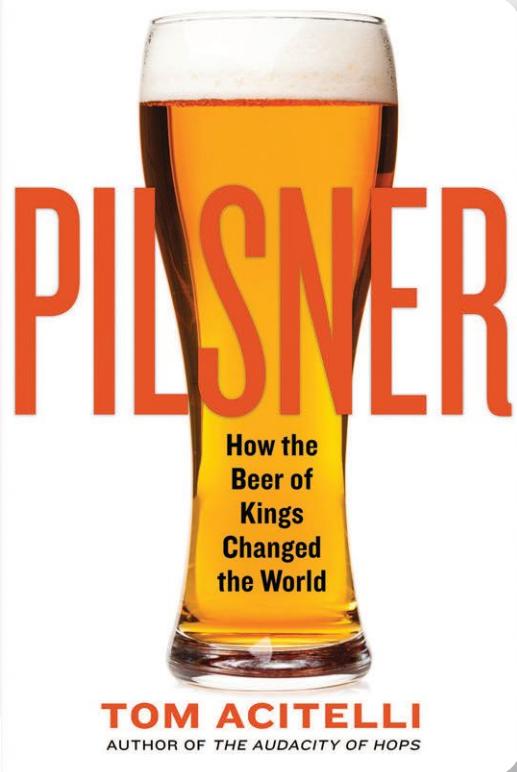
PILSNER: *HOW THE BEER OF KINGS CHANGED THE WORLD*

By Tom Acitelli

It would not be an overstatement to assert that the modern beer landscape owes virtually everything to Pilsner. All mass-market pale lagers can trace their lineage to Josef Groll's 1842 brew in Pilsen in one way or another, and revolt against many of those beers—often thin shadows of the original—ushered in a craft revolution whose story is still being written.

In *Pilsner: How the Beer of Kings Changed the World*, Tom Acitelli follows pale lager from a medieval monastery in St. Gallen, Switzerland, to a modern industrial brewery in Shenyang, China, with stops in such brewing centers as Munich, Milwaukee, St. Louis, Budweis, and, of course, Pilsen. As the historical narrative of this influential beer unfolds, the Industrial Revolution, immigration, war, prohibition, and science offer context as principal characters.

Acitelli's *Pilsner* is engaging reading for anyone who enjoys history, and it's especially rewarding to read with a cold Pils in hand.





SPIKE SOLO SYSTEM

The new 20-gallon single-vessel Spike Solo system lets you brew all-grain beer in small spaces. Available with NPT or tri-clamp fittings, the Solo is built from 1.2-millimeter-thick 304 stainless steel and is designed to last. The system can accommodate up to 40 pounds (18 kg) of grain, which will get you comfortably into barleywine territory, even for 10-gallon batches.

The 20-gallon Spike Solo requires 240-volt electrical service, a 30-amp circuit, and a NEMA 14-30 outlet, but word on the street is a smaller 120-volt model is in the works. Stay tuned.

The Spike Solo (NPT fittings) and Spike+ Solo (tri-clamp fittings) start at \$1,650 and \$1,800, respectively.

SPIKE STEAM CONDENSER LID

Spike's new Steam Condenser Lid turns steam back into liquid during the boil, making it easier for electric brewers to brew inside without having to fear that mold-causing moisture will collect on walls and ceilings. The lid fits Spike kettles, of course, but it is also compatible with most other popular brands of kettles.

The Steam Condenser Lid features 1.5" and 4" tri-clamp ports for accessories and hop additions and also includes a pump, condenser mister, piping, clamps, gaskets, barbs, and caps to complete the setup.

Offering a 50 percent reduction in boil-off, Spike's Steam Condenser Lid can help you eliminate the need to install a vent hood for indoor brewing. And if you're worried about dimethyl sulfide (DMS), don't

New Products from Spike

The COVID crisis has forced us all to hunker down to ride out the pandemic, and many have had unplanned spare time on their hands. Lockdowns have given established homebrewers more time to perfect their brewing skills and make more beer, while beginners can finally pursue a hobby they've been interested in.

Homebrewing's popularity under COVID restrictions has skyrocketed, and Spike Brewing, a manufacturer of premium homebrewing equipment, has experienced an uptick in interest, web traffic, and product sales. In fact, June 2020 proved to be the best month in Spike's nearly 10-year history.

Such growth has allowed Spike to release two new product innovations (see below), each of which sold out in less than two hours during presale events. In addition to new product launches, Spike has continued to push through the pandemic, adding five more stores to its partner network, bringing the total number of retail locations carrying Spike products to 35. Spike has also announced a new partnership with the WebsaurantStore that will bring Spike brewing systems to bars and dining establishments that want to expand into craft brewing.



be: third-party lab testing shows that 30 to 45 minutes of boiling reduces DMS to below the taste threshold (see "Advances in Wort Boiling" by Martin Brungard in the May/June 2019 issue of *Zymurgy* for more on boil times and DMS).

Spike's Steam Condenser Lid is available for 10-, 15-, 20-, 30-, and 50-gallon brew kettles, and pricing starts at \$275.



Mead Sharing during COVID-19

By Annie Zipser, with edits by Eva Sabolcik

One of our members in the Ann Arbor Brewer's Guild in Michigan set up a daily Zoom meeting for the club. In early May, our meadmakers decided to take over the "Virtual Pub" for a mead discussion. The platform was excellent for a 10- to 12-member discussion, and we started brainstorming how to add a mead →



tasting to the next meeting's agenda. We decided to meet twice a month.

We agreed that porch pick-up and drop-off could work well. Since our group covers a fairly large geographic area, picking a central location for distribution worked best for us. One of our members found a place to buy 2-ounce bottles (basically the same bottles vanilla extract is sold in) at a price of 80 bottles for \$50, so we bought two cases.

We created a sign-up sheet and started working out the rules:

1. Each participant had to be able to share something to join the group. We limited group size to 13 people so that members wouldn't need to offer a huge amount of any one mead.
 2. Each member needed to supply 1.5 ounces per person for the sharing (approximately 2 bottles of mead to start with).
 3. Bottles needed to be labeled.
 4. Mead drop-off was 5:30 to 6:00 p.m. the day before we met. Pick-up was from 6:00 to 7:30 p.m. that same day. Bottles were dropped into and picked up from a cooler. We maintained proper social distancing, and we all wore masks. (We did stand around and chat during drop-off while socially distancing and wearing masks—it was really nice to see each other in person!)
5. We set a style of mead to share and the number of people who would share, limiting it to three or four people sharing per session. The first session was blackberry or black raspberry meads because four of us happened to have them. (Our club primarily makes big, sweet, still dessert meads, so sharing 2-ounce bottles works well for us.)
- We met the next night. Each meadmaker shared the basic recipe, yeast type, age of their mead, and fermentation temperature. Comparing and contrasting the meads was an excellent learning experience, and 1.5 to 2 ounces of each mead was a good amount. After we finished the sampling portion of the evening, we discussed which mead type to consider at the next meeting.
- We all agreed that it was easier to enjoy an in-depth discussion with a group on Zoom than it would have been in the larger (and more chaotic) setting of an in-person meeting. We met for about 1.5 hours and had an excellent time!
- We learned a few things that might benefit other groups attempting something similar:
1. We needed to improve the layout in the cooler to make it easier to distinguish which meads were which. At least two of us brought home doubles of one mead and none of another. We decided to build a box that would hold all the bottles on a single level for future meetings.
 2. We needed to figure out how to distribute bottles. In a perfect situation, everyone would take a turn sharing, and by the end of the cycle, everyone would get their bottles back. But in our reality, some people share more often than others. We will probably wind up exchanging empty bottles at distribution, which may mean having to schedule our "theme" mead further in advance.
- Sharing our meads in this way proved to be a valuable way to learn from each other and maintain friendship and camaraderie even during the restrictions of COVID-19.

Brew
This!



Del Norte Mild

Pale mild ale

Recipe courtesy Steve Ruch (see Last Drop).

Batch volume:	2 US gal. (7.6 L)
Original gravity:	1.040 (10°P)
Final gravity:	1.009 (2.3°P)
Color:	6 SRM
Bitterness:	10–12 IBU
Alcohol:	4.1% by volume

MALTS

2 lb.	(907 g) Briess CBW Golden Light dried malt extract
8.5 oz.	(241 g) Maris Otter pale malt
6 oz.	(170 g) Great Western BräuMalt
1 oz.	(28 g) pale chocolate malt
1 oz.	(28 g) Briess Victory malt

HOPS

0.25 oz.	(7 g) East Kent Goldings, 4.5% a.a., steep 20 min.
----------	--

YEAST

11.5 g	Fermentis SafLager S-189
--------	--------------------------

ADDITIONAL INGREDIENTS

2 oz.	(57 g) sugar to prime
-------	-----------------------

BREWING NOTES

Mash the grains in 1 qt. (1 L) of water at 155°F (68°C) for 30 minutes. Remove grains, add 1 qt. (1 L) of water, and heat to near boiling. Thoroughly mix in half the malt extract and the hops and steep for 20 minutes. Remove the hops, thoroughly mix in the remaining extract, add 6 qt. (6 L) cold water, and pitch the yeast. Bottle after two weeks.

ALL-GRAIN VERSION

Omit the malt extract and increase the Maris Otter pale malt to 3.5 lb. (1.59 kg). Mash the grains in 1.5 gal. (6 L) of water at 155°F (68°C) for 45 minutes. Sparge with enough water to give you 2.25 gallons (9 L) in the kettle. Bring to a boil, add the hops and boil for 45 minutes. Chill and pitch the yeast. Bottle after three weeks.

Photos courtesy of Ian Stines and Annie Zipsner

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# Defying Gravity



## Dear Zymurgy,

I recently went through a few calendar years' worth of recipes and found the average alcohol level of Zymurgy recipes to be around 6% ABV. Why is the typical ABV so high? I am a retired medical doctor and have seen my share of people with problems from alcohol-induced diseases. I also believe it takes a lot of skill to make a great-tasting, low-alcohol beer. There is nowhere for the flaws to hide.

I propose that Zymurgy print low-alcohol versions of recipes whose styles aren't defined by high alcohol (e.g. Russian imperial stout). You already publish extract versions of recipes, so let's add low-alcohol versions. Then members can

test their skills in making low-alcohol beer and take simple steps to reduce the risk of alcohol-related side effects.

Ian Johnson  
Toronto, Canada

**Zymurgy editor-in-chief Dave Carpenter responds:** Hello, Ian, I can certainly relate to your desire for more low-ABV beers: I tend to stick to more sessionable recipes myself. However, at this time, it would be impractical for Zymurgy to develop an additional recipe formulation beyond the ones we already print unless the recipe's contributor specifically submits a low-alcohol version. That's not to suggest

your idea is without merit—far from it—but given the number of recipes we receive and the staff hours available to process and edit them, that extra step simply isn't feasible for us.

But there is another way! Most brewing software includes a feature for scaling a recipe by original gravity, so you could enter a recipe as it was originally printed and then have a computer reduce the malt bill to achieve a more modest ABV. Some software will even adjust the hops additions to maintain the same calculated IBU value, though you may want to reduce IBUs for lower-ABV beers (maintaining a fixed ratio of gravity points or Plato degrees to IBUs is a good way to approach that particular problem). I've used

this trick on a few occasions to convert IPA to pale ale, brown ale to mild, and (going the other direction) helles to festbier.

If you don't already have a brewing software package you like, you can download a free copy of J.B. Zorn's brewing spreadsheet from [HomebrewersAssociation.org/ja20](https://HomebrewersAssociation.org/ja20). It's a great tool for playing around with recipe formulation.

## READER FEEDBACK

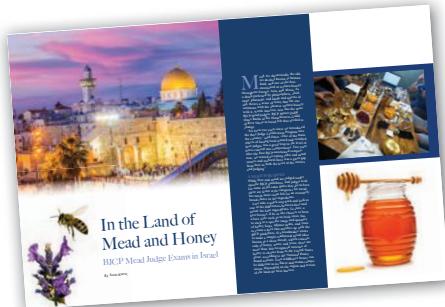
**Dear Zymurgy,**

I was disappointed by Cody Christman's response (*Dear Zymurgy*, May/June 2020) to the interesting take on a subject that many have been curious about ("Brewing With Cannabis," Mar/Apr 2020). Currently, only three U.S. states remain in which marijuana and low-THC cannabis-derived products are prohibited for any use, a trend that cannot be ignored.



As a homebrewer of more than 25 years and a professional brewer for the last five, I'm certainly no teetotaler, but I pride myself on staying informed on all topics and making the best choices for me based on solid science. I read publications like *Zymurgy* to keep me informed and educated, and I take great pride in my AHA and BA memberships. Kudos to *Zymurgy* for continuing to provide us with interesting articles on new trends and research in the world of fermentation.

Brett Goldstock  
Chief Fermentation Officer  
**Duck Foot Brewing Co.**  
San Diego, Calif.



**Dear Zymurgy,**

I've been a homebrewer for seven years, and *Zymurgy* and the AHA have helped me grow in this awesome hobby. Unfortunately, I'm writing today not with praise (although the magazine deserves this in abundance), but dismay about a story on mead in Israel ("In the Land of Mead and Honey: BJCP Mead Judge Exams in Israel," May/June 2020).

As I'm sure you're aware, Israel is in violation of numerous United Nations resolutions, and the Israeli government has

been engaged in systemic oppression of Palestinians for decades. Just as we need to stand up against police brutality and racism in this country, I expect the AHA to apply similar standards to racist and discriminatory activities perpetrated on a larger scale.

I would request that membership money not be used to support activities in Israel, and I would appreciate some acknowledgement of the lapse in judgement if the trip to Israel was in any way supported by AHA dollars.

Thank you for your consideration,  
Marty Zaluski

**Zymurgy editor-in-chief Dave Carpenter responds:** Thank you for your letter, Marty. All *Zymurgy* feature contributors get paid for their work, but our editorial budget, unfortunately, isn't lavish enough to cover field research and travel. That said, I stand by our decision to publish the article in question. Walls—be they physical barriers demarcating political boundaries or psychological barricades obstructing our understanding of and compassion for one another—have a rather poor track record in human history. As the publication of a member organization, *Zymurgy* has a responsibility not just to explain techniques, but also to celebrate what unites us as home fermentation enthusiasts. And the more of us we meet, the more we recognize ourselves in others. We can, should, and must continue honoring our common experiences as homebrewers, meadmakers, and cidermakers, especially when we disagree with governments that claim to act and speak on our behalves.



## PITCH RATES

For the past year, I have used pitching rate recommendations from a well-known yeast supplier. The manufacturer recommends one yeast packet in a 2-liter starter for 5 gallons of 1.065 original gravity (OG) ale or for cold pitching lager. Assuming a growth rate of 2.3 for a 2-liter starter, that yields about 230 billion cells from a 100-billion-cell yeast packet.

I have experienced buttery and pumpkin-like off flavors in several of my 5-gallon batches when using these pitch rates (these were worst in my lagers, which all had OG less than 1.052). My yeast packets were

fresh, I used a stir plate for my starter, I sufficiently aerated the starter and wort prior to pitching, and I propagated and fermented at recommended temperatures.

Seeking to remedy this problem, I referred to the pitching rate table in a well-known homebrewing guidebook. The book recommends between 295 and 410 billion cells for a 5-gallon batch of lager with an original gravity of 1.050. I have brewed two batches (an ale and a lager) using the higher pitch rates from the book, and the butter/pumpkin off-flavors are gone.

Why would the pitch rates recommended by a large yeast supplier be so low compared to a well-known manual? I am perplexed as to why the supplier would recommend pitching at a rate that seems to produce bad beer.

Jimmy Rose  
Austin, Texas

**Zymurgy editor-in-chief Dave Carpenter responds:** Hi, Jimmy, a good, all-purpose pitch rate for lager is 1.5 million cells per milliliter of wort per degree Plato of original extract (1.5M/mL°P). So, 5 gallons of 1.050 lager wort would require about 350 billion cells. For something strong like doppelbock, I'd even bump it up closer to 2M/mL°P, which would mean 600 billion cells or more in 5 gallons. Ales can be pitched at about half those rates. Bavarian hefeweizen and some Belgian ales can even be pitched a little lower to promote ester formation.

I can't offer specifics regarding the recommendations of yeast suppliers, but there is an argument to be made that the yeast we get direct from manufacturers is in better shape than what you might harvest from the bottom of a finished batch of beer. However, I don't think the difference is so great as to warrant the low pitch rates we often see recommended. Anecdotally, I've yet to brew a batch of beer and wish I had used less yeast. I've brewed many batches, however, and wished I had pitched more.

You've seen for yourself how increasing the pitch rate can improve beer quality and reduce that butter/pumpkin character, which I suspect is some mix of diacetyl (butter) and acetaldehyde (green apple, fresh pumpkin, or latex paint). Both of those flavors suggest yeast stress, which can be caused by poor health or inadequate pitch rates.

Good on you for paying attention to this. Treat your yeast well, and it will pay dividends with better beer!



## DEAR ZYMURGY

Send your Dear *Zymurgy* letters to [zymurgy@brewersassociation.org](mailto:zymurgy@brewersassociation.org). Letters may be edited for length and/or clarity.

## DOUGHING IN (AND OUT)

Dear Zymurgy,

Another hobby of mine besides you-know-what is baking bread. It has been my experience that one of the easiest ways to bake boules is to use a Dutch oven with a lid. I prefer plain cast iron Dutch ovens like those from Lodge to enameled cast iron models, as I know of one well-known brand whose interior cracked when heated empty.



My first loaves had a beautiful, dark brown crust, but the bottom was burnt black and hard as a rock. Now I place a false bottom in the Dutch oven so that the loaf is not in direct contact with the cast iron. I do the final proof in a large bowl with a parchment paper liner. This liner becomes a sling for lowering the loaf into the Dutch oven for baking and removing it when it's done. It works beautifully, and you won't get burned.

Rich Dombrowski  
York, Maine

## BREW DAY ASSISTANTS



Jessica Jones, head of brewery operations, oversees another brew day being set up.

Dave Evans  
Howell, N.J.



This is Otto, a mini husky, helping me brew.

AJ Lippert  
Lake Stevens Wash



These are my brew assistants in training, Jax and Juniper. They are new to the process but are learning quickly. Their noses go crazy when they smell the delicious wort and try to get a taste from the spent grain!

Javier Mondragon  
Tracy, Calif.



Eliza loves hanging out with me while I brew in the driveway. Today we brewed 6 gallons of Irish stout.

Jim Hatness  
Derby, Kan.



Brew dog Saaz watches over a recent brew session. In spite of her name, her favorite spent grain biscuits contain no hops!

Brad Olson  
Wake Forest, N.C.

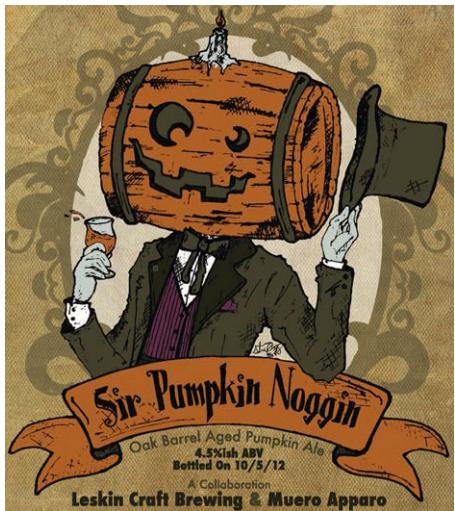
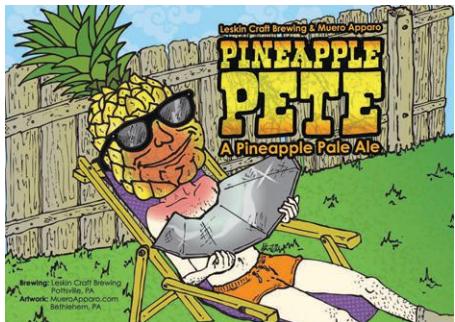


This is Kai lending a hand with cleaning the mash tun. Cheers!

Paul Snow  
Redwood City, Calif.



## HOMEBREW LABEL SUBMISSIONS



My friend Steve designed these labels for me back in 2012 and 2013 when he was a graphic designer at Crayola. They were for a pumpkin ale with oak chips added to secondary and a pineapple pale ale. I was really early in my homebrewing career when he created these for me, but I've since moved on to all-grain and perfected my pumpkin beer, which is now a much more reasonable ABV, in my opinion, at around 7%.

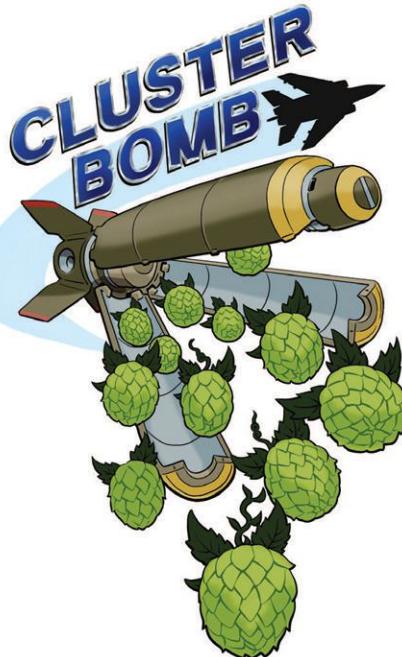
For the designs, I just told him about the beer and he came up with everything. I paid him with a few six-packs of the finished beer with the labels. These helped him get into making designs and labels for two Pennsylvania craft breweries, Saucony Creek Craft Brewery and The Larimer Beer Co. Sadly, his hard drive with the design files crashed and he's trying to recover them, but I'm hoping to make more labels and a T-shirt with Sir Pumpkin Noggin some day.

Tom Leskin  
Homebrewer 8 years,  
AHA member 6 years  
Pinellas Urban Brewers (PUBGuild)  
Seminole, Fla.



This label stars the very best boy and brew dog, Moose. Moose has been guarding the brewery and eating spent grain cookies since he was a tiny pup. Since Moose is a Golden Retriever, it seemed logical to name this pale colored Trappist-style ale after him: Golden Monk. The beer and label both feature a hybrid of sorts. The ale's ABV ended up in the range of a dubbel, but since it is a paler colored beer, I dubbed it a tripel-singel. The label shows off another fun combo, a hybrid between a Trappist monk and Moose the brew dog.

Eitan Kaplan  
Homebrewer 7 years,  
AHA member 8 years  
Seattle, Wash.



This label is for a hazy pale ale with prominent Cluster hops. I started my own brewing company, Blast Radius Brewing, where the beers and images are military themed. The label was hand drawn with pencil, inked, and then scanned into Photoshop for color.

Eric Lautenschlager  
Homebrewer 9 years,  
AHA member 5 years  
Albany Brew Crafters  
Albany, N.Y.



### SUBMIT YOUR LABEL

Do you make custom labels for your homebrew? Want it featured here in the pages of Zymurgy for all to see your work?

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# Fermented HOT SAUCE



By Amahl Turczyn

I'm one of those people who always has to have a bottle of homemade hot sauce on hand. It goes on everything. I grow my own hot peppers and use them to feed this obsession with all things hot and spicy. Just to be clear, you don't have to ferment peppers to make hot sauce, and for many with patience issues, the two or three weeks necessary to get a good, cool pepper fermentation will be too long. For those folks, a hot sauce recipe can be as simple as blending a quart of fresh hot peppers (or dried peppers that have been submerged in hot water for an hour or so to rehydrate

them), two tablespoons of salt, and enough vinegar to make a slurry. Press it through a sieve, bottle it up, and you're done.

This, along with three or four cloves of garlic and maybe some spices, was my go-to sauce recipe for years. Thai dragon, serrano, and jalapeño chiles are available year-round from my local Asian market, but in the summer, I grow more exotic varieties like Bolivian purira, aji amarillo, Japanese Takanotsume, cayenne, and Tabasco for hot sauce. Unfortunately, our growing season isn't long enough here in Colorado to grow super-hot varieties like ghost, 7-pot, and Naga Viper, but believe me, I've tried.

I slice and dry any excess harvest in a dehydrator for use later in the year. I have a dedicated blender jar for pepper sauce, as it tends to carry those garlic and chile flavors no matter how well I clean it (and spicy milkshakes aren't high on my kids' list of favorite things). Another useful tool is a stainless-steel ricer, or food mill. This device forces semi-liquids through a perforated plate, which is perfect for separating chile pulp from the hard seeds and pepper skin flakes. Most sauce recipes call for good old-fashioned apple cider vinegar (home-fermented if possible), but I've found rice vinegar and coconut vinegar, with their much softer acetic bite, perfect for making hot sauce.



Adding fermentation to the process develops fuller, more complex flavors in your hot sauce, and the resulting lactic acid provides softer, rounder tartness and acidity than any type of vinegar can deliver. It's the same familiar lactic acid profile we know and love in sour beer brewing. And you can always blend in a bit of vinegar as well. Now my hot sauces are not only noticeably more complex and flavorful, but they are also easier to digest (as lactic acid bacteria and wild yeasts have basically pre-digested the peppers), and, as long as I keep them in the fridge and don't heat-process them, all those probiotic microorganisms remain alive and kicking.

Chiles, like most vegetables, come standard with their own lactic acid bacteria and wild yeasts. Getting those microbes into solution and providing them a controlled, anaerobic environment in which to grow and feed off the available sugars and carbohydrates in the peppers is simple. You just need a brine of pure water and non-iodized salt. Three tablespoons of sea salt or pink Himalayan salt for every quart or liter of non-chlorinated water (charcoal- or reverse osmosis-filtered) produces a strong enough brine to keep out undesirable microbes like mold without making the end result too salty.

## SELECTING CHILES

First, choose your peppers. Homegrown chiles are best, but use what you can get. If only jalapeños are available, you can still make a good sauce, but taste one or two before you buy them. Depending on origin and season, they may have little more heat than a green bell pepper, and your hot sauce, while still tasty, may end up as just sauce. Peppers that have fully ripened to bright red or orange will be just as hot as green ones but will offer a little natural sweetness and less vegetal flavor, both of which are great (plus the color can be fantastic).

Red or green, look for striations on peppers like jalapeños. This often means they were grown in hotter conditions, which in turn means they will have a higher capsaicin (heat) content nearer the top of their range of 2,500 to 8,000 Scoville heat units (SHU). If you are lucky enough to get serranos, which are similar in flavor to jalapeños but thinner and longer, then you'll get a capsaicin content of 10,000 to 23,000 SHU.

Thai dragons are much smaller, skinny, thin-fleshed peppers, but they offer between 50,000 and 100,000 SHU, and you can often find them a bright, fully ripened red. They typically yield a thinner sauce because of the lower ratio of flesh to skin and seeds, but it can pack a lot of heat, more along the lines of good old Tabasco-style sauce (only you don't have to use as much salt in your recipe). And, of course, you can blend several different types of chiles according to taste, color, and desired consistency. Aji amarillo, for example, comes in at 30,000 to 50,000 SHU and is a brilliant yellow. (I would recommend sticking to like colors, though: combining green and red chiles yields a rather unattractive pale brown color.)

## FERMENTATION

So, you've chosen your chiles—on to the fermentation! Dissolve the salt in room-temperature water (this will take some stirring) and prepare the chiles. Give them a good wash in cold water, but don't worry about washing off the lactic acid bacteria and wild yeast; you won't. I prefer to slice the tops off of each pepper. You then want to either coarsely chop them into pieces, or, at the very least, cut a slit down the side of each pepper to allow the brine access. Then pack the peppers into your chosen fermentation vessel. Quart-sized Mason jars work fine.

Some people add garlic cloves to the ferment along with the peppers; although garlic is a natural antibiotic, it won't slow down

lactic acid bacteria much. I normally ferment peppers only and add garlic at the blending stage, but it's your call. Try to squeeze as many peppers as possible into the jar, minimizing space between them. If you can wedge them in so they aren't free-floating, it helps keep them submerged, but that depends on their size. The trick is to keep the peppers submerged in the brine throughout fermentation; as we know, fermentation produces gas, which tends to make the peppers buoyant. A sanitized weight on top of the veggies can help keep them down.

Now, pour the brine over the peppers and shake the jar to get as many bubbles out as possible. You will have to keep the jars topped up with liquid during fermentation, which takes two or three weeks at cool cellar temperatures (55 to 60°F, or 13 to 16°C), or less time at warmer (65 to 70°F or 18 to 21°C) temperatures. In either case, fermentation will take a few days to get going. Don't cover the jars tightly—you need to allow that gas to escape. Special silicone airlocks are available for Mason-type jars, but a loosely fastened lid works fine, too.

After a week or so, the brine will have turned a bit cloudy, and a savory, lactic, pickled-pepper aroma will begin to emerge. Keep your fermenting jars in a tray or drip pan of some sort, as the brine tends to seep out of the top. If you don't have special jar-fitting pickling weights, you can use the Ugly Bag of Mostly Water trick in the top of your jars to keep the peppers submerged. Just partially fill a baggie with water and tuck it in the top under the lid. This also makes it easier to see and shake out bubbles as they form. Taste a pepper periodically. Fresh-fermented peppers should remain nice and crisp with a pleasant tartness that will continue to develop over weeks and even months, if you want to let them ferment that long.

This fermentation has two stages. Salt, coupled with a lack of oxygen, prevents the growth of harmful bacteria, but once fer-



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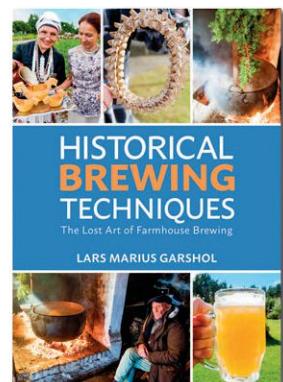


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“

# Adding fermentation to the process develops fuller, more complex flavors in your hot sauce.

Some people also add thickeners at this point to keep the sauce from separating later or turning out too thin. Cornstarch tends to break down in acidic liquids, but some have found success with arrowroot—about a teaspoon mixed with a little water and added to the blender will help in this regard, or you can go with xanthan gum, which is what commercial sauce producers use.

You can certainly bottle your sauce and enjoy it as is, or you can run it through a ricer or coarse sieve to remove the seeds and tough skin flakes and then bottle. Fancy glass hot sauce bottles are available online, but just remember that this sauce is a living, fermenting product that will continue to produce gas as it ages, even at fridge temperatures, so you'll want to keep the screw caps loose. Or, you can use food-service squeeze bottles with caps, which do a better job of allowing the sauce to vent (although seeds tend to get caught in the narrow cone tips, so it's best to strain the sauce if you use these). For a finely sieved sauce that I'm planning to give as a gift, I like using Cholula bottles—you just fill a squeeze bottle with a fine tip and then transfer the sauce into the narrow opening of the Cholula bottle.

You also have the choice of heat-processing the sauce for shelf stability. Obviously you will lose the probiotic benefits, but if you intend to keep your sauce around for several months, this might be the best option. Here, the microwave is your friend. Heat your hot sauce until the liquid begins to boil, swirl the contents around to distribute the heat, and then zap it again. You want to get the sauce as close to boiling temperature as you can without making a huge mess (boil overs aren't just for brewing!). Note that this quick heat process isn't a substitute for actual sterile canning, but with the salt and acid content of fermented hot sauce, the risk of subsequent spoilage is relatively low.

As for your leftover brine, if you have another batch of peppers ready to ferment, adding a bit of the old brine to the new batch will get things fermenting in a big hurry. Or, you can blend it into other sauces, such as New Mexico-style red chile paste. This is made with dried red New Mexico chile pods (or other dried varieties such as ancho, mulato, guajillo, etc.), garlic, and spices, and while it doesn't have hot sauce heat, it is a quite excellent and versatile condiment. A tablespoon or two fried with eggs on a corn tortilla, for example, makes a heavenly breakfast. With a bit of hot sauce, of course.

*Amahl Turczyn continues to brew and write at his home in Lafayette, Colo.*



## Fermented Hot Sauce

The yield of this recipe depends on the chile pepper variety, but a 32-ounce (950 mL) ferment usually makes at least 16 ounces (475 mL) of finished, strained sauce.

### INGREDIENTS

|          |                                                          |
|----------|----------------------------------------------------------|
| 1 lb.    | (454 g) hot chile peppers, washed, trimmed, and sliced   |
| 3 tbsp.  | (51 g) non-iodized salt                                  |
| 1 qt.    | (950 mL) filtered, chlorine-free water                   |
| 4        | large garlic cloves, peeled (in blender)                 |
| 1 bunch  | fresh cilantro stems (optional)                          |
| 0.5 tsp. | (2.5 mL) whole allspice berries, toasted and then ground |
| 1 tsp.   | (5 mL) whole black peppercorns, toasted and then ground  |
| 1 tsp.   | (5 mL) whole coriander seed, toasted and then ground     |
| 1 tsp.   | (5 mL) whole cumin seed, toasted and then ground         |
| 1 cup    | (237 mL) brine, reserved from the pepper ferment         |
| 1 cup    | (237 mL) coconut or rice vinegar                         |
| 1 tsp.   | (5 mL) arrowroot, as a thickener (optional)              |

### FERMENTATION NOTES

Wash and trim peppers, then cut a slit in each one, or coarsely chop. Pack peppers into your fermenter jar. Mix salt and water until salt is dissolved and pour over peppers. Place a weight or water-filled baggie over peppers to keep them fully submerged, then cover jar loosely with a lid or tightly with an airlock. Keep out of sunlight at cool temperatures, topping up with water or brine as necessary. Ferment one to three weeks, or until brine reaches 3.5 to 4.5 pH.

Drain and reserve brine. Add peppers to a blender jar and process with garlic, cilantro, and spices, if using. Strain pulp through a ricer or coarse sieve to remove pepper skin flakes and seeds. Bottle in shatterproof or loosely covered squeeze bottles and refrigerate if keeping probiotic, or heat process or can and use vacuum lids for longer storage.



tation starts, lactic acid acts as a preservative for the peppers. If any solids are exposed to oxygen at any point, though, they are fair game for bad microbes. If you've not checked your jars in a while and then notice a pepper that's somehow risen above the level of the brine, you may see mold growing on it. This is usually accompanied by a slightly rotten or off smell from other bacteria. If this is the case, dump the jar and start over.

### FINISHING AND BOTTLING

When your pickled peppers reach the desired acidity level (between 3.5 and 4.5 pH is considered safe), drain the brine into another container (don't dump it!) and transfer the peppers to your blender jar. (You can also use a food processor, but a blender will give a finer grind.) Add a cup of the reserved brine (or less, if you don't like it too salty) and a half cup of your favorite vinegar to round out the lactic acid with some acetic.

This is also the time to add auxiliary flavorings. Three large, peeled garlic cloves, the stems from a bunch of cilantro, and a blend of spices all work great here. For spices, I toast half a teaspoon of whole allspice berries and a teaspoon each of black peppercorns, whole coriander seed, and whole cumin seed in a pan until fragrant, pulverize them to a powder in a spice grinder, and add them to the sauce. Blend to your desired consistency. You can add more brine if it needs salt or more vinegar if it needs more acid.

# **ded•i•ca•tion** | dedə'kāSH(ə)n |

**noun (dedicate, dedicated)**

**1** the quality of being dedicated or committed to a task or purpose: *their dedication to customers and team were second to none*



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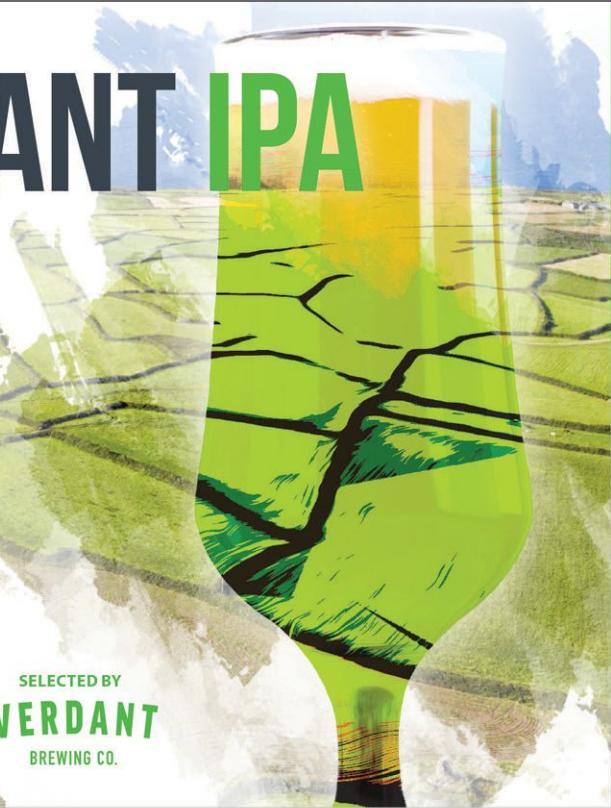
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# Side Conversation:

## Pouring Beer the Czech Way



By Dave Carpenter with Petr Novotny

**O**f all the destinations my wife and I visited during our two years living in Berlin, the Czech Republic made perhaps the greatest impression on me in terms of beer culture. Germany is known for its legendary Biergärten, Belgium boasts an embarrassment of Trappists and lambics, and there's nowhere finer than the British Isles for cask-conditioned real ale. But the Czech Republic (or Czechia) impressed me with an attention to detail that might go unnoticed by travelers whose lives do not revolve around hops, barley, water, and yeast (and sometimes bacteria).

It doesn't hurt that Pilsner was invented here, and the golden lager doesn't get any fresher than in Pilsen and Prague. Imported Pilsner Urquell can be very good, but it's

quite different from the unpasteurized, unfiltered experience of *Tankovna*, which is delivered directly from the Pilsner Urquell brewery to pubs, where it is pumped into tanks and served quickly, usually within three days.

Urquell, owned by Japanese brewer Asahi, may be the most famous, but Budweiser B:ORIGINAL (available in the U.S. as Czechvar thanks to trademark disputes from you-know-who), brewed by state-owned Budweiser Budvar in České Budějovice, is equally refreshing. Prague's own Staropramen, owned by Molson Coors, and Asahi-owned Radegast also turn out excellent pale lagers. And those are just the big ones. U Fleků's dark lager is legendary, and countless small operations turn out delightful lagers without fanfare.

But, most importantly for me, beer in the Czech Republic is almost always served with a generous head of persistent foam—none of this made-for-Instagram “Iceman Pour” BS. Not only are such pours aesthetically pleasing, but a good dollop of foam accentuates beer aromas and keeps oxidation at bay. And the side-pull Czech faucet is a key part of getting that foam just right.

### THE CZECH SIDE-PULL FAUCET

One probably needs to be a bit mad to spend more than one should on a faucet that doesn't fit one's existing draught hardware and then teach oneself to pour all over again, but I have never shied away from accusations of madness. After a bit of back and forth, I managed to import a side-pull Czech faucet to Colorado and hook it up to my home kegerator (shout out to Draft Choice in Brooklyn, N.Y.). That madness, though, results in creamy lagers whose texture and foam are as enjoyable as hop bitterness and malt sweetness.

Unlike the majority of beer faucets out there, the Czech side-pull faucet is not a simple on/off affair. It is, in essence, a ball valve, not unlike the one that lets wort flow from your mash tun. A screen inside the faucet serves a similar role to the restrictor plate you find inside a stout faucet. Varying the flow rate using the ball valve makes the screen knock more or less carbon dioxide out of solution, creating varying degrees of foam. A flow-control lever on the side allows even further precision in delivering the perfect pour.

Another distinguishing feature is the long nozzle, which can be submerged in the beer as the glass fills, although immersion is controversial among Czech brew-



A Czech side-pull faucet can deliver just the right foam-liquid ratio to suit your personal tastes (and those of your guests).

ers. American draught beer enthusiasts know that you never—never!—allow the faucet to touch beer, but don't tell that to a Czech bartender. In fact, the pouring technique with such a faucet is opposite what most of us have learned in that you pour foam first and then, pressing the long faucet near the bottom of the glass, dispense liquid beer beneath the cap of foam. Of course, then you need to wipe down the faucet to keep things clean.

It takes a bit of practice to unlearn draught gospel, but once you've gotten the hang of it, you can start to play with varying ratios of liquid to foam. And you can even dispense different qualities of foam. So-called "dry foam" is what most of us experience when we order a draught beer or pour from a bottle. It shows off bubbles of varying sizes that are easy to see. And, it's mostly carbon dioxide by volume.

"Wet foam," on the other hand, is more like the thick, creamy head you get from a nitro faucet or a beer engine. The bubbles are smaller, the head more uniform. Those smaller bubbles mean there's more beer in wet foam than in dry foam, and it tends to be more persistent, often sticking around till your last sip. (Wet foam also produces a spectacular beer mustache.)

With a side-pull faucet, you can adjust levels of wet and dry foam by varying the degree to which you open the valve. Barely pulling the lever causes wet foam to issue from the nozzle. Opening it a little wider creates drier foam, and opening it fully delivers liquid beer only. And that's where things get really interesting. Because in a Czech bar, you can ask for your beer with bespoke ratios of liquid to foam.

## POURING STYLES

To get this right, I contacted my Czech friend and regular *Zymurgy* contributor Peter Novotný, who completes the remainder of this article. Any errors in the words that follow are a consequence of my editing.

**Hladinka** is what you get for Pilsner Urquell and many other brands if you don't specify the pour, and it's what most Czechs expect (although only in case that bartender actually can make it that way—more on that later). *Hladinka* or *hladina* means

"water level" in Czech. Most Czech glasses have a volume mark at either the 0.5-liter or 0.3-liter mark, with a half-liter being the most common size in any pub.

When you get *hladinka*, it means that you expect to have liquid beer surface reaching the mark, with foam from the mark to the top of the glass. The bartender pours beer just slightly below or at the mark, and it quickly reaches the mark as the foam settles. The expectation is that you then end up with approximately one-quarter foam and three-quarters beer. Also, and this is very important, *hladinka* is dispensed in one straight pour, which requires a skilled bartender. That makes it different from *na dvakrát*.

**Na Dvakrát** means "twice" in Czech, referring to the fact that beer is poured twice to get the final beer. First you pour whatever you can get as far as foam-to-beer ratio, with the intent of creating more of a "dry" foam. Then you let it settle a bit before topping it off to get liquid beer up to the mark and the rest of the glass filled with foam. Sometimes you pour more than twice to get that result. Obviously, carbonation suffers with this technique, but it requires much less skill to get there. And, *na dvakrát* will deliver more bitterness and aroma than *hladinka*.

A historical difference between *hladinka* and *na dvakrát* exists to some extent for certain brands that actually account for that type of pouring. Budweiser Budvar (the real Czech one sold as Czechvar in the United States) is often poured *na dvakrát* because the beer is intentionally slightly over-carbonated in the keg. When you pour *na dvakrát* and lose some carbonation, you still end up with proper carbonation for that brand. Plzensky Prazdroj (Pilsner Urquell) is an example of a brand that needs *hladinka*; otherwise it is under-carbonated.

**Šnyt** does not have a good English translation. It's roughly one-third beer and two-thirds foam and doesn't quite fill a half-liter glass. Now, the half-liter glass here is paramount. The reason is that a *šnyt* corresponds roughly in volume to *malé pivo*, or a small beer of one-third liter.

The reason you would get this in a Czech pub is that you want to slow down, or you're getting ready to go home and you

don't want to hold a small glass when your fellow drinkers are holding half-liters. I guess it is just a sense of pride to not have the smallest glass. Beer will also be preserved longer against oxidation due to thick and plentiful foam, so again, you can drink longer and don't worry about the quality of taste (comes in handy once again when you want to slow down the drinking pace).

At the two extremes, you can have almost all foam or almost all liquid. **Mlíko** is almost only foam and served in a full half-liter glass. It has a creamier, sweeter taste and is often the nightcap you drink before heading home. **Čočtan** is virtually foamless and therefore the highest carbonation of all techniques. Very thirst-quenching.

To watch world champion bartender (yes, that's a thing) Lukáš Svoboda demonstrate all of these pours and show them side by side, check out the linked video at [HomebrewersAssociation.org/so20](https://HomebrewersAssociation.org/so20). It's all in Czech, but you'll get the idea.

## THE REGULARS

It is worth mentioning that *Čočtan*, *šnyt*, and *mlíko* are pours that only certain kinds of beer geeks would order—most people even in Czechia don't know about these. Old-school Czech beer geeks are very special beer geeks, not the ones you might imagine when thinking about craft beer in the U.S. These orthodox lager drinkers usually stick to one brand of Czech lager, often only in their "home" pub. They'll have at least five half-liter beers per evening, which explains why they developed "pacing" techniques such as drinking *šnyt* and *mlíko*.

We have a special word for these Czech beer geeks: *štamgast*. A *štamgast* can almost always be found in his or her pub when it's open, or at least in regular intervals, such as every Saturday. They often have a special table reserved, and their presence is vital for the atmosphere, and often the livelihood, of the pub. There would be no traditional Czech beer culture without the *štamgast*.

**Dave Carpenter** is editor-in-chief of *Zymurgy*. Petr Novotný lives in Portland, Ore., and is a regular *Zymurgy* contributor and Dave's go-to source for all things related to Czech beer.

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# CIDERMAKING FOR BREWERS

By Abram Goldman-Armstrong



Abe picking up apples 2017.

Cidermaking has much more in common with winemaking than with beer brewing. Cidermakers are dependent on Mother Nature as their mash tun: as apples ripen, their starches turn into sugars. To make cider, apples are crushed, or *scrattled*, into a mash that is pressed into juice to extract the sugars and transferred to a settling vessel or straight into the fermenter. Unlike the sugars in beer wort, all the sugars in apples are fully fermentable, so most cidermakers backsweeten their ciders.

#### THE HISTORY OF CIDER

People have been fermenting apple juice into cider since prehistory. *Malus pumila*, the forebearer of *Malus domestica*, the modern apple, was brought from its native Kazakhstan and hybridized with *Malus sylvestris*, the European crabapple, by 10,000 years ago. Romans wrote of Celts in Gaul making cider, where today the Asturian people consume more cider per capita than those in any other region in the world.

## IN THE LAST DECADE, CIDER HAS EXPERIENCED A GLOBAL RENAISSANCE, WITH INNOVATIVE CIDERS MADE FROM A WIDE ARRAY OF INGREDIENTS.

Cider has many unique historic styles, from the soft, earthy, subtly sweet *cide bouche* of Normandy to the funky, tannic, dry ciders of the English West Country, to the highly acetic Basque and Asturian *sargado* and *sidra natural*. Around Frankfurt, Germany, *Apfelwein* has a bracing acidity from the unique blend of sharp apples used.

In North America, the very first European settlers brought cider apples and cidermaking traditions, with cider apple trees and a cider press listed on the *Mayflower's* cargo manifest. Cider thrived in the New World, and by the time of the American Revolution, per capita cider consumption in Massachusetts colony was 30 gallons (114 L) per year. Cider was ideally suited to New England, where rocky soil and lack of processing infrastructure made malt production challenging, while apples grew well and abundantly.

As European settlers expanded westward, land speculator John Chapman, known to history as Johnny Appleseed, developed his



land claims by planting orchards for cidermaking. Several historic styles developed in the New World, including New England cider, fortified with molasses and raisins, and Quebec's legendary high-alcohol, sweet ice cider. Cider remained one of the most popular libations in the United States until the 1840s, when a new wave of German immigrants brought lager brewing with them, and rail and refrigeration made it possible for large industrial breweries to rise to dominance, while cider remained a farm-gate product.

## CIDERMAKING TODAY

In the last decade, cider has experienced a global renaissance, with innovative ciders made from a wide array of ingredients. Craft cider is truly global; there are *méthode champenoise* ciders from Estonia, hopped ciders from the West Coast of Norway, ciderkins from Texas, American-style sweet fruit cider from India, and traditional English farmhouse scrumpies from Oregon.

Many historic cider styles are impossible to reproduce without the right apples or the right natural microflora. There are, however, plenty of hacks employed by cidermakers around the globe to make delicious and complex ciders without having a large quantity of "proper" traditional cider apples.

## WHAT IS A CIDER APPLE?

Apples are divided into four classes; sharp, sweet, bittersweet, and bittersharp. Almost all commercially grown apples in North America are sharps, meaning they are high in acid, which helps them last in cold storage to arrive fresh, crunchy, and crisp on grocery store shelves year-round. Sharps such as Red and Golden Delicious, Granny Smith, Gravenstein, McIntosh, and Northern Spy are often referred to eating apples, dessert apples, or culinary apples.

Sweets tend to be highly aromatic apples, delightful to eat and great for adding aroma to bittersweet ciders. They are seldom grown commercially, as sweets are low in acids and tannins, are very delicate, and do not store well. In Somerset, England, the early



To make cider, apples are crushed, or *scrattled*, into a mash that is pressed into juice

Morgan Sweet apple is used to make single-varietal ciders, which are consumed in the fall while the bittersweet cider apples are pressed to make vintage or keeping cider.

Bittersweet varieties; including Dabinett, Yarlington Mill, Muscadet de Dieppe, and Harry Master's Jersey; were developed specifically for making cider in England and France over the centuries. These apples were selected for their tannins and post-fermentation character in cider. As they lack acid, bittersweets are often blended with sharps or bittersharp to create balanced ciders.

Bittersharp are high in both tannins and acids and are some of the few apple varieties considered to make single varietal ciders of vintage quality. This class includes the famed Kingston Black, Porter's Perfection, and Stoke Red.

## SOURCING CIDER APPLES

If we think about cider in beer terms, then most common apples (sharps) are various types of base malt. To achieve anything of the complexity of a cider from the West Country of England Normandy, or Brittany, you need bittersweet or bittersharp.

In North America, bittersweet and bittersharp are now being grown for cidermaking by orchardists and hobbyists alike, from New Hampshire and Michigan to the Pacific Northwest and even California. If you've got land, some horticultural knowhow, and time, growing your own cider apples will allow you to produce spectacular cider.



Gautard Apples.

Like hops, apple trees are genetically distinct. Apples are propagated by grafting scion wood cut from a tree of a certain variety onto a rootstock. Top grafting over established apple trees is a great way to get more cider apples in a relatively short time frame. Generally, top-grafted trees will bear fruit in year three, versus three to five years for dwarf trees, five to seven years for semi-dwarf, or seven to ten years for standard trees.

## CIDERMAKING WITHOUT CIDER APPLES

For most home cidermakers, unless they are lucky enough to live in the West Country of England, Normandy or another traditional cider-producing region, sourcing bittersweet is a bit of an aspirational goal. Fortunately, there are plenty of ways to make cider without bittersweet.

There are some truly great North American ciders made exclusively from found or foraged apples from feral orchards, including Aaron Burr ciders from New England and Wildcraft Cider from Oregon. Apples from feral orchards, are actually better suited for cidermaking than apples from commercial eating-apple orchards. Without irrigation or fertilizer, the trees yield small, dense fruits that give very intense and concentrated flavors when pressed. Apples are like hops: each seed in an apple is genetically distinct and will produce a tree with different characteristics than its parent. Seedling apples can be higher in tannins and acid than commercially grown apple varieties.



If you're buying apples, check for local farms, and try to select a blend of apples. Generally, the more varieties the better for adding depth to a cider. Many dessert apples are picked before they are ripe so they store better, which means they are full of starches. Conducting an iodine test for starch conversion on a halved apple is just like checking starch conversion on a sample from your mash tun. Some commercial producers add amylase enzyme to the crushed apples and let them macerate before pressing to convert any remaining starches.

### CIDERMAKING EQUIPMENT

The pieces of equipment most beer brewers won't have on hand needed for cidermaking will be a scrapper and a press. A scrapper, or mill, is a tool for shredding or crushing your apples so that you can press out the juice. Many homebrew shops rent presses with scrapers, and depending on the volume you're making, getting an electric scrapper is a good option. Those classic hand-crank models are a good workout though! The internet is full of videos on modifying under-sink garbage disposals into scrapers as well.

Basket presses with a screw mechanism are widely available, or consider building a rack-and-cloth press with a car jack or hydraulic press. Rack-and-cloth presses were developed by the Romans for making olive oil but were quickly adopted by cidermakers in Britain and France and are widely used by many commercial cidermakers to this day. The apple mash, or

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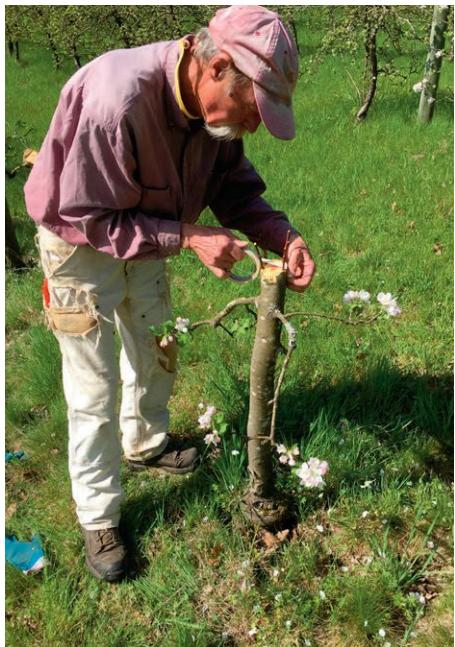
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pomace, is wrapped in cheesecloth and stacked on racks, then squeezed with the jack or hydraulic press. You want to extract as much juice as possible, so the pomace post-pressing feels like damp sawdust.

### BUYING JUICE

Pressing can be fun and give the cidermaker more control of the juice, but it requires additional equipment, can be quite messy, and demands a large amount of prep and

cleanup time. Many commercial cidermakers buy juice by the tanker load, and you can do so on a smaller scale. Look for unfiltered, fresh-pressed apple juice, ideally free of preservatives, which prevent spoilage but also inhibit yeast activity.

After pressing or purchasing juice, you have the option to add sulfites to prevent contamination by wild yeasts and bacteria. Sulfite additions are very complicated, and their effectiveness varies wildly with juice pH and microbial load. You want added sulfites to become “bound” and drop out prior to pitching yeast. Sulfites are allergenic and can be hazardous, so be careful using them. Many old texts recommend dangerously high dosages, and I would caution against adding more than 75 ppm of sulfur dioxide ( $\text{SO}_2$ ) to juice.

### TANNINS, TEA, AND HOPS

The body of a cider can be attributed to four main components: acidity, tannin, alcohol, and sweetness. Sharp apples have plenty of acidity and sugar to make alcohol but are distinctly lacking in tannin. Tannins are polyphenolic compounds that occur in plants and have an astringent character. They give wine red wine its fullness and lingering finish, while tannins in black tea deliver that characteristic mouth pucker.

There are many varieties of refined tannins for winemaking available, all with different sensory results. It's easy to add tannin to cider using different tannin-containing ingredients, such as tea, hibiscus flowers, hops, or berries. Oak aging can also contribute tannins, but use a light hand, as oak tannins are quite intense and can soon overwhelm a delicate cider.

### YEAST SELECTION

Traditional ciders are wild fermented with indigenous yeast from the apples, but modern ciders are generally made with wine yeast. Champagne yeasts are often recommended, but I find that they tend to produce austere, flinty ciders with little character. More estery and aromatic wine yeasts, or even ale yeasts, can add layers of nuance to a rather uninspired juice blend.

Yeast strain selection is really a personal preference, and as all the sugar in cider is fully fermentable fructose, even low-attenuating strains will ferment cider down to full dryness (0.997 or 0.998 terminal gravities are common). For fermenting sharps, I prefer to use an estery ale yeast such as Scottish ale or Irish ale, whereas for bittersweet I prefer a low-ester white wine yeast that doesn't interfere with the apple aroma. Some cidermakers employ lager yeasts to great effect.

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# CIDER RIOT! EVERYBODY POGO HOPPY DRY CIDER

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.048–1.052

**Final gravity:** 0.997–0.998

## JUICE

5 gal. fresh pressed,  
pasteurized dessert apple juice

## HOPS

3.5 oz. (100 g) Goldings hops,  
added with yeast

## YEAST

Scottish ale yeast

## ADDITIONAL ITEMS

10 g Hot Mix Sparkolloid  
As needed malic acid to adjust pH

## CIDERMAKING NOTES

Add juice to sanitized fermenter. If pH of juice is 3.8 or greater, add enough malic acid to adjust it to 3.7. Add hops and yeast. When cider reaches final gravity, boil Hot Mix Sparkolloid in 500 mL water for 30 minutes and add hot to the cider. Allow to settle for 1 week or more and then rack off of the sediment and keg or bottle.

## YEAST NUTRITION

Making sure your yeast stays healthy while it does its work is much more important for cidermaking than for brewing, as you are essentially feeding it candy. Many of the trace minerals present in wort are missing in apple juice. Conventionally grown dessert apples generally have plenty of nitrogen, due to its use as fertilizer, so adding diammonium phosphate (DAP) is not necessary, but a good source of organic nitrogen will keep the yeast from creating large amounts of sulfur compounds during fermentation. Yeast nutrients are often added after one-third of the gravity has been fer-



mented to help the yeast finish strong and healthy. A yeast hydration nutrient such as Go-Ferm can also ensure your yeast gets off to a good start.

Commercial cidermakers will try to encourage a rapid fermentation with Champagne yeast in order to get the sugar fermented quickly, but a slower fermentation rate is highly recommended to retain apple aroma.

Malolactic fermentation (MLF), or the conversion of malic acid into the softer citric acid by *Oenococcus oeni* bacteria, is important to some styles of cider. It produces light tropical aroma notes, a round creamy sensation in the finished cider, and the leathery, woody, “farmyard” character that is a hallmark of English and Norman farm ciders. Some yeast strains encourage malolactic fermentation, and MLF bacteria can be purchased to inoculate the cider.

## FININGS AND PRESERVATIVES

Once fermentation is complete, it's time to fine and rack your cider. Cider is a bit more difficult to fine than beer, as it does not contain proteins: it's hard for the fining agents to bond with yeast into clumps big enough to easily drop out of suspension. Gelatin can be very effective in fining cider, but it also strips tannin, so use it with care.

Often, getting a good bright cider means adding an auxiliary fining, which, like yeast, is negatively charged and will bond with the positively charged collagen finings (e.g., isinglass, gelatin) when those are added. Silica is a great example of an auxiliary fining, with silica gels such as silica

sol and kieselsol widely available for wine-making. If you prefer a vegan alternative to isinglass or gelatin, Hot Mix Sparkolloid yields great results in cider.

## BACKSWEETENING 101

Sugar has an important role to play in cider's body. Fully dry ciders are very refreshing and thirst quenching, but almost all commercial ciders are backsweetened to increase the level of sugar in the final product. Adding sugar to finished cider gives the yeast more food, and as many an aspiring cidermaker has discovered the hard way, can lead to “bottle bombs” unless handled correctly.

There are several options for avoiding bottle bombs: pasteurization, preservatives, refrigeration, and backsweetening with unfermentable sugar. The last of these is the most failsafe method. Many fitness companies sell pure sucralose, which is 600 times sweeter than sugar and is employed by commercial and hobby cidermakers in England as the sweetener of choice. As it is so intensely sweet, it must be added very judiciously. I find 200 to 400 milligrams in a 5-gallon (18.9-liter) batch is plenty for a semi-dry cider.

Sucralose adds sweetness but not much body, so many cidermakers prefer to use table sugar or even unfermented apple juice. Preservatives such as sulfites and sorbates can retard the refermentation process but will not completely stop it. Furthermore, they are potential allergens and can disguise the great flavors of the cider you've worked so hard to produce.



# COMMERCIAL CIDERMAKERS WILL TRY TO ENCOURAGE A RAPID FERMENTATION WITH CHAMPAGNE YEAST IN ORDER TO GET THE SUGAR FERMENTED QUICKLY, BUT A SLOWER FERMENTATION RATE IS HIGHLY RECOMMENDED TO RETAIN APPLE AROMA.

## THE P-WORD

Pasteurization has a bad rap in the brewing world, but not so when it comes to American cider production. Many cider producers, even those that add sulfites, will pasteurize their products so that they are shelf stable. To be effective, pasteurization must be done correctly; even some major players in the industry have had to recall product when pasteurization failed and it began fermenting on store shelves.

Most people probably have some concept of pasteurization from home canning, in which Mason jars are boiled in water baths. You don't want to cook your cider or beer, so a longer-duration, lower-temperature pasteurization is desired.

For homebrewers, a mash tun makes a great pasteurization vessel. Heat the water to the desired temperature and place your bottles of cider inside until you have reached the appropriate internal temperature for the proper length of time—10 minutes at 160°F (71°C) should do the trick. Remove the bottles from the pasteurization bath and place them in cool water to help them cool down.

If you pasteurize, of course, you will not be able to bottle condition, so do so after bottle conditioning or force carbonate the cider. If you don't pasteurize, just make certain your cider is totally dry: even the slightest trace of yeast will ferment every last scrap of sugar remaining in the cider.

## RESOURCES

1. *Ciderology* by Gabe Cook
2. *Cider Made Simple* by Jeff Alworth
3. *Craft Cidermaking* by Claude Jolieceur

*Abram Goldman-Armstrong made his first batch of cider in 1995 with a cheese grater and two plates for a press. He founded Portland, Oregon's Cider Riot in 2013 and is now the cidermaker for Tall Ship Craft Cider and Fjordfolk Mikrobryggeri in Sandefjord, Norway.*



## SEMI-DRY APPLE CIDER

**Batch volume:** 5 U.S. gal. (18.9 L)  
**Original gravity:** 1.048–1.052  
**Final gravity:** 0.997–0.998

**JUICE**  
5 gal. fresh pressed, pasteurized dessert apple juice

**YEAST**  
White wine yeast

**ADDITIONAL ITEMS**  
Yeast nutrient  
10 g Hot Mix Sparkolloid  
10g black tea

**CIDERMAKING NOTES**  
Add juice to sanitized fermenter. If pH of juice is 3.8 or greater, add enough malic acid to adjust it to 3.7. Add yeast and allow to ferment one-third the way to terminal gravity before adding yeast nutrient. When cider reaches final gravity, boil Hot Mix Sparkolloid in 500 mL water for 30 minutes and add hot to the cider. Allow to settle for 1 week or more and then rack off of the sediment.  
Steep black tea in finished cider for 4 to 24 hours for tannin and color and then remove. Optionally backsweeten before bottling or kegging (see below).

**BACKSWEETENING OPTIONS**  
**Option 1: Unfermentable sugar**  
Mix 400 mg sucralose into 20 mL finished cider and add at kegging or bottling.

**Option 2: Fermentable sugar**  
Dissolve 15 oz. (420 g) dextrose into the cider. If kegging, immediately refrigerate and force carbonate. If bottling, pasteurize the bottles to ensure the sugar will not ferment.

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# MAKING HARD CIDER

## FROM JUICE

*By Jason Phelps*



We've got a full-blown, five-alarm cidermaking emergency right here! Apple season is over, fresh-pressed cider is nowhere to be found, but we still want to make hard cider. What do we do? Why not make cider from juice or concentrate? Resourcefulness is the homebrew way, so let's explore the fresh apple alternatives we can use to make a glass of hard cider!



Most of the apple juices we will work with are made from culinary apples that typically lack the complexity that makes for the most interesting hard ciders. The result is typically lightness in all regards, from nose to flavor to body. This isn't necessarily a bad thing, but sometimes the "naked" result can be a bit boring. Fortunately, there are tools and techniques we can use to transform these plain sources into delicious outcomes.

## THE BASICS

No matter how we make cider, our goals are likely the same. The way we achieve these goals is where a nontraditional approach differs from traditional cidermaking. When making cider we are typically looking to achieve the following:

- At least some residual apple character
- Light body
- Balanced acidity
- Drinkability!

Both traditional and alternative cidermaking can yield a range of styles, but lower-alcohol, carbonated versions are most popular. We're typically aiming for a dry-to medium-sweet beverage, and fruitied or spiced ciders are also possible.

The cidermaking process isn't really at all different when making it from alternative sources. Once you get your juices, other sugars, and fruits all mixed up, you can pitch the yeast and get fermentation going.

As with fresh cidermaking, the temperature of the must should be appropriate for inoculation with yeast, and you may need to allow a recently mixed must to warm up prior to pitching.

## SELECTING INGREDIENTS

When we can't get fresh pressed cider, it's time to head to the grocery store. There are several options available at the local supermarket, including frozen concentrate, shelf-stable juice, and refrigerated ciders.

In all cases, we are looking for sources containing no preservatives. Any sorbate or benzoate variations should be avoided due to the potential for yeast inhibition. Ascorbic acid, otherwise known as vitamin C, is fine, and the quantity typically found in apple juice is not known to cause

fermentation problems. Products that are pasteurized don't typically contain preservatives, but depending on the type of pasteurization, you might be able to taste the outcome of all that processing.

## Frozen Concentrate

Frozen apple juice concentrate is widely available, but quality can vary, and the outcomes are most often very simple and straightforward. I picked up Seneca-brand apple juice concentrate from my local store, which comes frozen in a 12-ounce tube. It measures about 1.180 on my hydrometer, so there's plenty of sugar. The flavor is unmistakably concentrated apple, and the balance leans much more sweet than tart or acidic.

One advantage of concentrate is that you can dilute it to a range of starting gravities to make beverages of different strengths without having to add other sugars as is common in many country wine-style recipes for making cider or wine from juices. Concentrate can also be used to chaptalize (increase the sugar content of) low-sugar apple juices to bump up the potential alcohol without adding much volume (and what volume is added is all apple).

## Shelf-Stable Juice

There are many shelf-stable apple juice options available to home cidermakers: some from concentrate, others straight juice; some organic, others conventional.

One grocery store-branded apple juice from concentrate is pasteurized, contains no preservatives, and measures about 1.046 with a hydrometer. Fermented dry, this would create a cider with about 6.5% to 6.7% alcohol by volume. This juice has a pleasant apple nose with some "cooked" character. The acidity is not as

# Short Cider

*Recipe courtesy Jason Phelps.*

There's no need to bottle or keg this easy cider: simply refrigerate it when it has reached your preferred level of sweetness to arrest fermentation and then pour straight from the fermenter. This is one of my favorite ways to enjoy fermented apple juice or cider. Very rustic!

|                          |                   |
|--------------------------|-------------------|
| <b>Batch volume:</b>     | 1 US gal. (3.8 L) |
| <b>Original gravity:</b> | 1.054 (13.3°P)    |
| <b>Final gravity:</b>    | 1.020 (5.1°P)     |
| <b>Alcohol:</b>          | 4.5% by volume    |

**FERMENTABLES**  
1 gal. (3.8 L) pasteurized, organic apple juice

**YEAST**  
3 g Lallemand Belle Saison

**CIDERMAKING NOTES**  
Transfer juice to a fermenter, or pour some juice off into a glass for drinking and use the container it comes in! Allow it to come up to room temperature if needed. Sprinkle yeast over the top, gently mix (or lightly shake), and then seal with an airlock.

Ferment cider at room temperature for 24–36 hours and check the gravity. When the gravity has fallen to 1.020, refrigerate to slow fermentation and flocculate some of the yeast. Once the cider is cold, pour and enjoy.



# Who Tweaked My Cider?

Recipe courtesy Jason Phelps.

If you can't get real cider apples, use what you can! This cider uses acid and tannin additions to add complexity to plain store-bought apple juice.

**Batch volume:** 5 US gal [18.9 L]

**Original gravity:** 1.054 [13.3°P]

**Final gravity:** 0.995 [−1.3°P]

**Alcohol:** 7.7% by volume

## FERMENTABLES

5 gal. [18.9 L] pasteurized local grocery store brand apple juice

## OTHER INGREDIENTS

1.25 tsp. [6 mL] winemaking acid blend

1.25 tsp. [6 mL] powdered grape tannin

6 g Fermaid-K (yeast nutrient)

2.5 g diammonium phosphate (yeast nutrient)

7.5 g potassium sorbate

1.7 g potassium metabisulfite

## YEAST

10 g Lalvin DV10

## CIDERMAKING NOTES

Add the acid blend and grape tannin with the juice to the fermenter and follow the Pantry Cider recipe through stabilization. Finish and package as desired.



Brew  
This!

sharp as that of fresh cider; this is a sweet drinking juice. I've made cider from juices like this a number of times, and on many other occasions I've added honey to make countertop cysers (apple mead) that we would drink at about 4% ABV while they were still fermenting.

Knowing the brands I might see in New Hampshire will differ elsewhere, I crowd-sourced the names of brands you may find in a much larger part of the United States. Brands to look for include Indian Summer, Sprouts, Martinelli, Musselman's, Tree Top, Full Circle Organic, Acme Signature Select, Motts, Kirkland Signature, Santa Cruz, Newman's Own, Whole Foods, Publix, Costco, and other "big box" house brands.

## Refrigerated Cider and Juice

Refrigerated cider or juice starts out much the same as what you get right off the press at a local mill, but it is then packaged for transport and retail sale. Containers of this type of cider are always kept cold, and unless they are sourced from a short distance away, are likely to be pasteurized. Some alternatively may contain preservatives to prevent fermentation, messes, and exploding containers.

This specific source is where I see preservatives having factored into errant ferments most often. It can be deceptive. It looks like a gallon of fresh cider. But, you have to check the ingredients list. While trying to ferment through preservatives can be attempted, the risk of yeast stress or an outright stall is worth considering.

One of my local markets has a house-branded, cold-pressed cider that is organic, unfiltered, pasteurized, and free of any other ingredients. It measures about 1.053 with a hydrometer, which would yield 7.4% to 7.6% alcohol by volume when fermented dry. This cider definitely has a much more "fresh cider" nose to it, and the complexity of the fruit aromas overall is noticeable. When drinking it, you get a more pronounced acidity, especially in the finish. While this juice is pasteurized, it does not exude a "cooked" character found in other sources.

Based on the sensory notes on the above products, it could easily be argued that there is an obvious hierarchy for the type of cider these products will create. Sure. If you did nothing else to the juices, fermenting them all with the same yeast to dryness,

you might easily be able to tell the differences. While the differences might still be noticeable, assuming a clean fermentation, it's worth considering how pleasant and drinkable (or not) the outcomes are. Making great drinking ciders is our goal, and there are things we can do to achieve that with a wide range of sources. Whether it's in a pinch or your secret weapon, we have options.

We can also blend these sources, especially when thinking about concentrates, to make different formulations of flavors, acidities, and sugars. And don't forget additional sugar if you need to boost the original gravity to a certain level. Honey, maple syrup, and brown sugar all pair really well with apple, each having its own flavors and plenty of fermentable sugar.

You can also introduce other flavors, too. Consider cherries, pears, white grapes, or ginger. All of these flavors can be very complementary to apple flavor. Such flavors can be added as whole fruit or juices during the initial ferment, but you can also delay them and use them for flavoring later. Or do both.

## ADDING FERMENTATION CHARACTER

One way to amp up almost any fermented beverage is to use a yeast that leaves an abundance of character in the finished product. You can do this because you like the outcome, but you can also do this to add complexity to a cider that might otherwise taste pretty mellow on its own.

Having used a number of different yeasts from the earliest days of my homebrewing, I've enjoyed learning about yeast this way. It wasn't until 2009 that I specifically sought to use a variety of yeasts on the same cider recipe to discover the character each would impart and see if anything interesting stood out.

I ended up using four different yeasts for that project, including Wyeast 4766 Cider, Wyeast 4184 Sweet Mead, Wyeast 4783 Sweet White Wine (Rudesheimer), and Fermentis SafAle US-05. All of them made pleasant, drinkable cider, but there were certainly differences, and some just drank a lot more quickly than others. I made two batches each from the first three yeasts to provide two "opinions" on the combination.

Wyeast Cider yeast to me produces a dry, tart cider that was the most one-dimensional of all the results. The US-05 cider was a tad fruitier in the nose and not so dry,



but quite enjoyable. The Sweet Mead yeast outcome wasn't all that different; it did have a bit more complexity in the aroma, but it was still light and dry. Wyeast's Rudesheimer created the most interesting cider, with a noticeable increase in body and definite nutty earthiness in each sip. No batch saw more contact time with the lees than the others, but I do suspect those nutty, earthy components may have been from lees contact with this particular yeast. I found the same outcome in two batches made with the same yeast.

Since this project, I have tried a number of additional yeasts to make cider, with these three being notable: Wyeast 3787 Trappist High Gravity, Fermentis Saflager S-23, and Lalvin 71B-1122. The character from the Trappist yeast was definitely a departure from typical cider ferments, with aromas and flavors that included some of the expected phenols and esters. Otherwise, the texture, body and overall character weren't that dissimilar to those of any of my other cider projects.

One autumn, I took a small amount of leftover sweet cider, added mesquite blossom honey, and pitched a couple of packets of Saflager S-23. I didn't make a starter or do any other prep work; I just pitched the yeast and placed the container in an area where the temperature remained between 45 and 50°F (4–10°C).

I actually forgot about that cider and freaked out when I remembered, worrying that the temperature had fallen enough to freeze it. I dodged that bullet and ended up with a fully fermented, fully flocculated cider with beautiful fruity aromas and a crisp, clean profile and just a touch of residual sugar. I bottled it as it was, and I am pretty sure it only lasted about two weeks.

Lalvin 71B-1122 is a great all-around wine yeast with an exceptional ability to metabolize malic acid into a softer, less aggressive form, which can be an asset for high-acid cider ferments. The acidity of fresh cider, of which malic acid is a primary type, can vary widely, particularly with season, so a yeast that can help soften excess acid is great to have on hand.

While you can use yeast character as a differentiator, there are additional options.

Brew  
This!



## Pantry Cider

Recipe courtesy Jason Phelps.

This flavorful cider relies on a bit of honey after stabilization for some sweetness in the finished product. The other recipes accompanying this article make use of the basic instructions provided in the cidermaking notes below.

For low-gravity ferments (less than 1.070, say), I typically divide the nutrients into two equal doses and feed the must 24 and 48 hours after pitch. It is worth noting that my yeast pitch rate is typically 2 g/gal. at this gravity and lower. I manually degas with a large spoon or paddle prior to adding powdered nutrients.

**Batch volume:** 3 US gal. (11.4 L)

**Original gravity:** 1.045–1.050 (11.2°P)

**Final gravity:** 0.995 (−1.3°P) post-fermentation, 1.005 (1.3°P) finished

**Alcohol:** 6.6–7.2% ABV post-fermentation, 6.4% ABV finished

### FERMENTABLES

3 gal. (11.4 L) pasteurized local grocery store brand apple juice

### OTHER INGREDIENTS

4 g Fermaid-K (yeast nutrient)

1.5 g diammonium phosphate (yeast nutrient)

4.5 g potassium sorbate

1 g potassium metabisulfite

8 oz. (227 g) honey

12 oz. (355 mL) hot water

### YEAST

6 g Fermentis SafAle US-05

### CIDERMAKING NOTES

Add the juice to your fermenter and take a gravity measurement. You can directly pitch the yeast, but re-hydrating it shortly before pitching can reduce lag time and lead to a healthier, cleaner fermentation. Gently mix the must, seal the fermenter, and affix an airlock.

At 24 and 48 hours after pitching yeast, degas the must and then add nutrients. Once fermentation ceases, i.e. the gravity has stabilized at or near the expected final gravity, rack the cider off the lees and stabilize with potassium sorbate and potassium metabisulfite. Clearing will proceed naturally after stabilization, but the degree of clearing will vary.

After stabilization, rack cider to another vessel and add 8 oz. (227 g) honey mixed with 12 oz. (355 mL) hot water to liquefy it, mixing well. At this point, additional clearing may occur, but unless the cider is very cloudy you can go ahead and keg it. Carbonate to the desired level of CO<sub>2</sub>; I typically start at 3 to 3.2 vol. (6–6.4 g/L) and adjust according to taste.



## OTHER ADDITIONS

What else can we add to the ferment that might help us increase the complexity of these alternative ciders we are making? As I sampled juices from my local grocery, I was reminded that these products are produced to drink as is, and many of them trend sweeter and less acidic than fresh-pressed ciders. This leads us to the first addition we could make: acid. Tweaking tartness increases the complexity of basic cider.

We do this simply by adding acid. Plenty of country wine recipes use culinary apples and other fruits to make wine, and adding an acid blend is common. The most precise way to determine how much acid to add for a particular acidity change is to measure

both the pH and the titratable acidity of the must and adjust based on that information and sugar content. This is outside the scope of this article, but we can fall back on our observations about the juices for guidance (within reason: we have to take care, as too much acid can inhibit yeast activity. A typical winemaking pH is 3.4 to 3.6).

Cold-pressed cider can have more perceptible acidity, and some can be fermented as is. Juices that don't have a clear, sharp tartness in the finish will benefit from some acid to keep them tasting "fresh" once fermented. Winemaking acid blends are commonly found on homebrew shop shelves, but you can also find specific types on their own, including citric, malic, and tartaric acids. I recommend starting with  $\frac{1}{4}$  to  $\frac{1}{2}$  teaspoon of winemaking acid blend per gallon of must (0.3 to 0.7 milliliters per liter). Add

it in fractions and use your taste for a read on the balance. This is good for an original gravity of about 1.050, fermented dry to yield about 7% ABV. Alcohol and any residual sugar will influence the amount of acid needed to achieve good balance.

Apples, like grapes, contain tannins in their skins, and some of this does make its way into fresh-pressed ciders. Tannin content varies from one type of apple to another, and it is less likely that store-bought juices will have been formulated with noticeable tannins, since their purpose is, again, general consumption.

Powdered grape tannin is also available through most homebrew shops, making it a convenient ingredient in home cider recipes. If you are unfamiliar with the breadth of expressions of tannins in wine and other beverages, there are a couple of exercises you can do develop more of an awareness of the effect of tannins on beverage texture.

First is to make a strong cup of black tea and let it cool a bit. Take a sip. The "fuzzy" feeling on your teeth and in your mouth is the tannin. Another exercise is to take a very small sip of a bold red wine. Before you swallow, run your tongue across the roof of your mouth. You can feel the tannins, which will range in size from small and soft to coarse and almost like a bit of fine sand.

The goal for an addition to cider would be to increase complexity and mouthfeel without introducing so much that you reach (or exceed) these tea and wine experiences. The recipe for Who Tweaked My Cider? accompanying this article suggests an initial amount of  $\frac{1}{4}$  teaspoon per finished gallon (0.3 mL/L), that can certainly be increased or decreased based on experience.

# Apples & Cherries Living Together

Recipe courtesy Jason Phelps.

This cider combines apple and cherry juices to delicious effect! I like FruitFast brand cherry juice concentrate, which has a sugar concentration of 68 Brix (1.341 SG).

**Batch volume:** 5 US gal. (18.9 L)

**Original gravity:** 1.060 (14.7°P)

**Final gravity:** 0.995 (–1.3°P) post-fermentation, 1.002 (0.5°P) finished

**Alcohol:** 8.5% ABV post-fermentation, 8.2% ABV finished

## FERMENTABLES

4 gal. (15.1 L) pasteurized local grocery store brand apple juice

64 oz. (1.9 L) tart cherry juice concentrate

64 oz. (1.9 L) water

## OTHER INGREDIENTS

6 g Fermaid-K (yeast nutrient)

2.5 g diammonium phosphate (yeast nutrient)

7.5 g potassium sorbate

1.7 g potassium metabisulfite

24 oz. (710 mL) apple juice concentrate

## YEAST

10 g Lalvin 71-B

## CIDERMAKING NOTES

Combine the juices and water to 5 make gal. (18.9 L). Follow the Pantry Cider recipe through stabilization. Rack the cider off the post-stabilized sediment and add the apple juice concentrate. Mix well. Keg and carbonate. The result is an ever-so-sweet cider with great cherry flavor and a nice tart finish!

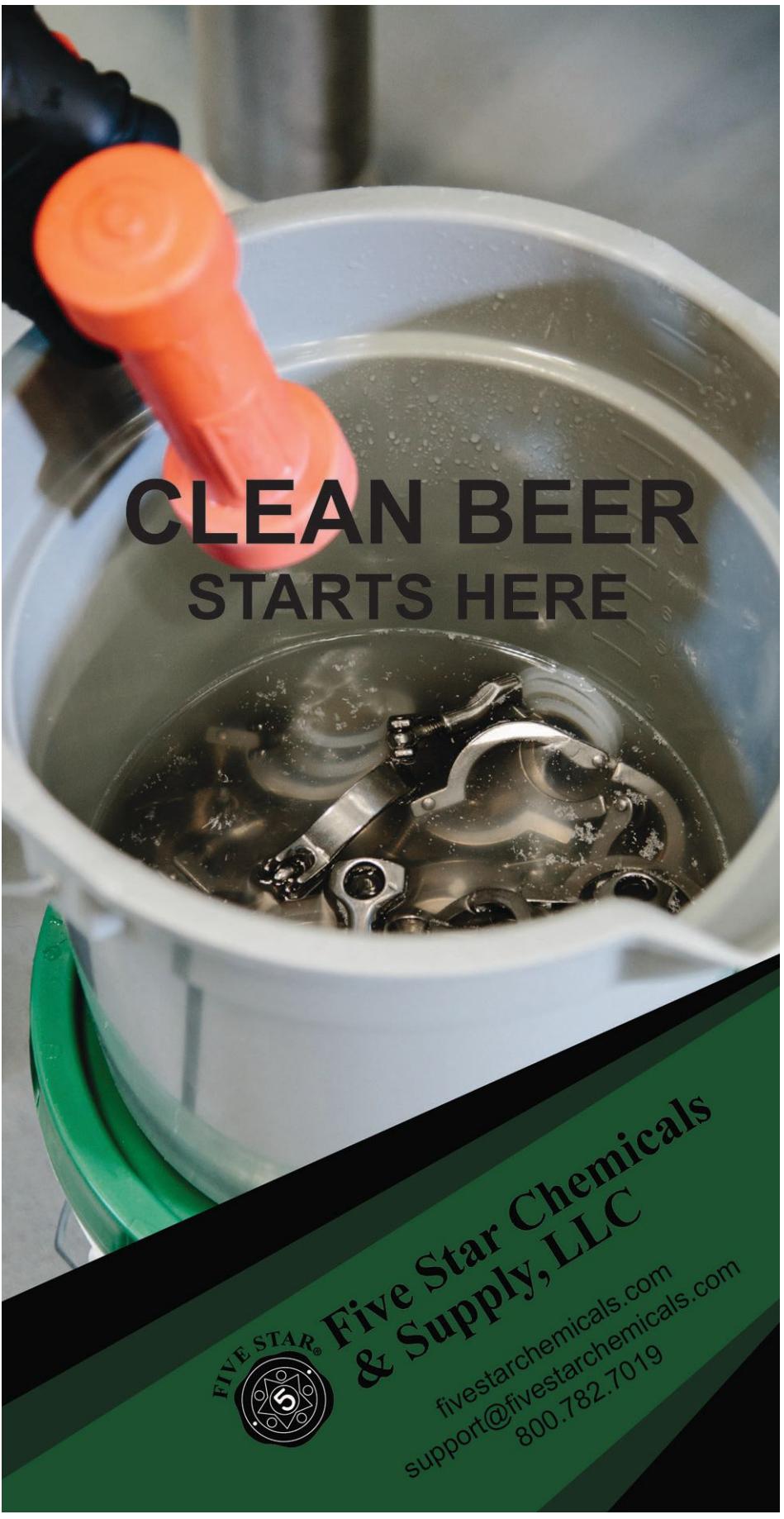


A blend of apple and cherry juices makes for a colorful fermentation.

## FINISHING OPTIONS

We've identified several alternative useful sources of apple juice and choices you have for fermenting the juices. Now let's review some ways to finish the cider before you package it.

If you like dry cider and have one with all the right aromas and flavors, you could go straight into packaging with that. Kegging is always an option, and after I started to keg at home in 2013, I soon realized how much less labor it is than bottling! I also found that kegging gives you precise control for creating just the right carbonation level for all kinds of ciders.



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Bottle conditioning dry ciders is much like bottle conditioning beer—you only need enough priming sugar and active yeast to carbonate the cider to a particular pressure. Excess sugar can create foaming or bottle bombs, so you can't expect to safely and reliably achieve a sweet, carbonated beverage this way.

Depending how sweet you like your beverages, one of the most common finishing options you have is to back-sweeten an otherwise dry cider. Not only does this add sweetness, but even small amounts of sweetness amplify the fruitiness of these beverages. Cider is often light in its fruity character anyway, so a small amount of sugar can amp the flavors up just enough to make a cider that much more pleasant.

In order to add sweetness in a cider after fermentation you stabilize it using potassium sorbate and potassium metabisulfite. This technique is often used in conjunction with cold crashing to help yeast flocculate so that the clearing cider can be racked off before stabilization. Reducing the amount of suspended yeast increases the efficacy of stabilization.

Mixing up a solution of your back-sweetening sugar (honey, maple syrup, brown sugar, etc.) and warm water is the easiest way to liquefy sugar for mixing into a finished cider. This is obviously going to introduce a dilution of the base cider, but you can account for this up front with this finishing step in mind.

I briefly mentioned fruit earlier when discussing ingredients, and even if you did use fruit in your ferment, you can also use it as part of back-sweetening! Many times when I've wanted to infuse fruit flavor, I have fermented the cider dry and added both fruit (whole or juice) and other sugars to the stabilized cider before it was kegged or bottled.

How about fruit and spices? Well, of course! Ginger is one of my favorite pairings with apples and ciders, but I've also seen happy consumers from pairings with cinnamon and hops as well.

The remaining considerations are all stylistic and creative. As always, make what you like, and if you really catch the bug, you'll start to try new things just because you can. The new loves I've discovered this way over the last 20 years would fill a highlight reel!

*Jason Phelps is cofounder and co-owner of Ancient Fire Mead & Cider in Manchester, N.H., which produces draft-style meads, wine-style meads, and ciders, all of which can best be experienced with a taproom visit.*

# KOMOS

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# THE LOST WHITE BEERS OF BELGIUM

By Roel Mulder

**W**hen summer comes, people all over Belgium flock to their favorite spot: the town square. Or at least that's what they do under normal circumstances. Every self-respecting Belgian café has a terrace with chairs and tables, where locals go to see and be seen. And to accompany this, they have the quintessential Belgian summer drink: white beer, a refreshing, pale yellow brew served in glasses shaped not unlike flowerpots. Cloudy and served with an optional slice of lemon, white beer, or *witbier*, can also be found in many American taprooms.

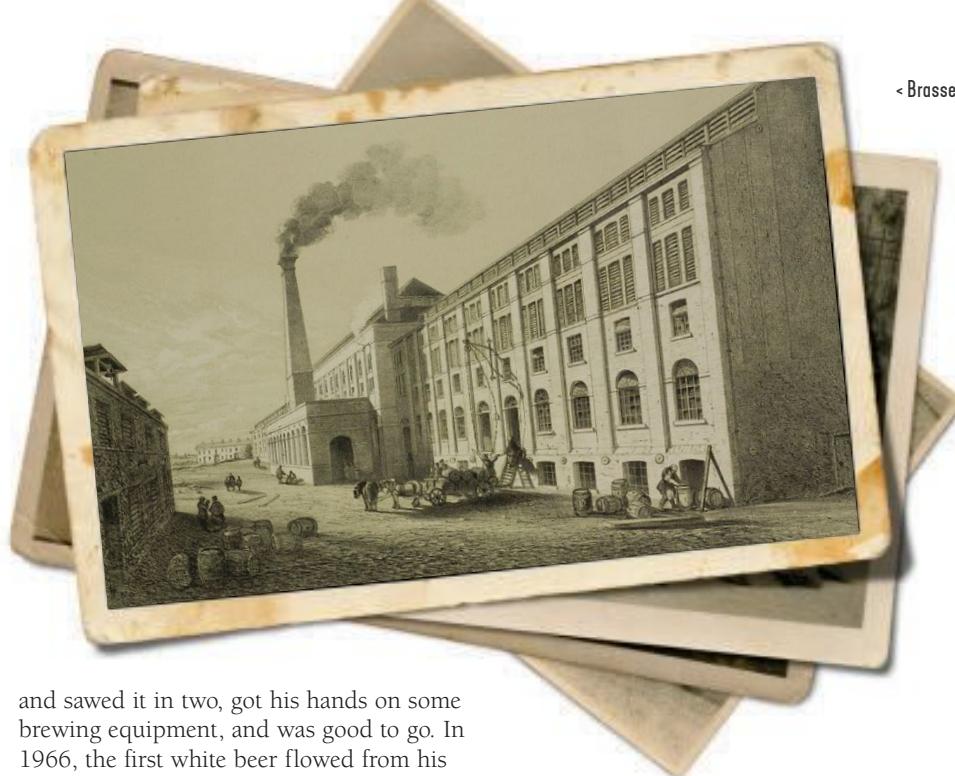
Nowadays, Belgian-style white beer usually contains 30 to 50 percent wheat. It is distinguished from its German counterpart, weizen, by the use of raw wheat in the grist and spices like coriander in the boil. White beer seems to be everywhere, not just in its home country. Belgian white beer is sold, imitated, and enjoyed worldwide. Therefore, it's easy to forget that it was almost lost for good. Its survival can be

credited to one man, and its story is one of Europe's first craft brewer and of the biggest brewery in the world.

## BELGIUM'S FIRST CRAFT BREWER

In the early 1960s, Pierre Celis was a simple milk seller in Hoegaarden, a sleepy village in the rolling hills of Flemish Brabant. Once it had been renowned for its white beer, but those times were long gone—Hoegaarden's last traditional brewery, Tomsin, had closed its doors in 1957. Pierre, who had often lent a hand there in his younger years, must have regretted seeing the old mash tun and the other utensils being sent away to a museum. Hoegaarden's white beer was now officially history.

Or, rather, it would have been were it not for Pierre Celis's entrepreneurship and thirst. Deprived of his favorite beverage, he decided he had to brew it himself. Mr. Tomsin was happy to scribble down the old recipe in a small note, "for my friend Pierre." Celis bought an old wine barrel



< Brasserie La Vignette Leuven ca. 1850 (KU Leuven Lias)

and sawed it in two, got his hands on some brewing equipment, and was good to go. In 1966, the first white beer flowed from his kettles. He was then 41 years old.

Celis had no education as a brewer. He had no commercial plan to speak of. He was driven only by passion and curiosity. In other words, Pierre Celis arguably was the first “craft brewer” of Belgium, perhaps even in all of Europe. Sure, there were still plenty of traditional and small-scale breweries around, but Celis was the first to start from scratch. Most people who knew about his tiny startup must have thought he had lost his mind.

There was nothing to suggest his plan would enjoy even the slightest bit of success. In those days, the Belgian beer market was headed in the direction of mass production and uniformity. Small breweries were losing out to big lager. Who on earth was going to buy the turbid, tart white beer that Celis didn’t even advertise?

Well, quite a lot of people, as it turned out. Right from the start, production grew

and grew. First, Celis’s beer became a local phenomenon. Then it got attention nationwide. By 1975, Celis was exporting small quantities to the United States. In 1979, he moved to a larger plant further down the road. Things were going great, and Celis added other beers to his line of products, some based on other all-but-vanished Belgian beers. For instance, another best-seller, Verboden Vrucht (“Forbidden Fruit”) was styled after the once-famous Diest beer.

Then, disaster struck. The brewery burned down. But, more on that later. First, let’s see where white beer came from and how it was brewed before Celis.

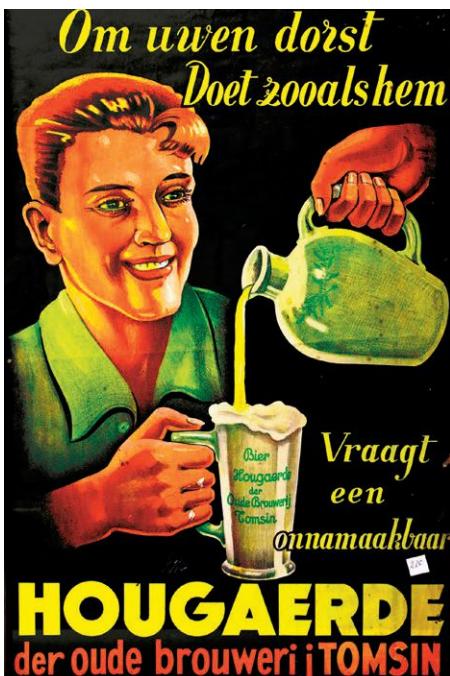
## LEUVEN, EUROPE’S LONGEST BAR COUNTER

The historic duchy of Brabant, a region now split between Belgium and The Netherlands, was once the heartland of white beer. The first sources on white beer date from the early 16th century, when tiny Hoegaarden suddenly conquered large chunks of the beer market. A century later, the village was home to only 1,200 inhabitants, but also to 20 breweries—one brewery for every 60 villagers!

Another center of beer exports was Leuven. Today, this lively city is less well-known than tourist favorites like Bruges, but it certainly merits a visit. Leuven is graced by the Gothic Saint Peter’s church and an impressive historic city hall. Furthermore, a university was founded there in 1425, the first in the Low Countries. Student life in Leuven continues to flourish to this day, no doubt to the great satisfaction of the city’s brewers. It is home to “Europe’s longest bar counter,” the rectangular Oude Markt square, which consists mainly of cafés.

Leuven’s beer production really gained momentum in 1752, when a canal was opened that made exports to other regions even easier. Within twenty years, the city’s production doubled, and 80 percent of Leuven’s beer was shipped to other cities and regions.

One of the brewers to benefit from this was Leonard Artois, whose grandfather had bought Den Hoorn (“The Horn”) brewery in



< Left to right:  
KADOC Advertisement Hoegaards bier;  
Gordito1869 - Hoegaarden.



1717. In the late 18th century he moved the company to the starting point of the canal. As we will see, this proved to be a decisive moment in the company's history—and in beer history in general.

### GOOD SACKS AND FAT SACKS

What was Leuven's white beer like? Most relevant information dates from the 19th century, when the brewing process was approached more scientifically than it had been earlier. In 1823, Artois was Belgium's first brewer to install a steam engine. A few years later, an old nunnery further down the road was converted to a steam-powered brewery so big that it was known as the "monster brewery." It was set up by French brewing engineer Georges Lacambre, who perfected white beer production there.

Lacambre (1811–1884) also authored a brewing manual. Published in 1851, his *Traité complet* remained a work of reference for Belgian brewers for years to come. Naturally, it also describes the process of making Leuven's white beer. And what a process it was. To our modern eyes, brewing white beer in Leuven was a hopelessly complicated, if not utterly daft affair. Yet, apparently at the time, it must have been a completely rational way to successfully produce a popular beer.

First, there was the malt. Only wind malt was used—malt that had not been kilned but merely left to dry in the wind. The barley was spread out in thin layers on racks in enormous attics. These malt attics of Leuven were the domain of *zolderboeren*, which means "attic farmers." They were the workers who frequently turned the malt with their rakes. The result was the palest malt possible. Of course, another advantage of wind malt was that it saved fuel costs.

Wind malt usually comprised 45 to 55 percent of the grain bill. Unmalted wheat

Every self-respecting Belgian café has a terrace with chairs and tables, where locals go to see and be seen. And to accompany this, they have the quintessential Belgian summer drink: white beer.

accounted for 44 to 56 percent, and finally there was 6 to 12 percent of oats. Two days before brewing started, the grain was divided into two parts and then milled separately. Three-fifths of the grist was kept apart under the name of *goedzakken*, which means "good sacks." Seventy-five to ninety percent of the *goedzakken* was barley malt. The other two-fifths of the grist, mainly wheat, were the so-called *vetzakken* or "fat sacks." Their respective roles during the brewing process will become clear shortly.

A typical Leuven brewhouse was bewilderingly complicated. There usually were three boiling kettles—the flour kettle, the hop kettle, and the water kettle—and one or two unheated mash tuns with false bottoms. There was a lauter tun, and wort was cooled in coolships, broad wooden vessels similar to those still used in lambic brewing today. These coolships, however, did not primarily serve to inoculate wort with wild yeast. Leuven brewers actively added yeast.

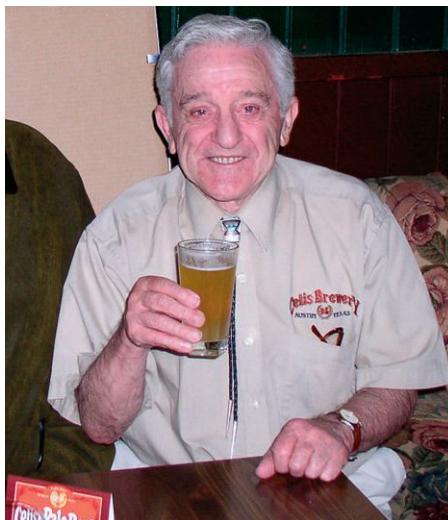
The milled *goedzakken* were placed in the mash tun, and water was poured over the grain. Six to nine men stirred the mash thoroughly, after which the wort was extracted, partly through the false bottom, partly with so-called *stuikmanden*, solid wicker baskets that were pushed into the mash from above. Wort would flow into the baskets through the holes, after which it could be spooned out. In this way, two or three mashes were made using water of higher temperature than that of the previous mash. (For more on *stuikmanden*, see Roel Mulder's article "Lost Belgian Beers: Liège Saison" in the Sept/Oct 2019 issue of *Zymurgy*.)



This wort was used to fill the flour kettle, and when it was almost full, the *vetzakken* were poured into the kettle. It's a rather unique practice that I haven't found elsewhere. The kettle was then slowly heated up and finally brought to the boil. As one would expect, the contents needed to be thoroughly and continuously stirred to avoid burning.

Meanwhile, the process of extracting wort from the *goedzakken* in the mash tun continued with new infusions of water. The resulting wort was sent to the hop kettle, where it was boiled with old hops, mainly from Aalst, a city halfway between Brussels and Ghent. The spent grains were put into the lauter tun to be used as a filter bed through which the worts from both the hop kettle and from the flour kettle were sent to the coolers.

The worts were then combined in a single vessel, and yeast was added. Then, the wort was transferred to wooden barrels and left to ferment. After five or six days, the main fermentation was complete, and the beer was ready to be sent to the customers. White beer was drunk very fresh and had to be consumed within three weeks. After that, it would be too sour. White beer destined for other regions was often shipped while still fermenting!



<sup>^</sup>Trent Johnson - Pierre Celis.

## PEETERMAN

The rationale behind the process described above, seems to be that the *goedzakken* were used to obtain a fairly normal wort, and that most of the saccharification happened here. Often, as many as seven mashes were extracted from them. Then, the *vetzakken* were added to the strongest wort in the flour kettle, where at least some saccharification must have taken place. Yet it must have left a lot of starch and unfermentable sugars in the wort. Also, the *vetzakken* were responsible for most of the beer's (very much desired) turbidity. Only about half of the total wort was hopped, from which it follows that this was not a very hoppy beer. Formation of lactic acid was not shunned and probably was inevitable.

Alongside white beer, Leuven had another beer type, which formed about 20 percent of production: *Peeterman*. This term is in fact an old nickname for the people of Leuven themselves. Peeterman was heavier than white beer but brewed in a similar way. It was amber colored, contained no oats, and was made from a 50/50 blend of wind malt and wheat. Its darker color was caused by a longer boil, often four to five hours. Peeterman, which had a slightly longer shelf life but was rarely exported, was said to be "drink and food" at the same time.

## STELLA

Belgium was relatively slow at adopting lager brewing, which is why many old beer styles managed to survive until the early 20th century. Yet, industrial production was on the rise, and brewing center Leuven was no exception.

The fate of Leuven's white beer is best told by looking at the Artois brewery, already one of the city's biggest producers. In 1892–1893



# Leuven White Beer, 1851

This recipe employs a slightly simplified version of the complicated process used in Leuven throughout the 18th and 19th centuries. Getting everything at the right values might take some experimenting. For the rationale on the separate *goedzakken* and *vetzakken* grists, see the main article.

**Batch volume:** 20 L [5.28 US gal.]

**Original gravity:** 1.042 [10.5°P]

**Final gravity:** 1.021 [5.3°P]

**Efficiency:** 75%

**Color:** 3 SRM [6 EBC]

**Bitterness:** 10 IBU

**Alcohol:** 2.8% by volume

## MALTS & ADJUNCTS

1.85 kg [4.08 lb.] Pilsner malt

1.63 kg [3.58 lb.] raw wheat

220 g [7.8 oz.] flaked oats

## HOPS

30 g [1.1 oz.] traditional European hops

## YEAST

Witbier yeast

## BREWING NOTES

To do this the old-fashioned way, divide the grain bill into *goedzakken* and *vetzakken* grists. For the *goedzakken*, take 1.7 kg [3.75 lb.] of malt, 300 g [10.6 oz.] of wheat, and all the oats; the remainder will constitute the *vetzakken*. The idea is to conduct a fairly standard mash with the *goedzakken* grist. Then, place the first half of the runnings into the kettle and add the *vetzakken* grist. Leave this at 70–80°C (158–176°F) for 20 minutes and then boil for one hour. Keep stirring to avoid caramelization.

The remainder of the *goedzakken* wort is boiled separately with the hops for 1 hour. Filtering might be a problem, so use rice hulls or wheat husks as a filter aid. Another option is the traditional way: push in a basket (I used a plastic basket from a salad spinner), let the wort flow in, and just spoon it out.

Leave the wort to cool in a coolship or similar vessel for natural *Lactobacillus* inoculation. Combine the cooled *goedzakken* wort with the cooled wort obtained from the combined *vetzakken* and *goedzakken* boiled mash and pitch yeast. Drink fresh, within 3 or 4 weeks after primary fermentation.

Artois built a new brewhouse equipped for producing bottom-fermented German beers. A definitive sign that new times had come was the introduction of the luxury Pilsner Stella Artois in 1926. By the eve of the Second World War, only nine percent of production at Artois was still top-fermented.

After the war, white beer and Peeterman were discontinued for good. Artois was buying and closing breweries all over Belgium and made its Stella the best-selling beer in the country. It didn't end there: a merger with Piedboeuf from Liège in 1988 created Interbrew, one of the founding companies of AB InBev, the largest brewery in the world. AB InBev is a mega brewer that, after first disavowing white beer, is now one of its biggest producers.

## NATURAL YEAST

Back to the brewing village of Hoegaarden. Its white beer used to be regarded as somewhat simpler than its Leuven counterpart. "Its raw taste has something wild about it," Georges Lacambre wrote. In fact, he looked down on it a bit: its high starch content was an indication of inadequate brewing methods, he thought. Generally, Hoegaarden's white beer contained more barley, and there were no separate *goedzakken* and *vetzakken* grists. All of the grain was put in the mash tun at once, though a few mashes were boiled separately, only one of them with hops.

Traditionally, in Hoegaarden no yeast was added. Indeed, it was spontaneously fermented, just like the famous lambic



Brew  
This!



# Hoegaarden white beer, 1851

Making this version of white beer is much less complicated than brewing its Leuven counterpart. The tricky bit is letting the spontaneous fermentation kick in.

**Batch volume:** 20 L (5.28 US gal.)

**Original gravity:** 1.036 (9°P)

**Final gravity:** 1.018 (4.6°P)

**Efficiency:** 75%

**Color:** 3 SRM (6 EBC)

**Bitterness:** 19 IBU

**Alcohol:** 2.4% by volume

## MALTS & ADJUNCTS

2 kg [4.41 lb.] Pilsner malt

730 g [1.61 lb.] raw wheat

450 g [1 lb.] flaked oats

## HOPS

40 g [1.4 oz.] traditional European hops

## YEAST

None!

## BREWING NOTES

Mash in cool to lukewarm water and then draw a “first mash” into a kettle by running off wort and/or spooning it out from above using baskets. Pour more boiling water onto the grain and draw a “second mash” into the kettle together with the first mash. Bring the combined mashes to a boil. Add more boiling water to the grains, stir, and rest 30–45 minutes. Drain this “third mash” into a separate kettle and boil 90–120 minutes with the hops. Meanwhile, pour the boiling combined first and second mashes over the grain and once again remove the resulting liquid, combining it with the hopped wort after the main boil. Cool the wort in the open air and allow to spontaneously ferment. Drink fresh, within 2 or 3 weeks.

beers of Brussels. Whereas lambic was kept for several years, the beer of Hoegaarden was drunk extremely fresh. Fermentation kicked in relatively quickly, after which the beer had to be consumed within 8 to at most 15 days in summertime. For that same reason, it was brewed year-round.

The question is, of course, did Pierre Celis also ferment his white beer spontaneously when he restarted its production in 1966? Probably not. Actually, the version of white beer made by Celis and those who came after him differs in many ways from the old recipe. The oats, still used by Celis in the 1970s, have by now completely disappeared. The coriander and orange peel that today we think of as typical for white beer, are absent from the old Belgian white beer recipes and from Tomsin’s 1957 version.

Celis actively added yeast, although it was kind of wild. “Most other beers today are produced with cultured yeast, cultivated in laboratories,” he said. “Hoegaarden only is Hoegaarden because of its old natural yeast.” He compared his methods to the sourdough in bread. In any case, Celis’s

white beer was still sweet, sour, tart, and not pleasing to everyone’s palate.

Pierre Celis’s story is telling of how a brewer’s life can go. In 1985, his brewery was destroyed by an enormous fire. Undeterred, he started rebuilding his company, but a lack of funds forced him to call upon financial aid from, ironically, mega brewer Artois from Leuven. Once they were on board, they were quick to let quantity prevail over quality. In 1990, Celis sold them the rest of the plant. Hoegaarden is now a 100 percent AB InBev-owned brand. Pierre Celis then moved to the land of his dreams: the USA. In 1992, he started his own brewery in Austin, Texas, and in 1999 he came back to Belgium, where he created his Grottenbier (“cave beer”).

Pierre Celis died in 2011, 86 years old. Luckily, his beloved white beer lives on.

*Roel Mulder is a Dutch historian writing about beer history. He has written a book about Dutch beer including historical recipes and is currently researching the origins of the many Belgian beer styles.*



Brew  
This!



# Peeterman, 1851

This is the amber-colored luxury variant of Leuven’s white beer. Originally, most of the amber color was obtained by boiling for several hours. You may want to add some color and/or caramel malt to simulate this. As with Leuven’s white beer, the grist is separated into goedzakken and vetzakken grists.

**Batch volume:** 20 L (5.28 US gal.)

**Original gravity:** 1.060 (14.7°P)

**Final gravity:** 1.030 (7.6°P)

**Efficiency:** 75%

**Color:** 12 SRM (24 EBC)

**Bitterness:** 18 IBU

**Alcohol:** 4% by volume

## MALTS & ADJUNCTS

2.63 kg [5.80 lb.] Pilsner malt (add color malts if necessary)

2.63 kg [5.80 lb.] raw wheat

## HOPS

50 g [1.8 oz.] traditional European hops

## YEAST

Witbier yeast

## BREWING NOTES

If you want to follow the original method, split the grain bill into goedzakken and vetzakken grists. For the goedzakken, take 2.42 kg (5.34 lb.) of malt and 740 g (1.63 lb.) of unmalted wheat; use the remainder for the vetzakken. Again, conduct a standard mash with the goedzakken grist. Then, place the first half of the runnings into the kettle and add the vetzakken grist. Leave this at 63–68°C (145–154°F) for 90 to 120 minutes, and then boil for one hour. Stir to avoid too much caramelization.

The remainder of the goedzakken wort is boiled separately with the hops for 2 to 3 hours. Leave the wort to cool in a coolship or similar vessel for natural *Lactobacillus* inoculation. Combine the cooled goedzakken wort with the cooled wort obtained from the combined vetzakken and goedzakken boiled mash and pitch yeast. Drink fresh, within 3 or 4 weeks after primary fermentation.



# Milkshake IPA

## Demystified

By Christiana Bockisch

The milkshake IPA—you might think craft beer has gone too far, or that it's an abomination, but it doesn't have to be! When I first heard the words "milkshake IPA" a couple of years ago, I cringed. My taste buds ran for cover. It sounded like a Leinenkugel fever dream. I had visions of a soupy IPA with a final gravity in the neighborhood of 1.025. After doing some reading, I found that the inventors of this concoction are Tired Hands Brewing of Pennsylvania and Omnipollo of Sweden.<sup>1</sup>

I was intrigued that Tired Hands was involved in this. Tired Hands is an excellent brewery and where I had my first hazy IPA: Alien Church. I was instantly hooked. I have tried a few commercial examples of milkshake IPA from various breweries since first hearing about the style. A small handful are very good, but the majority I have tried have one common flaw: they are

far too sweet. For a while, I stopped thinking about milkshake IPAs. At the time, I thought they were definitely a creative beer style, but it was not a style I was interested in brewing.

In June 2018, my aunt gave me about 10 pounds of homegrown Oregon strawberries, as she usually does. Not thinking much about milkshake IPAs at the time, I made a pale ale with them and was a little disappointed. It was mouthwateringly dry and not in a good way. Then I had an epiphany—the lactose in a milkshake IPA can balance the dryness and acids from fruit. The following year, I crafted a strawberry milkshake IPA using the homegrown strawberries, and it ranks in the top 10 beers I've ever made. →

When fruit is added to the fermenter, yeast quickly consumes the fructose, leaving behind water and natural acids. This can result in a very dry and sometimes tart beer if a large amount of fruit is added, which is why some brewers might reach for fruit flavors and tinctures rather than the real thing. Lactose is less sweet than table sugar and cannot be fermented by *Saccharomyces*. Lactose is therefore a more subtle and sophisticated way to back-sweeten milkshake IPA. By adding a low level of sweetness, the fruit acids in milkshake IPA are slightly offset, allowing the fruit and hop flavors to shine through.

### Style Overview

The base style of a milkshake IPA is a New England IPA, or New England Ale, as I argue they should be called (see “Rethinking NEIPA,” *Zymurgy*, Jul/Aug 2020). Adding fruit and lactose to this style makes it a milkshake IPA. Some versions contain vanilla, but this is an optional ingredient in my opinion. The malt bill should include flaked oats or wheat to provide a soft, rounded mouthfeel. Since NEIPA is the base style, haze is to be expected, and the beer can take on the color of the fruit added, as in Figure 1.

The aroma should be exceptionally fruity from hops and fruit. The flavor should be like that of NEIPA, but with even more fruit flavor and some vanilla presence, if used. It might have a slightly sweeter impression than NEIPA, but it should not be cloying. Some tartness from fruit is acceptable but should not dominate. It should also not be bitter like a West Coast IPA. In general, the style should be reminiscent of a milkshake or smoothie, but not so sweet and heavy to preclude drinking a full pint of it. It should be quaffable, not a sugary abomination.

### Water

The water profile for milkshake IPA should not be heavy in chloride without some sulfate backup. Many sources mention that NEIPAs should have more chloride than sulfate, with chloride concentrations greater than 100 parts per million (ppm).<sup>2,3</sup> Increasing the chloride-to-sulfate ratio is known to increase the sweet, malty profile of a beer, but milkshake IPA does not need help with sweetness! Lactose



**Figure 1:**  
Purple Stuff Blackberry milkshake IPA in a non-standard glass  
(Instagram trend approved!)

and hop- and fruit-derived fruity flavors are enough to provide a sweet impression. When overdone, chloride can lend a chalky, baby-aspirin mouthfeel. It should also not have a high sulfate water profile

like West Coast IPA. Go for a balanced sulfate-chloride profile with chloride no more than 100 ppm.

### Malt

Specialty malts, such as crystal, should be omitted or kept to a minimum. This beer can easily be made too sweet, and it is not a malt-forward style, so keep the malt bill simple. A small amount of Munich malt can subtly increase malt presence without overwhelming the palate or adding too much unfermentable sugar. The main infusion mash step temperature should be kept on the low end, no warmer than 152°F (67°C). This will prevent alpha amylase from producing too many long-chain, unfermentable sugars (oligosaccharides). Lactose should be added during the last 10 minutes of the boil at a rate of no more than 8 oz. per 5 gallons (12 g/L).

### Recommended Hop Pairings

|                        |                                                                                                                                               |                                                                                                                                                |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Berries</b>         | <ul style="list-style-type: none"> <li>• Ekuanot</li> <li>• El Dorado</li> <li>• Endeavor</li> <li>• Enigma</li> <li>• Epic</li> </ul>        | <ul style="list-style-type: none"> <li>• Glacier</li> <li>• Huell Melon</li> <li>• Mosaic</li> <li>• Pacific Gem</li> <li>• Simcoe</li> </ul>  |
| <b>Stone Fruits</b>    | <ul style="list-style-type: none"> <li>• Ahtanum</li> <li>• Amarillo</li> <li>• Bitter Gold</li> <li>• El Dorado</li> <li>• Galaxy</li> </ul> | <ul style="list-style-type: none"> <li>• Glacier</li> <li>• Idaho 7</li> <li>• Nelson Sauvin</li> <li>• Palisade</li> <li>• Wai-Iti</li> </ul> |
| <b>Tropical Fruits</b> | <ul style="list-style-type: none"> <li>• Azacca</li> <li>• Citra</li> <li>• Ekuanot</li> <li>• Galaxy</li> <li>• Hallertau Blanc</li> </ul>   | <ul style="list-style-type: none"> <li>• Huell Melon</li> <li>• Idaho 7</li> <li>• Mosaic</li> <li>• Motueka</li> <li>• Sabro</li> </ul>       |
| <b>Citrus</b>          | <ul style="list-style-type: none"> <li>• Amarillo</li> <li>• Azacca</li> <li>• Cascade</li> <li>• Cashmere</li> <li>• Centennial</li> </ul>   | <ul style="list-style-type: none"> <li>• Chinook</li> <li>• Citra</li> <li>• Galaxy</li> <li>• Hallertau Blanc</li> <li>• Jarrylo</li> </ul>   |
|                        |                                                                                                                                               | <ul style="list-style-type: none"> <li>• Motueka</li> <li>• Pacifica</li> <li>• Sorachi Ace</li> <li>• Strata</li> <li>• Zythos</li> </ul>     |

**Figure 2:**  
Fruit and hop pairings. This is not a complete list, and the rules are not hard and fast. Trust your palate and be willing to experiment!

## Yeast

My go-to yeast is Imperial Juice, but Imperial Barbarian is also a great option. In general, choose a British or American ale yeast that can produce a low level of fruity esters and is unlikely to stall out. Don't choose a yeast that you've struggled with on attenuation. Make a large enough starter to ensure a pitch rate of at least 1 million cells/mL<sup>°P</sup>. As mentioned before, it is easy to make this style too sweet. Good attenuation is your friend. Yeasts that flocculate easily can also tend to stall. This style is not supposed to be crystal clear anyway, so there is no need to seek out an overly flocculent yeast.

## Hops

Choose hops to match the fruit flavor profile. For example, Mosaic can offer berry flavors, and it plays well in the strawberry milkshake IPA recipe provided in this article. See Figure 2 for recommended hop and fruit pairings.

As for the hopping method, a majority of the hops should be added post-boil, in the whirlpool, and in the fermenter. A 60-minute boil hop addition should not be used. In fact, I have stopped using a 60-minute addition in most of my recipes, even for non-NEIPAs. I generally opt for a 30- or 45-minute addition. I have noticed that the bitterness is less harsh this way.

Milkshake IPAs are hardly IPAs in the traditional sense (personally I think it's a total misnomer) and should not have the bitterness of a West Coast IPA. There should be dry-hop additions during the active fermentation phase, but do not fear that the yeast will blow out all the hop aroma compounds with the escaping CO<sub>2</sub>. I, too, used to have this fear, until I finally tried it, and I became a believer! Yeast can bio-transform geraniol to produce fruity flavor compounds, like citronellol, linalool, and nerol,<sup>4,5</sup> that otherwise would not form in a traditional end-of-fermentation dry hop addition. A hop addition after active fermentation is also a good idea, but the mid-fermentation addition is key.

## Fruit

When choosing fruit, fresh is always better. I would avoid using frozen supermarket fruit or any canned puree. If you can, seek out fruit from a farmer's market or a pick-your-own farm. Better yet, grow it yourself! Add at least 1 pound of fruit per gallon (120 g/L). For milder fruits like strawberry, increase to 2 pounds per gallon (240 g/L).

My method for adding fruit might be considered uncouth. Sanitizing such large volumes of fruit would require more vodka than I'm willing to add to my beer, and



# Her Name Was Strawberry!

If you can get your hands on Oregon strawberries, do it! They are sweeter and more flavorful than the typical variety. They lack that white stuff in the center and are red all the way through. This varietal is much softer than normal strawberries and doesn't survive shipping well, so it can be hard to find outside of Oregon. They might be worth the trip, though! Oregon strawberry season starts in June.

**Batch volume:** 5.5 US gal. (20.8 L)

**Estimated efficiency:** 80%

**Original gravity:** 1.057 (14°P)

**Alcohol:** 6% by volume

**Final gravity:** 1.012 (3.1°P)

## Malts and Adjuncts

9 lb. [4.08 kg] Simpson Golden Promise malt

1 lb. [454 g] flaked oats

1 lb. [454 g] light Munich malt

## Hops

1 oz. [28 g] Mosaic @ 30 min

2 oz. [57 g] Mosaic, dry hop 4 days after

3 oz. [85 g] Mosaic, whirlpool

pitching yeast, removed on day 7

2 oz. [57 g] Mosaic, dry hop 24 hours after  
pitching yeast, removed on day 7

[57 g] Mosaic, dry hop 4 days prior to  
kegging

## Additional Items

8 oz. [227 g] lactose @ 10 min

11 lb. [5 kg] frozen and partially thawed strawberries,  
added on day 7

## Optional Items

1 vanilla bean, soaked in vodka at least 24 hours,  
added on day 12

## Yeast

Imperial Juice

## Water

Ca<sup>2+</sup>: 103 ppm, Cl<sup>-</sup>: 100 ppm, SO<sub>4</sub><sup>2-</sup>: 110 ppm

## Brewing Notes

Mash at 150°F (66°C) for 60 minutes with a target mash pH of 5.3. Boil 60 minutes, adding hops and lactose as indicated. Start fermentation at 66°F (19°C). Add the first dry hop addition one day after pitching the yeast. Add the second dry hop addition 4 days after pitching the yeast. Remove both dry hop additions and add the strawberries on day 7. Once fermentation begins to slow, raise the temperature to 68°F (20°C). If adding vanilla bean, add the bean and its vodka extract to the fermenter on day 12. Beer should be fully attenuated in 17–21 days. Keg when fermentation is complete. Air-free transfer recommended.

## Extract Version

Replace Simpsons Golden Promise with 5.75 lb. (2.6 kg) light dry malt extract. Steep the Munich malt and flaked oats for 30 minutes at 160–170°F (71–77°C), remove grains, and completely dissolve extract in resulting liquid. Top up with reverse osmosis water to desired boil volume and proceed as above.



Table 1: Other recipe variations to consider.

| Variation    | Fruit(s)                                   | Hops                | Other Ingredients |
|--------------|--------------------------------------------|---------------------|-------------------|
| Peach Pie    | Peaches                                    | El Dorado<br>Galaxy | Cinnamon          |
| Pina Colada  | Pineapple<br>Coconut                       | Strata<br>Citra     | N/A               |
| Orange Swirl | Fresh squeezed orange juice<br>Orange zest | Strata<br>Cashmere  | Vanilla bean      |



# Purple Stuff

**Post-boil volume:** 5.5 US gal. (20.8 L)  
**Original gravity:** 1.054 (13.3°P)

**Final gravity:** 1.010 (2.6°P)  
**Estimated efficiency:** 70%  
**Alcohol:** 5.8% by volume

## Malts and Adjuncts

10 lb. (4.54 kg) Simpson Golden Promise malt      1 lb. (454 g) flaked oats

## Hops

|       |                          |       |                                                                        |
|-------|--------------------------|-------|------------------------------------------------------------------------|
| 1 oz. | (28 g) Mosaic @ 30 min   | 2 oz. | (57 g) Mosaic, dry hop 4 days after pitching yeast, removed on day 7   |
| 3 oz. | (85 g) Mosaic, whirlpool | 2 oz. | (57 g) Mosaic, dry hop 24 hours after pitching yeast, removed on day 7 |

## Additional Items

8 oz. (227 g) lactose @ 10 min  
 7 lb. (3.18 kg) frozen and partially thawed blackberries, added on day 7

## Optional Items

1 vanilla bean, soaked in vodka at least 24 hours, added on day 12

## Yeast

Imperial Barbarian

## Water

Ca<sup>2+</sup> 103 ppm, Cl<sup>-</sup> 100 ppm, SO<sub>4</sub><sup>2-</sup> 110 ppm

## Brewing Notes

Mash at 150°F (66°C) for 60 minutes with a target pH of 5.3. Boil 60 minutes, adding hops and lactose as indicated. Start fermentation at 65°F (18°C). Add the first dry hop addition one day after pitching the yeast. Add the second dry hop addition 4 days after pitching the yeast. Remove both dry hop additions and add the blackberries on day 7. Once fermentation begins to slow, raise the temperature to 68°F (20°C). If adding vanilla bean, add the bean and its vodka extract to the fermenter on day 12. Beer should be fully attenuated in 17–21 days. Keg when fermentation is complete. Air-free transfer recommended but not required.

## Extract Version

Replace the Simpsons Golden Promise with 5.63 lb. light dry malt extract. Steep the flaked oats for 30 min at 160–170°F (71–77°C), remove grain, and completely dissolve extract in resulting liquid. Top up with reverse osmosis water to desired boil volume and proceed as above.

heating the fruit results in inevitable flavor changes or loss. Campden tablets have given me bad results. Instead, I freeze the fruit for at least 48 hours in a zipper or vacuum-sealed bag and then partially thaw in the refrigerator. Freezing has the added benefit of breaking down fruit cell walls to release more juice and flavor into the beer.

I also do not rack to secondary. Racking what is essentially a NEIPA, one of the most oxygen-sensitive beer styles, can utterly destroy it. The yeast cake will not suck down all the fruit flavors and make a bland beer. The yeast will not spontaneously autolyze and ruin it either. It will be fine. In the words of Charlie Papazian, “Relax. Don’t worry. Have a homebrew.” Plus, yeast needs to be there to ferment the sugars from the fruit.



After partially thawing the fruit, squish and squeeze the bag to muddle the fruit chunks and further break down the cell walls. Sanitize the plastic bag, transfer the fruit to a sanitized muslin bag, and gently add it to the beer under a stream of CO<sub>2</sub>, if possible. The beer will begin fermenting again in a day or two once the fruit fully thaws. Fermentation, in my experience, terminates in 10 to 14 days. Given the oxygen sensitivity of this beer style, it is important to package it as soon as it is fully attenuated.

## Optional Vanilla

If you want to add vanilla, it is best added to the fermenter, after the fruit is done actively fermenting. I have tried adding vanilla bean to the boil and found that the flavor is essentially non-existent in the final product. Start small with the vanilla addition, one vanilla bean for 5 gallons (18.9 L). Add a second bean if the flavor is too mild for your liking. Many commercial examples, in my opinion, have an obnoxious amount of vanilla, so be cautious.

Split the vanilla bean lengthwise and cover it with a minimal amount of vodka. You can scrunch the bean down into a Mason jar and then add the vodka to cover. Let it sit for at least 24 hours, and up to a week. Add the bean and all the vodka to the fermenter five to seven days before you plan to package. If you can easily sample your batch without introducing too much oxygen, try it three days after adding the bean to see how the flavor is progressing.

I have also read about brewers adding straight vanilla extract, starting at 0.5 Tbsp per 5 gallons (2.5 mL/L), but I have not tried this yet.

### Kegging and Bottling

Packaging milkshake IPA can be a challenge for the same reasons it can be for NEIPA. Oxygen can turn that bright, juicy beer into brown cardboard water if precautions are not taken. Instead of bottling, I advocate for kegging this style using air-free transfer methods if possible (unless, of course, you have invested in a canning setup with a counterpressure filler). If you are constrained to bottling, use the usual best practices for avoiding oxygen introduction—avoid splashing, get it transferred and capped quickly, and keep the beer covered as much as possible. Let the beer condition at room temperature for the minimum amount of time before refrigerating. If you are constrained to bottling, consider choosing a fruit that is high in antioxidants and ascorbic acid (vitamin C), since these compounds are natural oxygen scrubbers. Still, kegging is generally the best way to go for milkshake IPA and NEIPA styles on a homebrew setup. See Table 1.

To sum up, a well-made milkshake IPA should have the following characteristics:

- **Aroma:** Strikingly fruity from both the hops and the fruit. The vanilla can have an aromatic presence if added. Little to no malt aroma.
- **Appearance:** Hazy, and can take on the color of the fruit added. If fruit does not impart significant color, the color should be pale to straw. Head can be white or can take on the fruit color.
- **Flavor:** Juicy, fruity, and similar to a smoothie or milkshake, but without being too sweet or cloying. Bitterness should be very subdued. A mild amount of tartness from the fruit is acceptable, but it should not be sour. Malty or caramel flavors are inappropriate.
- **Mouthfeel:** Medium to medium-full bodied, primarily from adding oats or wheat. Should not feel too creamy, nor should it be astringent.
- **Overall impression:** A NEIPA with an even stronger fruit presence. It can be on the sweeter side, but not so much that you wouldn't want a full pint of it—or a second!

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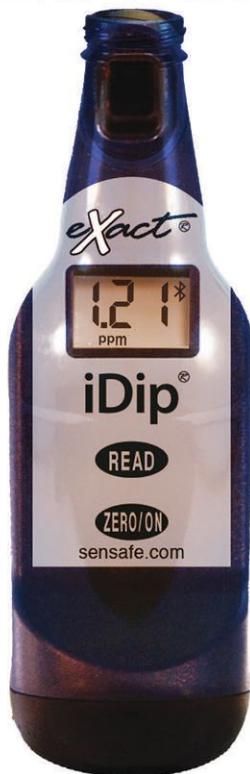
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R0719





# BRITISH HOPS

TRADITIONAL AND MODERN

By Felicity Beaumont

The British climate is the wettest maritime hop growing climate in the world. New Zealand also has a maritime climate, but if you've been there, you know New Zealand is much warmer in the summer and much colder in the winter than the UK. Like New Zealand, Central Europe's Continental climate is also hotter in summer and colder in the winter than Britain's.

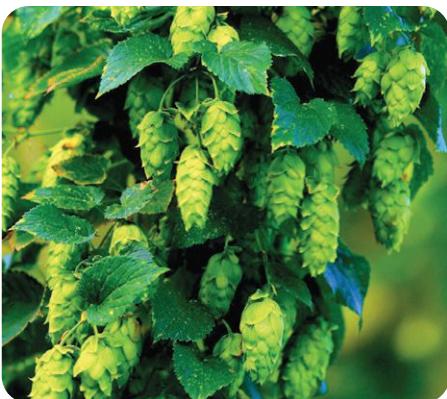
Washington's Yakima Valley is a semi-arid zone, mostly irrigated desert, where hops could not grow without irrigation. Little to no irrigation is needed for British hops because they are often grown on lovely, heavy clay soil, and there is plenty of rainfall in England. Even in a dry spell, there's usually enough water down below to nourish hops' deep roots, making British hops among the world's most sustainable.

Hops are grown in two distinct areas in Britain: Herefordshire/Worcestershire and Kent/Suffolk. Growers in Kent and Suffolk refer to their fields as *hop gardens*, while those in Herefordshire and Worcestershire call them *hop yards*. Beyond this, there are no significant differences in the hops produced because all British hop growers enjoy the same maritime climate and terroir responsible for British hops' unique characteristics.

Regardless of where they are grown or what you call the field in which they're grown, all hops are harvested just once a year, typically September and October in the Northern Hemisphere and March and April in the Southern Hemisphere.



The Bruff hop machine.



Hops ready for the plucking.



## THE HOP HARVEST AT STOCKS FARM

The Capper family purchased Stocks Farm in 1963, but records indicate there has been a fruit and hop farm here for at least 200 years. The area, situated on the border of Herefordshire and Worcestershire, shows evidence of large investments in hops in the 19th century and later. Oasts dot the horizon, including one attached to the Stocks Farm farmhouse.

The farm occupies around 200 acres—half produces dessert apples and cider apples (see “Cidermaking for Brewers” in this issue of *Zymurgy* for more on cider

apples), while the other half is dedicated to hops. Currently, 10 varieties of hops are grown on those 100 acres, in addition to several trial varieties. These trials represent potential favorite hop varieties in the future, so they are monitored closely throughout the season to see how they perform and discover the flavors they produce.

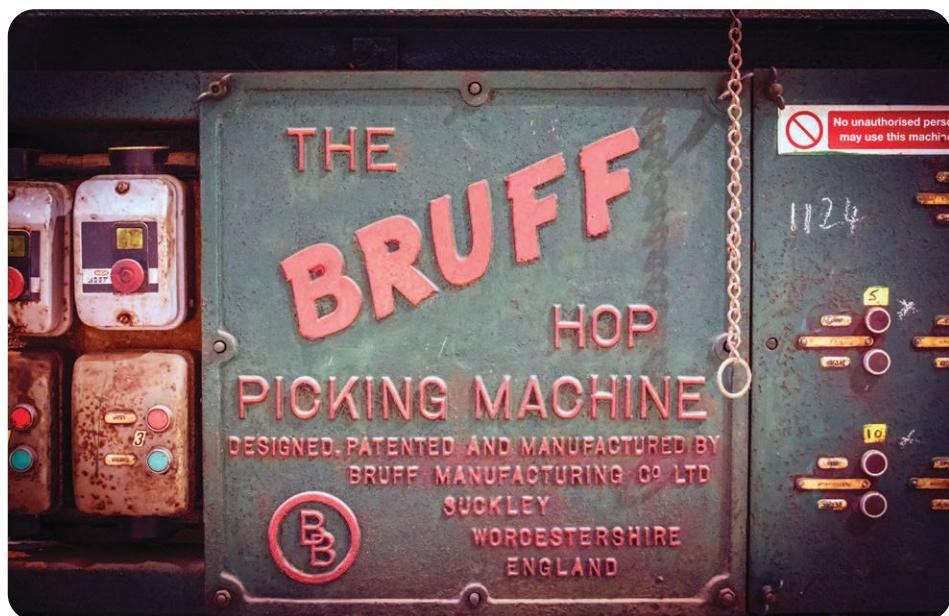
Hop picking takes place over six weeks in September and October each year. We welcome our regular hop pickers back at the end of August, and we feel lucky that the same families have returned for

decades—it’s always a pleasure to catch up with them. There is a tense week during which early hop varieties are regularly checked to determine their fitness for harvest. A couple of varieties compete to be the first picked, and then the date is set. Our quiet farmyard then becomes a busy, frenetic place where tractors and trailers make regular trips to the hop shed to unload their aromatic bounty.

The hops are removed from the bine by our harvest workhorse, the Bruff hop picker. The Bruff has been at Stocks Farm since the early 1960s, and it didn’t have far to travel as it was manufactured less than a mile away in our village. It’s a brilliant example of British engineering—simple but robust—that continues to be highly regarded in the industry.

The Bruff works on the principle that hop cones are heavier than the leaves and uses gravity to separate them. Bines enter the shed from the field and are mounted upside down onto the track. From this point, bines are stripped and the hop cones begin their journey. They travel along sticky belts, through rollers, and past fans before finally going along the waterfall belt and up into the kilns to be dried.

It takes 20 minutes for bines to travel from field to kiln, with the Bruff processing a staggering 19 bines per minute. The process is noisy, but the hum of the machine is a welcome sound during harvest, and the hop shed becomes highly aromatic with the aroma of freshly picked bines.





The hop harvest begins.

The hop kiln operates 24 hours a day—were the hops not dried immediately, they would begin to rot. This part of the process is critical to providing brewers with a quality product. Fresh-picked hops are about 80 percent moisture, but drying them to 11 percent moisture allows the cones to be stored and shipped worldwide. Too dry, and the hops are ruined; too wet, and the hop bales could rot or even combust. A fine balance and expert handling is needed to get them just right.

After the hops have dried to the desired moisture level, they cool on the conditioning floor until they are baled, which involves compressing the hops into a solid brick that is ready for storage. The bales, which weigh on average 60 kilograms (133 pounds), are then labeled with the farm name, hops variety, and bale weight before being shipped to the hop merchant.

Stocks Farm produces enough hops for more than 46 million pints of beer each year!

#### GOLDINGS: THE TRADITIONAL CHOICE

The plural term *Goldings* refers to a family of related hop varieties or clones that all share similar properties but mature at different rates. This is crucial because hops are harvested during a short four- to five-week period in the UK. If all the plants were to mature at the same rate, half the crop would be underripe and half would be overripe, spelling disaster for those wonderful aromas we try to capture each year at harvest time.

“  
**VERY FEW HOPS VARIETIES SHARE THE HIGH LEVELS OF HUMULENE FOUND IN THESE VARIETIES, ESPECIALLY IN COMBINATION WITH LOW ALPHA ACIDS, WHICH IS ONE OF MANY REASONS THAT GOLDINGS ARE SUCH A PRIZED BRITISH HOP.**

As far back as 1737, British hop growers recognized the significance of their discovery of Mathon (aka Canterbury Whitebine) and went on to create a family of Goldings that included Old Golding, (1790), East Kent Golding (1838), Cobbs (1881), Early Bird (Amos) (1887), Eastwell Goldings (1889), Whitbread Golding Variety (1932), and Early Choice Golding (1948). Incredibly, 280 years after the first Goldings variety was discovered, it is still revered around the world, and it remains the biggest variety by area grown in the UK today.

Goldings are sometimes considered “nearly noble hops” because they share many of the same characteristics as the four Continental noble hops varieties—Tettnang, Spalt, Hallertauer Mittelfrüh, and Saaz—which are low in alpha acids and high in humulene. Very few hops varieties share the high levels of humulene found in these varieties, especially in combination with low alpha acids, which is one of many reasons that Goldings are such a prized British hop.

Humulene plays an important role in brewing, as it is responsible for the traditional earthy, woody, spicy flavor we describe as classically “hoppy.” Paired with high humulene, relatively low alpha acids lend a gentle bitterness to any brew produced using this type of hop and an easy to drink beer. Goldings’ low alphas (typically 4% to 9% by weight) and high humulene (35% to 40%) provide wonderful aromas



Between the lines.

Brew This!



# OATMEAL STOUT

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.069 (16.8°P)

**Final gravity:** 1.021 (5.2°P)

**Efficiency:** 79%

**Bitterness:** 36 IBU

**Color:** 32 SRM

**Alcohol:** 6.6% by volume

## MALTS

7 lb. (3.18 kg) Maris Otter malt

1.5 lb. (680 g) medium crystal malt, 55°L

1 lb. (454 g) British pale chocolate malt

1 lb. (454 g) flaked oats

1 lb. (454 g) dark crystal malt, 75°L

8 oz. (227 g) malted oats

## HOPS

1 oz. (28 g) Phoenix, 10.5% a.a. @ 60 min

1 oz. (28 g) East Kent Goldings, 4.8% a.a.  
@ 10 min

1 oz. (28 g) East Kent Goldings, 4.8% a.a.

@ 0 min

2 oz. (57 g) Phoenix, 10.5% a.a. @ 0 min

## YEAST

Propagate Lab MIP-130 Malty Ale

## BREWING NOTES

Mash with 14.4 qt. (13.6 L) water at 156°F (69°C) for 60 minutes. Sparge with 12.7 qt. (12 L) water at 170°F (77°C). Boil 60 minutes, adding hops as indicated. Ferment at 67°F (19°C).

of spice, honey, thyme, floral, and earthy flavor notes with characteristically gentle bitterness. It also works well as a fabulous late hop addition to provide delicate and yet complex flavors in the beer.

Goldings have historically been used in combination with Fuggle to produce complex, balanced, drinkable beer. However, we are now seeing wonderful results when Goldings are used with several of the newer style British hops, with depth of flavor

from Goldings providing a wonderful backbone to popular IPAs.

While new British varieties have some fantastic, punchy aromas, our traditional varieties have low myrcene levels, which makes them ideal for session beers. Low myrcene delivers a delicate aroma that leaves room for other hop oils to fill in complexity of flavor. Goldings grown in the UK have a distinctly different aroma from their foreign counterparts.

Alpha acids provide beer with bitterness, and it's a hop constituent of prime importance to brewers. As growers, we eagerly await the alpha analysis once the hops are picked and dried each year. Alphas can vary dramatically from one year to the next, which is down to several reasons, but weather is at the forefront. Our weather in 2019 was perfect for hop growing, with a mild winter and plenty of sun and showers to keep the plants growing.

## MODERN HOPS CHOICES

The importance of Goldings goes beyond just brewing characteristics, as they have been used to breed the majority of hop varieties grown commercially in Britain. There are currently 23 British hop varieties available, with many more in development and on farm trials at the moment. If you reserve British hops just for milds and bitters, it's time to rethink your approach. Modern British hops can deliver notes of lychee, grapefruit, citrus, mint, grass, floral elements, honey, chocolate, molasses, peppermint, and more.

**Olicana** is a relatively new variety, released commercially in 2014 by the Charles Faram Hop Development Program. Its sister, Jester, is better known, but Olicana is more vigorous. It has fantastic floral, mango, and passion fruit aro-





Not everything is automated.

mas, and with an alpha range of 7% to 9% by weight, its flavor intensity works perfectly with late hopping in IPA-style beers.

**Harlequin** is another gem from the Charles Faram Hop Development Program. After conducting on-site trials the last few years, we are now putting in more Harlequin bines at Stocks Farm, as it's one of our favorites. This variety excels for late and dry hopping, but it also provides wonderful, smooth bittering characteristics, making it a true dual-purpose hop. It's a fruity number with delicious passion fruit, peach, and pineapple aromas, but it has less of the citrus intensity

of other new varieties. The alpha range is between 9.5% and 12%.

**Phoenix**, a relatively unknown variety, was developed at Wye College and originally grown and sold to just one brewer. We love it because of its high alpha acids (between 9% and 12%), but also because it expresses quite interesting aromas, especially when dry hopping. Phoenix's chocolate, molasses, and mildly spicy notes make it superb in traditional porters and stouts.

We are members of the British Hop Association, support the British hop industry, and are committed to finding the

latest new variety to suit market demands. Britain's hop-breeding program, the first of its kind in the world, has been ongoing since 1906 and has evolved as scientific understanding of hops has developed.

Feedback from the market and from ongoing farm trials is crucial for the British hop industry. In fact, the British Hop Association is currently funding a PhD program that uses DNA sequencing to select desirable traits and get new varieties of hops to market more quickly. More information about this exciting work can be found at [BritishHops.org.uk](http://BritishHops.org.uk).

*Felicity Beaumont joined Stocks Farm in spring 2019, but she didn't have to go far—her family's farm is just down the hill. A farmer's wife, she is used to the stresses of the harvest.*



# OLICANA AMERICAN PALE ALE

**Brew This!**

 **OLICANA AMERICAN PALE ALE**

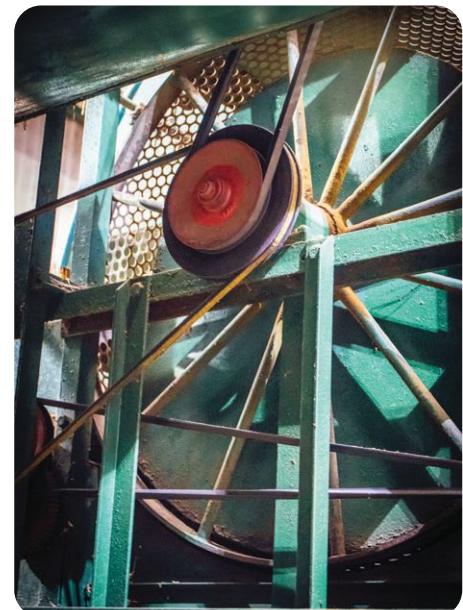
**Batch volume:** 23 liters [6 U.S. gal.]  
**Original gravity:** 1.053 [13.1°P]  
**Final gravity:** 1.010 [2.6°P]

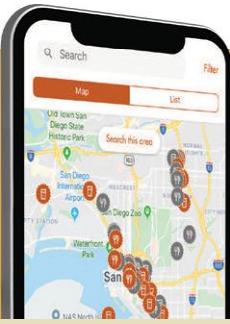
**MALTS**  
 4.5 kg [9.9 lb.] UK lager malt  
 400 g [14 oz.] German caramel Pils malt

**HOPS**  
 25 g [0.9 oz.] Olicana, 7.9% a.a. @ 60 min  
 25 g [0.9 oz.] Olicana, 7.9% a.a. @ 10 min

**YEAST**  
 Fermentis SafAle US-05

**BREWING NOTES**  
 Mash with 13 L [13.7 qt.] water at 156°F for 60 minutes. Sparge with 21 L [22.2 qt.] of water at 170°F. Boil 60 minutes, adding hops as indicated. Ferment at 65°F.





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# Blast from the Past

By **Dave Carpenter**

In normal years, the September/October issue of *Zymurgy* includes all of the gold-medal recipes from the Final Round of the National Homebrew Competition (NHC). Unfortunately, 2020 has been anything but normal.

Due to the cancellation of NHC this year, there are no stories about Ninkasi Award winners or Homebrewers, Cidermakers, and Meadmakers of the Year. There are no recipes to share. But even

though we couldn't conduct NHC this year, we still wanted to do something to celebrate the competitive spirit of homebrewing. So, we're taking a look back and reprinting some of the top recipes from 2010 to 2015.

What follows are the recipes that earned AHA members the titles of Homebrewer of the Year, Meadmaker of the Year, and Cidermaker of the Year, as well as recipes from winners of the Samuel Adams Ninkasi

Award. We pulled these recipes out of the archive, so please forgive any inconsistencies in formatting between these and others that appear in *Zymurgy*.

I hope you enjoy these award-winning recipes. I know we're all looking forward to the 2021 National Homebrew Competition.

**Dave Carpenter** is editor-in-chief of *Zymurgy*.



# Gold-Medal Beer Recipes

## Zed's Dead Red

Flanders Red Ale

Recipe courtesy Remi Bonnart,  
2010 Homebrewer of the Year

**Batch volume:** 5.8 U.S. gal. (21.95 L)  
**Original gravity:** 1.060  
**Final gravity:** 1.008

### MALTS

|       |                               |
|-------|-------------------------------|
| 4 lb. | (1.81 kg) German Pilsner malt |
| 4 lb. | (1.81 kg) Vienna malt         |
| 2 lb. | (0.9 kg) dark Munich malt     |
| 8 oz. | (227 g) aromatic malt         |
| 8 oz. | (227 g) caramel Munich malt   |
| 8 oz. | (227 g) Special B malt        |
| 8 oz. | (227 g) wheat malt            |

### HOPS

|       |                                                             |
|-------|-------------------------------------------------------------|
| 1 oz. | (28 g) East Kent Goldings plug hops, 5% alpha acid (60 min) |
|-------|-------------------------------------------------------------|

### YEAST & BACTERIA

Wyeast 1764 Pacman ale yeast (primary)  
 Wyeast 3763 Roselare Ale Blend (secondary)

### ADDITIONAL ITEMS

1 tsp. yeast nutrient

### BREWING NOTES

Mash grains at 158°F (70°C) for one hour. Mash out at 168°F (76°C) for five minutes. Boil 90 minutes. Ferment for 3 weeks at 60–65°F (16–18°C).

After primary fermentation, transfer to glass secondary and pitch Wyeast Roselare Ale Blend and about 250 mL (roughly 1 cup) of the previous year's batch and age at 70°F (21°C) with a silicon airlock until desired character/acidity is reached, in this case about 9 months. During the course of fermentation, dregs of several sour beers were added to fermentation including

Girardin Gueuze and a homebrewed sour blonde ale (approximately 12 separate batches that were brewed by different homebrewers and blended) that was aged in an oak barrel that had previously contained New Belgium La Folie.

Soak 2 oz. (57 g) of medium toast French oak cubes in Daron Calvados (enough to completely cover oak cubes) for a couple weeks. Add oak cube/Calvados mixture to beer and age an additional 3 months or until desired character is achieved. Transfer beer to keg and force carbonate to about 2.5 vol. (5 g/L) of CO<sub>2</sub>. After enjoying on draught for a while, bottle using a counter pressure bottle filler. Age bottles at cellar temperature (in this case about 8 months); pellicle will form in the bottle and character will develop for many years.

## Tri-Paul-Bock

Eisbock

Recipe courtesy Paul Sangster,  
2011 Ninkasi Award Winner

**Batch volume:** 6 U.S. gal. (22.7 L)  
**Original gravity:** 1.088  
**Final gravity:** 1.020  
**Bitterness:** 24 IBU  
**Color:** 21 SRM

### MALTS

|                                        |
|----------------------------------------|
| 14.75 lb. (6.69 kg) Munich malt        |
| 4.5 lb. (2.04 kg) German Pilsner malt  |
| 2.75 lb. (1.25 kg) caramel Munich malt |

### HOPS

|                                                         |
|---------------------------------------------------------|
| 2 oz. (56 g) Hallertau pellet hops,<br>3% a.a. (60 min) |
| 1 oz. (28 g) Hallertau pellet hops,<br>3% a.a. (30 min) |

### YEAST

2.5 L starter WLP833 German Bock yeast

### BREWING NOTES

Mash grains at 155°F (68°C) for 60 minutes. Mash out at 168°F (76°C) for 5 minutes. Boil 120 minutes. Ferment 3 months at 35°F (2°C). Freeze-concentrate post fermentation.

## Smoke Screen

Classic rauchbier

Recipe courtesy Randy Scorby,  
2011 Homebrewer of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)  
**Original gravity:** 1.057  
**Final gravity:** 1.013  
**Bitterness:** 27 IBU  
**Color:** 12 SRM

### MALTS

|                                          |
|------------------------------------------|
| 6.9 lb. (3.13 kg) Weyermann Rauchmalz    |
| 1.1 lb. (498 g) Weyermann Pilsner malt   |
| 1 lb. (454 g) Weyermann Munich II malt   |
| 0.7 lb. (317 g) 51°L caramel Vienna malt |
| 0.1 lb. (45 g) Weyermann Carafla II malt |

### HOPS

|                                                |
|------------------------------------------------|
| 2 oz. (57 g) Tettnang hops, 4% a.a. (60 min)   |
| 0.3 oz. (8.5 g) Tettnang hops, 4% a.a. (5 min) |

### YEAST

Wyeast 2633 Octoberfest lager yeast blend  
starter

### ADDITIONAL ITEMS

0.5 tsp. Wyeast yeast nutrient (15 min)

### BREWING NOTES

Single decoction mash schedule. Mash in at 122°F (50°C), hold for 10 minutes. Pull a thick decoction and hold at 154°F (68°C) for 20 minutes, and boil for 10 minutes. Return to main mash and hold at 154°F (68°C) for 40 minutes or until conversion is achieved. Sparge with 168°F (76°C) water. Boil 90 minutes. Ferment 48 days at 48°F (9°C).





## Sitzung Helles

Munich helles

Recipe courtesy Jonathan Permen,  
2012 Homebrewer of the Year

**Batch volume:** 7 US gal. (26.5 L)

**Original gravity:** 1.051

**Final gravity:** 1.010

**Bitterness:** 20 IBU

**Color:** 4.6 SRM

### MALTS

14.25 lb. (6.46 kg) German Pilsner malt

0.44 lb. (200 g) Munich malt

0.16 lb. (73 g) biscuit malt

0.16 lb. (73 g) melanoidin malt

### HOPS

1.85 oz. (52 g) Hallertau Mittelfrüh (FWH)

### YEAST

Wyeast 2308 Munich Lager yeast (starter)

### ADDITIONAL ITEMS

3 g CaCl<sub>2</sub> and 1 g MgSO<sub>4</sub> as water additions

1 package gelatin finings (in keg)

### BREWING NOTES

Single infusion mash at 154°F (68°C) for 60 minutes. Boil 90 minutes. Ferment 6 weeks at 48°F (9°C).

## Mow the Damn Lawn!

Lite American lager

Recipe courtesy Annie Johnson, 2013  
Homebrewer of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.048

**Final gravity:** 1.008

**Color:** 2 SRM

**Alcohol:** 5.3% by volume

### MALTS & ADJUNCTS

8.3 lb. (3.76 kg) two-row pale malt

2 lb. (0.9 kg) flaked rice

### HOPS

0.7 oz. (20 g) Hallertauer pellets (60 min)

### YEAST

4 L starter WLP840 White Labs

American Lager Yeast

### ADDITIONAL ITEMS

1 tablet Whirlfloc

### BREWING NOTES

Mash at 149°F (65°C) for 60 minutes. Boil 90 minutes. Ferment 21 days at 48°F (9°C). Lager 30 days at 32°F (0°C).



## Ei Hefe

Bavarian-style weissbier

David Barber, 2013 Ninkasi Award Winner

**Batch volume:** 5.5 U.S. gal. (20.82 L)

**Original gravity:** 1.052

**Final gravity:** 1.012

**Bitterness:** 8.3 IBU

**Color:** 3 SRM

**Alcohol:** 5.3% by volume

### MALTS

3.65 lb. (1.65 kg) German Pilsner malt

5.6 lb. (2.54 kg) German wheat malt

### HOPS

0.8 oz. (23 g) Hallertauer Mittelfruh pellets, 3.4% a.a. (60 min)

### YEAST

1 qt. starter Wyeast 3068 Weihenstephan Weizen yeast

### BREWING NOTES

Start with reverse osmosis water, add 2.2 g calcium chloride to mash, add 2.7 g calcium chloride to sparge. Use a double decoction mash schedule to conduct an acid rest at 113°F (45°C) for 15 minutes and a protein rest at 126°F (52°C) for 15 minutes. Then mash at 146°F (63°C) for 20 minutes, 158°F (70°C) for 20 minutes, and 167°F (75°C) for 10 minutes. Boil 90 minutes. Ferment 9 days at 62°F (17°C).

## Albanach Láidir

Strong Scotch ale

Recipe courtesy Mark Schoppe, 2012  
Ninkasi Award Winner

**Batch volume:** 6 U.S. gal. (22.71 L)

**Original gravity:** 1.085

**Final gravity:** 1.023

**Bitterness:** 22 IBU

**Color:** 18 SRM

### MALTS

13.75 lb. (5.78 kg) Rahr pale ale malt

2.4 lb. (0.9 kg) dextrin malt

9.5 oz. (269 g) Weyermann Rauchmalz

9.5 oz. (269 g) biscuit malt

9.5 oz. (269 g) Briess Victory malt

9.5 oz. (269 g) 60°L crystal malt

5 oz. (142 g) roasted barley

### HOPS

0.6 oz. (17 g) Summit pellet hops, 18.5% a.a. (75 min)

0.25 oz. (7 g) Kent Golding pellet hops, 5.0% a.a. (15 min)

0.25 oz. (7 g) Kent Golding pellet hops, 5.0% a.a. (5 min)

### YEAST

White Labs WLP028 Edinburgh Scottish ale yeast (repitched slurry)

### ADDITIONAL ITEMS

143 g dextrose to prime

### BREWING NOTES

Single step infusion mash at 155°F (68°C). Collect one gallon of first runnings, boil until condensed to a syrup and add to kettle. Boil 150 minutes. Ferment 3 weeks at 65°F (18°C) and then condition 2 weeks at room temperature.



### ON THE WEB

Find past winners' homebrew recipes on our website @ [HomebrewersAssociation.org/homebrew-recipes](http://HomebrewersAssociation.org/homebrew-recipes)



## 2010 Barleywine

American barleywine

Recipe courtesy David Barber,  
2013 Ninkasi Award Winner**Batch volume:** 5.5 U.S. gal. (20.82 L)**Original gravity:** 1.090**Final gravity:** 1.019**Bitterness:** 76 IBU**Color:** 12 SRM**Alcohol:** 9.5% by volume

### MALTS & ADJUNCTS

|        |                                     |
|--------|-------------------------------------|
| 13 lb. | (5.9 kg) American two-row pale malt |
| 7 lb.  | (3.18 kg) Maris Otter pale malt     |
| 4 oz.  | (113 g) 60°L crystal malt           |
| 8 oz.  | (227 g) Caravienne malt             |
| 4 oz.  | (113 g) light Caramunich malt       |
| 4 oz.  | (113 g) 120°L crystal malt          |
| 4 oz.  | (113 g) 40°L crystal malt           |
| 1 lb.  | (0.45 kg) cane sugar                |

### HOPS

|         |                                                      |
|---------|------------------------------------------------------|
| 1 oz.   | (28 g) whole Cascade, 8.6% a.a. (120 min/first wort) |
| 1 oz.   | (28 g) whole Zeus, 15.2% a.a. (60 min)               |
| 0.4 oz. | (11 g) whole Chinook, 12.7% a.a. (60 min)            |
| 1 oz.   | (28 g) whole Centennial, 10.5% a.a. (15 min)         |
| 1 oz.   | (28 g) whole Cascade, 8.6% a.a. (0 min)              |
| 1 oz.   | (28 g) whole Centennial, 10.5% a.a. (0 min)          |
| 1 oz.   | (28 g) whole Simcoe, 12.7% a.a. (0 min)              |
| 1 oz.   | (28 g) whole Amarillo, 8.7% a.a. (dry hop)           |
| 1 oz.   | (28 g) whole Centennial, 10.5% a.a. (dry hop)        |
| 1 oz.   | (28 g) whole Simcoe, 12.5% a.a. (dry hop)            |

### YEAST

Wyeast 1056 American Ale yeast

### ADDITIONAL ITEMS

|          |                         |
|----------|-------------------------|
| 1 tablet | Whirlfloc               |
| 1.5 g    | gypsum (mash)           |
| 1.8 g    | calcium chloride (mash) |

### BREWING NOTES

Mash at 149°F (65°C) for 90 minutes. Boil 120 minutes. Ferment 30 days at 68°F (20°C).

## Way Off Kilter

Scottish light 60/-

Recipe courtesy Robert Hilferding,  
2014 Homebrewer of the Year**Batch volume:** 5.3 U.S. gal. (20 L)**Original gravity:** 1.047**Final gravity:** 1.024

### MALTS

|          |                             |
|----------|-----------------------------|
| 9 lb.    | (4.08 kg) pale two-row malt |
| 1.1 lb.  | (0.49 kg) 20°L Munich malt  |
| 0.25 lb. | (113 g) 40°L crystal malt   |
| 0.1 lb.  | (45 g) roast barley         |
| 0.1 lb.  | (45 g) chocolate malt       |

### HOPS

|          |                                                    |
|----------|----------------------------------------------------|
| 0.7 oz.  | (20 g) East Kent Golding pellets, 5% a.a. (60 min) |
| 0.88 oz. | (25 g) East Kent Golding pellets, 5% a.a. (15 min) |
| 0.7 oz.  | (20 g) East Kent Golding pellets, 5% a.a. (5 min)  |
| 0.48 oz. | (14 g) East Kent Golding pellets, 5% a.a. (0 min)  |

### YEAST

1 L starter Wyeast 1728 Scottish Ale yeast

### ADDITIONAL ITEMS

1 tablet Whirlfloc

### BREWING NOTES

Single step infusion mash at 155°F (68°C). Mash out at 168°F (76°C) for 25 minutes and commence sparge. Boil 60 minutes. Ferment 4 days at 67°F (19°C). Condition 10 days at 67°F (19°C). Carbonate to 2.4 vol (4.8 g/L).



## Hop Canyon Habanero IPA

American IPA with habanero chiles

Recipe courtesy Jeremy Voeltz, 2014  
Ninkasi Award Winner**Batch volume:** 5.5 U.S. gal. (20.82 L)**Original gravity:** 1.074**Final gravity:** 1.016

### MALTS

|          |                             |
|----------|-----------------------------|
| 14 lb.   | (6.35 kg) pale two-row malt |
| 1.25 lb. | (0.57 kg) 10°L crystal malt |
| 1 lb.    | (0.45 kg) dextrin malt      |
| 0.5 lb.  | (227 g) CaraVienne® malt    |

### HOPS

|          |                                                 |
|----------|-------------------------------------------------|
| 1 oz.    | (28 g) Amarillo pellets, 9% a.a. (mash)         |
| 0.25 oz. | (7 g) Columbus pellets, 13% a.a. (60 min)       |
| 0.25 oz. | (7 g) Northern Brewer pellets, 9% a.a. (60 min) |
| 0.4 oz.  | (11 g) Magnum pellets, 15% a.a. (60 min)        |
| 0.5 oz.  | (14 g) Warrior pellets, 18% a.a. (60 min)       |
| 0.2 oz.  | (6 g) Simcoe pellets, 13% a.a. (60 min)         |
| 0.4 oz.  | (11 g) Crystal pellets, 4% a.a. (30 min)        |
| 0.25 oz. | (7 g) Centennial pellets, 9% a.a. (30 min)      |
| 1 oz.    | (28 g) Simcoe pellets, 13% a.a. (30 min)        |
| 2 oz.    | (57 g) Amarillo pellets, 9% a.a. (0 min)        |
| 2 oz.    | (57 g) Simcoe pellets, 13% a.a. (0 min)         |
| 2 oz.    | (57 g) Amarillo pellets, 9% a.a. (dry)          |
| 4 oz.    | (113 g) Simcoe pellets, 13% a.a. (dry)          |

### ADDITIONAL ITEMS

16.5 g chopped habanero chiles (secondary)

### YEAST

White Labs WLP001 American ale yeast

### BREWING NOTES

Use a water profile that includes 165 ppm calcium, 12 ppm magnesium, 17 ppm sodium, 300 ppm calcium sulfate and 55 ppm chloride. Mash at 155°F (68°C) for 75 minutes. Boil 60 minutes. Ferment 21 days at 64°F (18°C). Condition 7 days at 68°F (20°C) and then "dry pepper" with 3 g chopped habanero chiles per gallon for five days.



## Gueuze

### Gueuze

Recipe courtesy Oskar Norlander,  
Peter Salmond, and Erik Norlander,  
2015 Homebrewers of the Year

**Batch volume:** 5.5 U.S. gal. (20.82 L)  
**Original gravity:** 1.052

#### MALTS

5.25 lb. (2.38 kg) Pilsner malt (49%)  
2.69 lb. (1.22 kg) wheat malt (25%)  
2.69 lb. (1.22 kg) unmalted wheat (25%)

#### ADDITIONAL ITEMS

2 oz. (57 g) rice hulls, in mash, to assist  
lautering (1%)

#### HOPS

1 oz. (28 g) aged whole hops (60 min)

#### YEAST & BACTERIA

Wyeast 3278 Belgian Lambic Blend ale yeast

#### BREWING NOTES

Mash with a single infusion at 162°F (72°C) for one hour. Boil 60 minutes. Ferment at 70°F (21°C) with Wyeast Lambic blend for two months. Add to 30-gallon Solera red wine barrel and remove 10 gal. of older aged beer. Blend to taste with younger non-barrel aged beer made from the same recipe. Keg, chill, and carbonate.

## Mark's Chipotle Lichtenhainer

### Lichtenhainer with chipotle chiles

Recipe courtesy Mark Schoppe,  
2015 Ninkasi Award Winner

**Batch volume:** 6 U.S. gal. (22.71 L)

**Original gravity:** 1.044

**Final gravity:** 1.004

#### MALTS

4.16 lb. (1.88 kg) Rauchmalz  
4.16 lb. (1.88 kg) wheat malt

#### HOPS

0.16 oz. (4.5 g) Hallertau Mittelfrüh pellets,  
5.7% a.a. (30 min)

#### YEAST & BACTERIA

1 vial White Labs WLP677 Lactobacillus  
delbrueckii starter (primary)  
Wyeast 2575 Kölsch II yeast starter (secondary)

#### ADDITIONAL ITEMS

5 dried chipotle peppers  
1g gypsum, 1g calcium chloride and 1.25 mL  
lactic acid in mash, 1 mL lactic acid in sparge  
water

#### BREWING NOTES

Single infusion mash at 148°F (64°C) for 70 minutes. Boil 30 minutes. Use *Lactobacillus* only in primary fermentation for 21 days at 90°F (32°C). Add German ale yeast starter (Wyeast 2575) in secondary and condition 156 days at 68°F (20°C). Add five dried chipotle peppers, rehydrated in boiled water, and condition for 7 days at 68°F (20°C).



# Gold-Medal Mead Recipes



## Apple Juiced!

### Petillant, sweet sack cyser

Recipe courtesy Rodney Kibzey,  
2010 Meadmaker of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.120

**Final gravity:** 1.025

#### FERMENTABLES

4 gal. (15.1 L) Michigan cider  
1 gal. (3.8 L) Miller's orange blossom honey

#### YEAST

1 L starter White Labs WLP 720 Sweet Mead Yeast  
or Wyeast 4184 Sweet Mead yeast

#### MEADMAKING NOTES

Keep it clean and give it some time. Primary fermentation 6 months at 70°F (21°C) in glass; secondary fermentation 18 months at 68°F (20°C) in glass. Carbonate to 1.5 vol. (3 g/L).



## Cinnamon-Vanilla Metheglin

Metheglin

Recipe courtesy Gordon Strong,  
2010 Ninkasi Award Winner

**Batch volume:** 5 U.S. gal. (18.9 L)

### FERMENTABLES

20 lb. (9.07 kg) Tupelo honey

### YEAST

2 packets VL3C yeast

### ADDITIONAL ITEMS

2 tsp. (9.86 mL) DAP  
1 tsp. (4.93 mL) Fermaid-K  
4.5 tsp. (22.18 mL) GO-FERM  
1 Tbsp. (14.79 mL) Vietnamese extra fancy cinnamon  
2 Madagascar vanilla beans, split, scraped  
1 packet Super-Kleer

### MEADMAKING NOTES

Rehydrate and proof yeast in 104°F (40°C) water with GO-FERM and a pinch of sugar for 15 minutes. Mix honey with enough carbon-filtered tap water to yield 5 gal. volume, combining with a stir-whip to thoroughly combine and aerate. Combine nutrients together and add 1/4 of total. Pitch yeast and ferment at 68°F (20°C). Add 1/4 of total nutrients each day, stirring to release CO<sub>2</sub>.

Ferment to completion, rack and age until 1 month before serving. Prepare spice teas by pouring 2 cups boiling water over cinnamon and vanilla separately, steeping for 5 minutes, and then straining through a coffee filter. Add 1 cup tupelo honey to each tea and stir to dissolve. Blend teas with finished mead to taste to create a pleasant but not overpowering balance of spice with a sweet finish. Add tupelo if necessary. Use your palate to adjust the sweetness and individual spice levels to final levels. Use Super-Kleer to polish the mead to brilliant clarity.

## Adore

Semisweet standard melomel with pluots

Recipe courtesy Monique Scovil,  
2011 Meadmaker of the Year

**Batch volume:** 6 U.S. gal. (22.7 L)

**Original gravity:** 1.090

**Final gravity:** 1.030

### FERMENTABLES

14 lb. (6.35 kg) wildflower honey

### YEAST

Lalvin D-47 dry yeast

### ADDITIONAL ITEMS

pluots (quantity unknown)  
potassium sorbate, primary  
potassium metabisulfite, primary  
acid blend at bottling  
1 packet liquid Superkleer to clarify

### MEADMAKING NOTES

Mix honey with enough filtered water to yield 6 gal. (22.7 L) and stir vigorously to oxygenate. Add the yeast energizer and nutrient to the must. Add the fruit and pectic enzyme. Add the yeast on top of the must. Ferment completely, watching for signs of slowing fermentation. Rack to secondary and age until clear.

## Rhubarb Mead

Sweet petillant melomel with fresh rhubarb

Recipe courtesy Thomas Eibner,  
2012 Meadmaker of the Year

**Batch volume:** 3.5 U.S. gal. (13.25 L)

**Original gravity:** 1.140

**Final gravity:** 1.005

### FERMENTABLES

12 lb. (5.44 kg) wildflower honey

40 lb. (18.14 kg) rhubarb

### YEAST

Lalvin 71-B dry yeast

### MEADMAKING NOTES

Staggered nutrient addition. Ferment in primary for six weeks; rack, clarify, keg, force carbonate to 2.5 vol. (5 g/L).

## SRB Mead

Sweet, still standard mead with strawberry, rhubarb, and blackberry

Recipe courtesy Mark Tanner,  
2013 Meadmaker of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.157

**Final gravity:** 1.036

### FERMENTABLES

16 lb. (7.26 kg) clover honey

8 lb. (3.63 kg) rhubarb

8 lb. (3.63 kg) strawberries

6 lb. (2.72 kg) blackberries

### YEAST

2 packets Lalvin 71-B dry yeast

### ADDITIONAL ITEMS

1 tsp. Fermaid-K  
2 tsp. diammonium phosphate  
9 g Go-Ferm

### MEADMAKING NOTES

Rehydrate and proof yeast in 100°F (38°C) water with Go-Ferm. Mix honey with bottled spring water to bring volume to 5 gal.. Pitch yeast, mix, aerate. Add initial nutrients and fruit (frozen, thawed, chopped). Stagger remaining nutrient additions for a week. Stir daily for first week to release CO<sub>2</sub>. Ferment to completion, rack, age one month, and carbonate to 2.5 vol. (5 g/L).

## Strawberry Tupelo

Sweet petillant melomel with strawberries

Recipe courtesy Thomas Eibner,  
2012 Meadmaker of the Year

**Batch volume:** 4 U.S. gal. (15.14 L)

**Original gravity:** 1.160

**Final gravity:** 1.050

### FERMENTABLES

22 lb. (9.98 kg) Tupelo honey

36 lb. (16.33 kg) frozen strawberries

### YEAST

Lalvin 71-B dry yeast

### MEADMAKING NOTES

Staggered nutrient addition. Ferment in primary for three weeks; rack, clarify, keg, and force carbonate to 2.5 vol. (5 g/L) CO<sub>2</sub>.

**2**

Still, sweet, standard melomel with key limes  
Recipe courtesy Matthew Weide,  
2014 Meadmaker of the Year

**Batch volume:** 4 U.S. gal. (15.14 L)

**FERMENTABLES**

13 lb. (5.9 kg) wildflower honey  
16 oz. (473 mL) key lime juice

**YEAST**

3 packs Lalvin 71B-1122 dry yeast

**ADDITIONAL ITEMS**

Super Kleer

**MEADMAKING NOTES**

Re-hydrated 71B-1122 yeast with Go-ferm, pitched into must after being properly mixed and oxygenated. Staggered nutrient additions over 5 days of DAP and Fermaid K (amounts per manufacturer) Wine whip for oxygen intake for first 5 days. I then shake the vessel for another 10 days to degas. Add 8 oz. key lime juice (or to taste) when racking. Super Kleer at packaging.

**Batch volume:** 5 U.S. gal. (18.9 L)  
**Original gravity:** 1.106 (25 Brix)

**FERMENTABLES**

16 lb. (7.26 kg) blueberry honey

**YEAST**

10 g Lalvin 71B-1122 dry yeast

**ADDITIONAL ITEMS**

16 g diammonium phosphate  
8 g Fermaid O  
12.5 g Go-Ferm  
potassium metabisulfite  
Kieselsol  
Chitosan

**MEADMAKING NOTES**

Add RO water to the honey until it reaches 5.5 gal.. Mix until the must is fully homogenized. Add 90 seconds of oxygen with a diffusion stone. Properly hydrate the yeast using Go-Ferm, and then pitch the yeast. Ferment at 60°F (16°C). Add half of the Fermaid O nutrient addition at the first signs of fermentation. Add the second half of the Fermaid O addition when the sugar levels are depleted by about 25 percent. Ferment a total of 30 days at 60°F (16°C).

When fermentation is complete, transfer to a secondary and add 45 ppm of sulfites. Let the mead condition in the secondary for 5 months at 64°F (18°C). Add a clearing agent if needed. Transfer to a keg; add 30 ppm of sulfites and carbonate to your preferred level of carbonation.



# Gold-Medal Cider Recipes

**Applewine**

Apfelwein

Recipe courtesy Anjie Watts,  
2010 Cidermaker of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.070 to 1.080

**Final gravity:** 1.008 to 1.012

**FERMENTABLES**

1 bushel(35 L) Arkansas Black apples, pressed

**YEAST**

1–2 packets Lalvin 1118 Champagne yeast

**ADDITIONAL ITEMS**

3 cinnamon sticks (in primary)  
potassium sorbate

**CIDERMAKING NOTES**

Use enough water and sugar to reach target volume and gravity. Adjust pH as necessary. Affix airlock, using vodka instead of water. Ferment 2 weeks. After fermentation, back-sweeten to taste and add potassium sorbate to prevent refermentation. Bottle or force carbonate in keg. Best to leave six months to a year, but we all know that is not possible.

**Squirt's Perry**

Semisweet sparkling common perry

Recipe courtesy Edward Walkowski,  
2011 Cidermaker of the Year

**Batch volume:** 6 U.S. gal. (22.7 L)

**Original gravity:** 1.062

**Final gravity:** 1.004

**FERMENTABLES**

6 gal. (22.7 L) Ritter's Cider Mill Bartlett pear fresh cider

**YEAST**

Lalvin BA-11

**ADDITIONAL ITEMS**

Super-Kleer to clarify

**CIDERMAKING NOTES**

Ferment 3 weeks at 64°F (18°C). Carbonate to 1.7 vol. (3.4 g/L).



## 2011 Honeycrisp Celebration

Semisweet petillant common cider

Roger Kee, 2012 Cidermaker of the Year

**Batch volume:** 20 U.S. gal. (75.71 L)

**Original gravity:** 1.060

**Final gravity:** 1.020

**Color:** 3 SRM

**Alcohol:** 5.3% by volume

### FERMENTABLES

22 gal. (83 L) Minea Farms (Woodinville, Wash.) pressed apple juice, 50% Honeycrisp blended with Gala, Braeburn, and Granny Smith

### YEAST STARTER

3 vials White Labs WLP775

English Cider yeast

2 L filtered water

2 L Gala apple juice

1 g Wyeast Yeast Energizer

1 g White Labs WLN 1000 nutrient

### ADDITIONAL ITEMS

22 campden tablets

sorbate

potassium Sulfite

Super-Kleer to clarify (if necessary)

### CIDERMAKING NOTES

Follow strict sanitation protocols on all equipment and containers (diluted Star San spray and soak buckets). Prepare a yeast starter by combining 2 liters of filtered water and 2 liters of Gala apple juice to yield a must of 1.020 original gravity and add the cider yeast, yeast energizer, and yeast nutrient. Ferment starter on a stir plate until fully attenuated, about 8 days at 66°F (19°C).

Thaw juice three days at ambient temperatures of 55°F (13°C) and treat with 1 powdered campden tablet per gallon. Transfer juice to fermenter. Save 1 gallon juice and refrigerate. Allow three days for campden to off-gas and settle; set fermentation temperature to 50°F (10°C).

Add 1/2 gallon juice (1.89 L) to the crashed yeast after decanting out starter medium. Add half of the total nutrient/energizer and spin on a stir plate to incorporate the additions into a slurry. Save 1/2 gallon juice for later addition. Add last half nutrient to this and gently shake and refrigerate. Oxygenate juice for three

minutes using diffusion stone. Ferment at 65°F (18°C). After lag phase (about two days) with signs of steady fermentation, add last 1/2 gallon of juice that contains the last half of the nutrient. Let fermentation complete (about 16 days).

Check and dump lees as needed. Check gravity and ensure finish. Crash to 40°F (4°C), age eight more days and taste. Adjust balance and structure of final product with homemade Honeycrisp juice concentrate, malic acid, Meyer lemon juice, wine tannin, or tannic apple concentrate (Golden Russet). Stabilize with 3 tsp. sorbate, 1/2 tsp. metabisulfite and 1/8 tsp. potassium sulfite (about half recommended amount of these). Age another 30 days in bulk at 40°F (4°C). Transfer and rack once to ensure clarity. Use Super Kleer if needed. Force carbonate to 2.5 vol. (5 g/L) for final and package.

## Northern Lights

Dry, sparkling common cider

Recipe courtesy Tavish and Laura Sullivan, 2013 Cidermakers of the Year

**Batch volume:** 12 U.S. gal. (45.42 L)

**Original gravity:** 1.055

**Final gravity:** 1.008

**Color:** 2 SRM

**Alcohol:** 6.3% by volume

### FERMENTABLES

4 gal. (15.14 L) Honeycrisp apple juice

4 gal. (15.14 L) Aurora apple juice

4 gal. (15.14 L) Jonagold apple juice

### YEAST

1 vial White Labs English cider yeast

### CIDERMAKING NOTES

Ferment 12 days at 64°F (18°C). Carbonate to 2.5 vol. (5 g/L).

## Bartlett Perry

Sparkling, semisweet common perry

Recipe courtesy Edward Walkowski, 2014 Cidermaker of the Year

**Batch volume:** 10 U.S. gal. (37.85 L)

**Original gravity:** 1.048

**Final gravity:** 1.002

**Color:** 3 SRM

**Alcohol:** 5.3% by volume

### FERMENTABLES

10 gal. (37.85 L) fresh Bartlett pear cider sulfited to 50 ppm SO<sub>2</sub>

### YEAST

10 g Lalvin DV-10 yeast (properly hydrated)

### ADDITIONAL ITEMS

Malic acid to adjust acidity to 6 g/L

Fermax, added in two additions, per product instructions

Super-Kleer to fine, then filtered bright

### CIDERMAKING NOTES

Source 10 gal. fresh pear cider. Sulfite to 50 ppm SO<sub>2</sub> and adjust acidity to 6 g/L with malic acid. This year I fermented with Lalvin DV-10, a Champagne-type yeast. I have used 11-22B and Ba-11 in the past with good results. I used Fermax split into two additions, and fermented 2 weeks at 60°F. Following fermentation to dryness, I added sorbate, backsweetened with cane sugar to taste, fined with Super-Kleer KC, and filtered. This perry was keg-carbonated at 2.8 vol. (5.6 g/L) CO<sub>2</sub>.

## Common Cider

Petillant, medium common cider

Recipe courtesy Brett Glenna, 2015 Cidermaker of the Year

**Batch volume:** 5 U.S. gal. (18.9 L)

**Original gravity:** 1.064

**Final gravity:** 1.014

### FERMENTABLES

5 gal. (18.9 L) mixed-variety cider

2 lb. (0.9 kg) light brown sugar

### YEAST

White Labs WLP775 English Cider yeast

### CIDERMAKING NOTES

Heat 1.5 qt. water to dissolve sugar, add to must, and ferment

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Amoretti



# Relax, Don't Worry, Have a Homebrew!

That mantra rings as true today as it did in 1978 when Charlie Papazian cofounded the American Homebrewers Association with Charlie Matzen. Homebrewing can be as simple or as complex as you want to make it, but the first step is always to relax and not worry.

To aid your relaxation and help you get the most out of *Zymurgy*, here are some standard assumptions and methods for our recipes. Of course, when a recipe says to do something different, follow the recipe. But you can always fall back on these general tips to brew great beer.



## ON THE WEB

For more detailed info, head over to [HomebrewersAssociation.org](https://HomebrewersAssociation.org) and dive into our How to Brew resources.

## BREWING WITH ZYMURGY

### MAKING WORT

Most recipes in *Zymurgy* offer an all-grain version and a malt extract or partial-mash alternative. Pick the procedure you prefer and prepare some wort! Some recipes

might include a water profile. If you can't (or don't want to) deal with water chemistry, don't worry about it: just go ahead and brew! Extract brewers needn't add minerals to water.

### Malt Extract Recipes

Making wort from malt extract is easy.

- Crush specialty grains, if any.
- Place milled grains in a mesh bag and tie it off.
- Steep bag of grains in 150–160°F (66–71°C) water for 30 min. in your brew pot.
- Remove bag of grains from the pot.
- Fully dissolve extract in the hot, grain-infused water (if there are no specialty grains in the recipe, you can skip directly to this step).
- Top up with water to your desired boil volume. (Leave some room for foam!)



### All-Grain and Partial-Mash Recipes

Unless otherwise specified, all-grain brewers can conduct a single-temperature infusion mash with these parameters:

- Water/grain ratio: 1.25 qt./lb. (2.6 L/kg)
- Mash efficiency: 70%
- Mash temperature: 150–153°F (66.7–67.2°C)
- Mash duration: 60 minutes

Partial-mash recipes make the same assumptions but use a smaller amount of grain and augment the wort with malt extract.

### BOILING

No matter how you get here, everyone loves adding hops.



- Boil time is 60 minutes unless otherwise stated.
- Boils are assumed to be the full batch volume, but you can also boil a concentrated wort and top up with water in the fermenter.
- Hop additions are given in minutes before the end of the boil.

# Brew Lingo

Every field has specialized language, and homebrewing is no different. Here are some of the key terms, abbreviations, and acronyms you'll find throughout Zymurgy.

**AA** – alpha acid

**ABV** – alcohol by volume

**AHA** – American Homebrewers Association

**BBL** – US beer barrel (31 US gal or 117.3 L)

**BIAB** – brew in a bag

**BJCP** – Beer Judge Certification Program

**Chico** – American ale yeast, AKA Wyeast 1056, WLP001, SafAle US-05, and others

**CTZ** – Columbus, Tomahawk, and Zeus: interchangeable high-alpha-acid hops

**DME** – dry malt extract

**DMS** – dimethyl sulfide, an off flavor similar to canned corn or cooked vegetables

**DO** – dissolved oxygen

**EBC** – European Brewing Convention (beer color)

**FG** – final gravity

**FWH** – first wort hops, added to the boil kettle as it fills with sweet wort after mashing

**HERMS** – heat exchange recirculating mash system

**HLT** – hot liquor tank

**IBU** – international bitterness unit

**LHBS** – local homebrew shop

**°L** – degrees Lovibond (malt color)

**LME** – liquid malt extract

**LTHD** – Learn to Homebrew Day

**MLT** – mash-lauter tun

**NHC** – National Homebrew Competition

**OG** – original gravity

**°P** – degrees Plato (density of wort or beer)

**RIMS** – recirculating infusion mash system

**RO** – reverse osmosis, a water purification process that removes most dissolved ions

**SG** – specific gravity (wort/beer density)

**SMaSH** – single malt and single hop

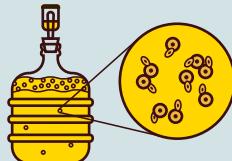
**SMM** – S-methyl methionine, precursor to dimethyl sulfide (DMS)

**SRM** – Standard Reference Method (beer color)

## FERMENTING & CONDITIONING

Pitch yeast into chilled, aerated or oxygenated wort.

- Use twice as much yeast for lagers as you do for ales.
- Ales ferment at 60–70°F (15–20°C). Lagers ferment at 45–55°F (7–13°C).
- Condition ales at room temperature or colder for a week or two.
- Condition lagers at close to freezing for several weeks if you can (traditional but not required).



## BOTTLING & KEGGING

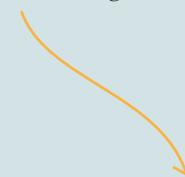
If you bottle,

- Use 1 oz. of dextrose (corn sugar) per gallon of beer (7.5 g/L) for a good, all-purpose level of CO<sub>2</sub>.
- Use less sugar for less fizz.
- Take care with higher carbonation levels—many single-use beer bottles aren't designed for high pressure.



If you force carbonate in a keg,

- Use the chart to dial in the gauge pressure on the regulator.



- Add 0.5 psi (35 mbar) for every 1,000 feet (300 meters) you live above sea level.
- To convert psi pressures to mbar, multiply by 69.
- To convert volumes of CO<sub>2</sub> to g/L, multiply by 2.

## REGULATOR PRESSURES (PSI) FOR VARIOUS CARBONATION LEVELS AND SERVING TEMPERATURES

| TEMP (°F) | VOL. CO <sub>2</sub> |     |      |      |      |      |      |      |      |      |      |
|-----------|----------------------|-----|------|------|------|------|------|------|------|------|------|
|           | 2.1                  | 2.2 | 2.3  | 2.4  | 2.5  | 2.6  | 2.7  | 2.8  | 2.9  | 3.0  | 3.1  |
| 33        | 5.0                  | 6.0 | 6.9  | 7.9  | 8.8  | 9.8  | 10.7 | 11.7 | 12.6 | 13.6 | 14.5 |
| 34        | 5.2                  | 6.2 | 7.2  | 8.1  | 9.1  | 10.1 | 11.1 | 12.0 | 13.0 | 14.0 | 15.0 |
| 35        | 5.6                  | 6.6 | 7.6  | 8.6  | 9.7  | 10.7 | 11.7 | 12.7 | 13.7 | 14.8 | 15.8 |
| 36        | 6.1                  | 7.1 | 8.2  | 9.2  | 10.2 | 11.3 | 12.3 | 13.4 | 14.4 | 15.5 | 16.5 |
| 37        | 6.6                  | 7.6 | 8.7  | 9.8  | 10.8 | 11.9 | 12.9 | 14.0 | 15.1 | 16.1 | 17.2 |
| 38        | 7.0                  | 8.1 | 9.2  | 10.3 | 11.3 | 12.4 | 13.5 | 14.5 | 15.6 | 16.7 | 17.8 |
| 39        | 7.6                  | 8.7 | 9.8  | 10.8 | 11.9 | 13.0 | 14.1 | 15.2 | 16.3 | 17.4 | 18.5 |
| 40        | 8.0                  | 9.1 | 10.2 | 11.3 | 12.4 | 13.5 | 14.6 | 15.7 | 16.8 | 17.9 | 19.0 |
| 41        | 8.3                  | 9.4 | 10.6 | 11.7 | 12.8 | 13.9 | 15.1 | 16.2 | 17.3 | 18.4 | 19.5 |
| 42        | 8.8                  | 9.9 | 11.0 | 12.2 | 13.3 | 14.4 | 15.6 | 16.7 | 17.8 | 19.0 | 20.1 |

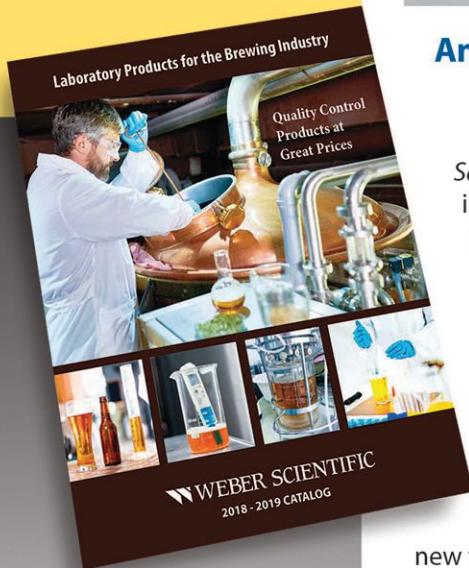
■ = PSI

Source: Brewers Association Draught Beer Quality for Retailers

# Your Total Source for Beer Quality Testing Supplies



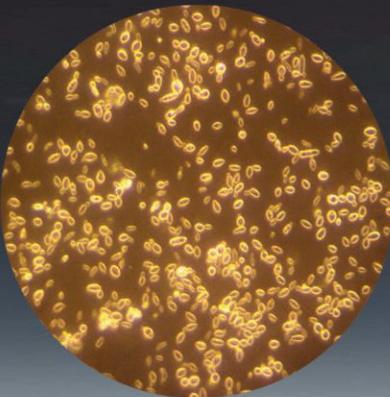
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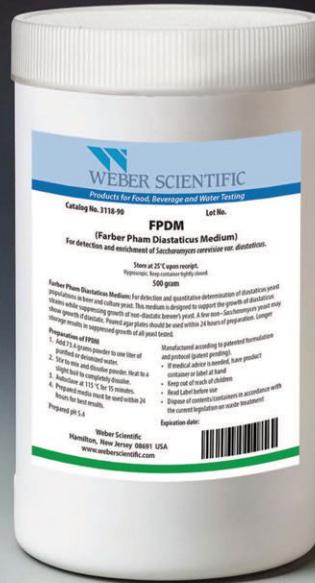
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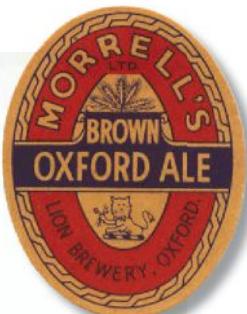
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# Morrell's of Oxford



Entrance to Morrell's Brewery in Oxford

By Peter Symons

In 2014, I visited the Oxfordshire History Centre in Oxford and searched through their brewing records for two days. So-called “pure beer,” i.e. all-malt beer, was a hot topic around the turn of the 20th century, probably in response to the arsenic poisoning scandal of 1900 and subsequent findings of the Royal Commission that the sulfuric acid used to convert starch to glucose was contaminated with arsenic.<sup>1</sup> Many brewers maintained that they needed to use grain and sugar adjuncts to produce good beer, but as this 1901 extract from the *Bucks Herald* shows, one Mr. Morrell disagreed.

**BUCKS CHAMBER OF AGRICULTURE**—Many brewers stated that they could not brew beer without using glucose, and yet Mr. Morrell, of Oxford, declared that his brewery had never contained any glucose or sugar, they never brewed from anything but barley malt and hops, and he had never used foreign barley, (Hear, hear.) He would ask whether the trade of Mr. Morrell brewery had decreased in consequence of this fact, and of their having used English materials.<sup>2</sup>

In the period 1900 to 1919, Morrell's newspaper advertisements played on the pure beer angle.

#### PURE BEER

Messrs. MORRELL'S TRUSTEES have never used any SUGAR, RICE, RICE-GRITS, FLAKED RICE, MAIZE-GRITS, FLAKED MAIZE, SYRUP, GLUCOSE, SACCHARUM, or any other substitute for either Malt or Hops in the manufacture of their Ales and Stout, which are guaranteed to be absolutely the product of the best BARLEY-MALT AND HOPS ONLY. (signed H.M. DOWSON. Manager.)<sup>3</sup>



Exterior of the Morrell's brewery in 1976. Courtesy Roy Denison.

One snippet of Morrell's history was based on a 1906 document in the archive, titled PURE BEER MALT and HOPS ONLY. The major part of this brochure was formed of a reprinted article titled "The Drink Delectable" from *The Gentleman's Journal* of May 5, 1906 (see sidebar).<sup>4</sup> This document also had a price list on the back, and under MILD ALES was STOUT, priced at 53/- (53 shillings) per barrel. The information in the brewing books was sparse, just the bare statistics in accounting fashion, with no detail about process. I noticed that many of the beers listed were similar to those of other regional breweries for this period.

### 1903 MORRELL'S P AND SMALL BEER

In looking for an interesting beer to see its evolution over time, one labeled only as *P* was the first suspect—*P* for porter. The first

mention of *P* was found in an 1889 brewing book, and it had an original gravity of 26 pounds per barrel (1.072).<sup>5</sup>

Because I like stouts, Table 1 gives an all-malt formulation for 1903 Porter and Small Beer.<sup>6</sup> This version would suit a brewer that abhors the whole idea of using glucose (dextrose) or grain adjuncts. Much of this was brewed as a parti-gyle by mixing mostly strong wort with some weak wort, i.e. 120 barrels at 26 pounds per barrel (1.072) combined with 11 barrels at 9.6 pounds per barrel (1.027).

In 1903 the major hop types in store were Mid Kent 1901, Bavarians 1899, East Kent 1902.<sup>7</sup> From later records, it was likely that the hops used were a blend of olds (more than two years old) and old olds (more than three years old), Fuggle would seem a reasonable kettle

**TABLE 1: 1903 MORRELL'S P AND SMALL BEER**

| Gyle 6<br>Brewed 17 October 1903 |               | Historical recipe for 131 brl.<br>(120 brl. Porter & 11 brl. Small Beer) |                | Modern homebrew suggestion |  |
|----------------------------------|---------------|--------------------------------------------------------------------------|----------------|----------------------------|--|
| Historic Ingredient              | Qty.          | Weight in pounds                                                         | Pct. by weight | Modern Ingredient          |  |
| Pale malt @ 336 lb./qr.          | 35 qr.        | 11,760 lb.                                                               | 90%            | Maris Otter or Chevallier  |  |
| Black malt @ 256 lb./qr.         | 5 qr.         | 1,280 lb.                                                                | 10%            | Black Patent               |  |
| <b>TOTAL</b>                     | <b>40 qr.</b> | <b>13,040 lb.</b>                                                        |                |                            |  |
| Hops (variety unspecified)       | 196 lb.       | 1.5 lb./brl. (4.9 lb./Qr.)                                               |                | Fuggle 2.77 g/L at boil*   |  |

\*A 5-hour boil was shown in the brewing book, but I suggest adjusting to a more reasonable 90 minutes.

### THE DRINK DELECTABLE

There are few breweries now left where the materials used are only the sacred three—malt, hops and water—but amongst them is still reckoned to be the subject of our sketch,

#### The Old Lion Brewery at Oxford

Now owned by Messrs. Morrell's Trustees, and well known in the days of Mr. James Morrell as the largest single handed brewery in England.

Here one can still purchase the genuine article, brewed from malt made from the best Oxfordshire barleys and the finest hops Kent, Farnham or Worcester can produce. The business was founded in the 18th century, and passed about the year 1885 into the hands of Mr. James Morrell, jun.

The premises consist of a large modern maltings, a mineral water factory, large stabling, offices and brewery buildings proper. The latter contain two mash tuns, 35 qr, and 55 qrs, giving a working capacity of up to 2,500 barrels per week, and two large boiling coppers [kettles]—one open, the other closed. The former, of 160 brl capacity, is used for the production of delicate bitter ales, the latter for the brewing of stout, for which this firm has a wide reputation, and for which they gained a prize at the Brewers Exhibition in London in 1901.

At this brewery the beers were formerly cleansed in slate pontos [pontoons], but these were done away with about ten years ago [1891], and an 'all copper' system introduced, the hop back and all the skimming vessels now being copper lined, thus giving at once the utmost cleanliness of manufacture, and guarantee for soundness.

There are large bottling stores where the head brewer does not fail to draw attention to the fact that, in spite of all the experiments of the last twenty years with screws, seals, and patent fastenings of every kind, the old cork system is the most perfect one, and beer bottled this way manifests a decided superiority over every other. The beers are bottled directly from the cask and not filtered through pulp, or artificially 'conditioned' but allowed to mature in bottle.

Reprinted from *The Gentleman's Journal*, May 5, 1906.



Inside the brewhouse at Morrell's of Oxford.

hop for a stout. I reduced the hopping rates for the modern recipe to account for the likelihood that the historical hops would have had seeds and lower alpha acid content than today's hops, but I did notice that they were paying a premium for cold storage.

No fermentation details or final gravity were stated for this 1903 Porter, but earlier versions of this beer from 1899 showed that the final attenuation ranged between 6.25 and 9.5 pounds per barrel, or 1.017 to 1.026, which would give a stout of between 6% and 7% ABV.<sup>8</sup>

I found some further insights into their brewing system in three letters in the records.<sup>9</sup> The letters were addressed to the Morrell's Trustees, and I have summarized them as follows

## ARCAIC WEIGHTS AND VOLUMES

When researching old recipes, one frequently encounters units of measurement that are no longer in use, and the accompanying recipes from Morrell's of Oxford are no different. Here's a rundown of a few obscure weights and volumes of relevance to this article.

A pound (lb.) is the same whether you're in the United States or the United Kingdom, a unit of weight equal to approximately 453.59 grams.\* The Imperial hundred-weight (cwt) was—and still is—equal to 112 lb. (The U.S. hundredweight is 100 lb.)

The bushel (bus.), barrel (btl.), and quarter (qr.) are *volume* measurements. One quarter is equal to 8 Imperial bushels. In turn, an Imperial bushel is equal to 8 Imperial gallons. Thus, a quarter is 64 Imperial gallons. An Imperial barrel (btl.) is equal to 36 Imperial gallons. (Keep in mind that Imperial measurements are different from U.S. measurements with the same names: an Imperial gallon is slightly more than 20 percent larger than a U.S. gallon)

| Historical Unit | U.K. equivalent  | U.S. equivalent | Metric equivalent |
|-----------------|------------------|-----------------|-------------------|
| Bushel (bus.)   | 8 Imperial gal.  | 9.61 U.S. gal.  | 36.37 L           |
| Barrel (btl.)   | 36 Imperial gal. | 43.23 U.S. gal. | 163.66 L          |
| Quarter (qr.)   | 64 Imperial gal. | 76.86 U.S. gal. | 290.95 L          |

The quarter (qr.) was used to describe the capacity of mash tuns (see the sidebar *The Drink Delectable*). But, quarters and bushels were also used to describe grain quantities. The actual weights represented by these measurements depended on the commodity being weighed. Custom and practice meant buyers knew from experience what weight to expect from a bushel or a quarter of a given substance, just as modern homebrewers understand that a gallon of water weighs more than a gallon of pale malt. A U.K. quarter of base malt nominally weighed 336 pounds, while a quarter of black patent malt was 256 pounds.

Hopping rates could be defined as the number of pounds of hops used per quarter (lb./qr.) or as the number of pounds per barrel (lb./btl.). The pounds per barrel number is useful, as this figure, after applying a suitable reduction to account for age of hops, storage conditions, seeds, use of pellets, etc., can be converted into grams per liter (g/L). For example, for the 1933 Bitter and Proctor, the straight conversion of 1.75 lb./btl. to 4.85 g/L is reduced by one-third to yield 3.2 g/L for modern brewers with better hops.

Finally, there are numerous mentions of gravity expressed in brewers' pounds per barrel (lb./btl.), which have been converted to specific gravity. If you want to bother with the math, you just need to know that an Imperial barrel of water weighs roughly 360 pounds. For example, you can convert 20.1 lb./btl. to specific gravity as follows:

$$\frac{360 + 20.1}{360} = 1.056$$

\*Strictly speaking, grams represent mass, not weight, but that's not relevant to this discussion.

**TABLE 2: 1933 BEST BITTER AND PROCTOR**

| Gyle 11<br>Brewed 26 October 1933 |               | Historical recipe for 120 brl.<br>(110 brl. Proctor & 10 brl. B.B.) |  | Modern homebrew<br>suggestion |                           |
|-----------------------------------|---------------|---------------------------------------------------------------------|--|-------------------------------|---------------------------|
| Historic<br>Ingredient            | Qty.          | Weight in pounds                                                    |  | Pct. by<br>weight             | Modern<br>Ingredient      |
| Pale malt @ 336 lb./qr.           | 20 qr.        | 6,720 lb.                                                           |  | 90.7%                         | Maris Otter or Chevallier |
| Black malt @ 32 lb./bus.          | 4 bus.        | 128 lb.                                                             |  | 1.7%                          | Black Patent              |
| Glucose                           | 5 cwt.        | 560 lb.                                                             |  | 7.6%                          | Dextrose powder           |
| <b>TOTAL</b>                      | <b>23 qr.</b> | <b>13,040 lb.</b>                                                   |  |                               |                           |
| Hops (variety unspecified)        | 210 lb.       | 1.75 lb./btl. (9.1 lb./Qr.)                                         |  | Fuggle 3.2 g/L at boil        |                           |

A boil time of 3.5 hours was recorded.

The Morrell's brewery seems to have had some trouble after they upgraded their brewery in 1875. Reports from H. H. Haslett, the then newly appointed brewer, in 1887 had a list of plant required improvements and suggestions for improving the beer. He didn't like the pontoons.

The pontoons hold 10 brl each; if we have a brewing of 109 brl the question arises of what to do with the extra 9 brl. At present the 9 brl are run into 27 gallon tubs and fermented, the temperature decreases and the beer only partially attenuates, however, this beer is pumped into the settling back and renders the whole cloudy.

By 1890, Alfred Jorden, the manager, was not happy. His letter stated that in 1875 slate pontoons, pipe, and connections were put in. In 1885, there were complaints that the beers were "unsound." Several eminent consultants of the day, including Mr. Southby, thought the water to blame, but Dr. Moritz identified that wort was being contaminated by the "accumulation of decomposed matter" in the wort pumps and suggested that they be cleaned. This was done at the expense of £1,000, as the sediment in the wort mains had to be burned out.

Mr. Jorden wrote, "I was not asked for a report as you considered it a matter for the manufacturing department and

the Architect. In 1887 Mr. Haslett was appointed and he was an advocate of using the skimming system for cleansing the beer and removing the pontos [pontoons]." Jorden then proposed that there was no present need for extending the skimming system.

After Jorden's death in 1890, there was an annual report from Haslett, dated October 10, 1891. Of note was that only pale and black malts were used, and the foreign malts to be used were Californian for stock beers and an increased amount of Symrna (Turkish) for running beers, due to the English barleys being of "indifferent quality and poor in extract."

I continued working my way through the books looking for something different and found that in October 1930, there was a parti-gyle of XXXX & Proctor Special, with the next mention in April 1931—B.B. & Pr. XXXX at 30 pounds per barrel (1.082). Then, in October 1931, its full name of Proctor reappeared, and it was brewed as a parti-gyle with B.B. Best Bitter on a regular basis.

There was a long-established tradition of brewing a big ale for the faculty of the big universities (think Audit Ale or Chancellor Ale). However, the Morrell's Lion Brewery in Oxford produced a near barley-wine-strength ale called Proctor, in bottle and draught, that probably took advantage of the undergraduates at the start of term when they were flush with funds.

### 1933 BEST BITTER AND PROCTOR<sup>10</sup>

In the 1933 brewing books Proctor was parti-gyled with B.B. (Best Bitter) at 14.7 pounds per barrel (1.040), which was probably sold as OOB - Original Oxford Bitter.<sup>11</sup> The parti-gyle was 10 barrels of Proctor at 30 pounds per barrel (1.082) and 110 barrels of B.B. at 1.040.

I suggest using a large proportion of the first copper for Proctor and the rest of the first copper and all the second copper for B.B. or possibly use a reiterated mashing technique and just brew the Proctor.

Use the *Guile Brews* Blending Calculator (link at HomebrewersAssociation.org/s020) to adjust your worts and liquor into the fermenters.

Dry hopping was not shown, but earlier stock documents showed hops listed separately, so it was done. Perhaps consider 4 ounces per barrel (0.69 g/L) for the B.B. and 8 ounces per barrel, (1.39 g/L) for Proctor.<sup>12</sup>

### 1953 LIGHT AND COLLEGE ALE<sup>13</sup>

The next brewing books were from 1946, and Proctor was nowhere to be found! B.B. at a gravity of 1.034 was now gyled with College Ale at 1.078—it seems Proctor did not survive the war. By 1953, College Ale was a classic parti-gyle of a small volume of a strong beer (10 barrels at 1.075) and a larger volume of a weaker beer (110 barrels at 1.031). The weaker beer originally known as Best Bitter had at this time been renamed to Light.

**TABLE 3: 1953 LIGHT AND COLLEGE ALE**

| Gyle 36<br>Brewed 3 June 1953 |                  | Historical recipe for 120 brl.<br>(110 brl. Light & 10 brl. College) |  | Modern homebrew<br>suggestion |                         |
|-------------------------------|------------------|----------------------------------------------------------------------|--|-------------------------------|-------------------------|
| Historic<br>Ingredient        | Qty.             | Weight in pounds                                                     |  | Pct. by<br>weight             | Modern<br>Ingredient    |
| Pale malt @ 336 lb./qr.       | 14.5 qr.         | 4,872 lb.                                                            |  | 89.0%                         | Maris Otter             |
| Crystal malt @ 288 lb./qr.    | 1.5 qr.          | 432 lb.                                                              |  | 7.9%                          | Medium crystal (88°L)   |
| Flaked barley                 | 1.5 cwt.         | 168 lb.                                                              |  | 3.1%                          | Flaked or rolled barley |
| <b>TOTAL</b>                  | <b>16.75 qr.</b> | <b>13,040 lb.</b>                                                    |  |                               |                         |
| Hops (variety unspecified)    | 154 lb.          | 1.28 lb./btl. (9.2 lb./Qr.)                                          |  | Fuggle 2.64 g/L at boil       |                         |

The 3.5-hour boil was reduced to 70 minutes and hopping rate increased to suit.



Brew  
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# 1953 Morrell's College Ale

Gyle No. 36 – 3 June 1953

In formulating the timing and types of hop additions, I relied on recipes for similar strong ales from other breweries from the same period. Similarly, the fermentation details and final gravity are assumptions. This recipe is based on a mash efficiency of 75% and was validated using the Brewfather app, which I highly recommend.

**Batch volume:** 19 liters [5 U.S. gal.]

**Original gravity:** 1.075 [18.2°P]

**Final gravity:** 1.022 [5.6°P]

**Color:** 27 EBC [14 SRM]

**Bitterness:** 34 IBU

**Alcohol:** 7% by volume

## MALTS & ADJUNCTS

6.19 kg [13.6 lb.] Simpsons Maris Otter malt

549 g [1.2 lb.] Crisp Medium Crystal malt

216 g [7.6 oz.] flaked barley

## HOPS

58 g [2 oz.] UK Fuggle, 5% a.a. @ 70 min

7 g [0.25 oz.] UK East Kent Goldings, 4.8% a.a., dry hop

## WATER

Ca 50 ppm, Mg 10 ppm, Na 15 ppm, SO<sub>4</sub> 75 ppm, Cl 63 ppm, HCO<sub>3</sub> 40 ppm

## YEAST

White Labs WLP002 English Ale

## ADDITIONAL ITEMS

1 tablet Whirlfloc @ 5 min

## BREWING NOTES

Mash at 65°C [149°F] for 90 minutes. Sparge at 75°C [167°F]. Boil 70 minutes, adding hops and Whirlfloc as indicated, added 5 minutes before end of boil.

Pitch yeast at 18°C [65°F] and let rise to 20°C [68°F] over 3 days. Hold at 20°C for 3 days, then gradually cool to racking temperature, roughly 14°C [58°F], over 1 day. Rack and dry hop. Carbonate to approximately 2 vol. [4 g/L].

College Ale was an English strong ale. This beer, like similar ones of this era, sits between the BJCP 2015 styles of Strong Bitter and English Barleywine and is perhaps not quite bitter enough for a Burton Ale.

I found no details in the archive about the specific brewing operations in either the 1930s or 1950s. A 1989 report on brewing practice mentioned the use of Maris Otter pale malt and suggested that mashing should be carried out at a single conversion temperature of 64°C (147°F) for 1.25 to 1.5 hours, followed by underletting at 75°C (167°F) and sparging at 75°C (167°F).<sup>14</sup>

A full recipe for a single gyle of College Ale based on the 1953 version accompanies this article. You, of course, have a choice to brew it either as a single high-gravity gyle, or design it as a parti-gyle of College Ale with Light.

I hope that these recipes and beers give you a flavor of the 82 curated recipes in my book *Guile Brews*. If you brew these beers please let me know how they turn out.

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### Napa Fermentation Supplies

575 3rd St Building A  
Napa, CA 94559-2701  
[707] 255-6372  
[napafermentation@aol.com](mailto:napafermentation@aol.com)  
[napafermentation.com](http://napafermentation.com)  
Serving all of your homebrew needs since 1983!

### Tavern Service Company

18228 Parthenia St  
Northridge, CA 91325-3391  
[818] 349-0287  
[info@tavernservice.com](mailto:info@tavernservice.com)  
[tavernservice.com](http://tavernservice.com)  
Complete range of homebrew supplies and equipment. Keg beer, nitro coffee supplies and CO<sub>2</sub> and nitrogen refills.

### NorCal Brewing Solutions - Online Retailer

8865 Airport Rd, Suite H  
Redding, CA  
[530] 243-2337  
[Sales@NorCalBrewingSolutions.com](mailto:Sales@NorCalBrewingSolutions.com)  
[NorCalBrewingSolutions.com](http://NorCalBrewingSolutions.com)  
Manufacturers of Jaybird line of brewing and distilling products: False bottoms, mash paddles, hop filters, yeast harvesters, brinks, thumpers. Call for custom hardware solutions!

### Homebrewer SD, The

2911 El Cajon Blvd # 2  
San Diego, CA 92104-1204  
[619] 450-6165  
[brew@thehomebrewerssd.com](mailto:brew@thehomebrewerssd.com)  
[thehomebrewerssd.com](http://thehomebrewerssd.com)  
AHA Homebrew Store of the Year 2018. Westcoaster Magazine Best Homebrew Store in San Diego: 2016, 2017, 2018. Supplies, classes, resources, with brewery & tasting room.

### Kings & Convicts BP, LLC

dba Home Brew Mart  
5401 Linda Vista Road, Suite 406  
San Diego, CA 92110  
[619] 295-2337  
[info@homebrewmart.com](mailto:info@homebrewmart.com)  
[homebrewmart.com](http://homebrewmart.com)

Home Brew Mart has been serving brewers world-wide for over 27 years now. We have everything you need to brew the beer you want.

### Doc's Cellar

855 Capitolio Way Ste 2  
San Luis Obispo, CA 93401-7175  
[805] 781-9974  
[docsellar@gmail.com](mailto:docsellar@gmail.com)  
[docsellar.com](http://docsellar.com)

### Beer Designs

5574 Everglades St Suite D  
Ventura, CA 93003  
[805] 308-2337  
[sales@beeravenue.com](mailto:sales@beeravenue.com)  
[beeravenue.com](http://beeravenue.com)  
Bringing your ideas to life by creating custom beer tap handles for home, office, or restaurant use! A selection of homebrewing supplies is also available.

### Colorado

The Brew Hut  
15120 E Hampden Ave  
Aurora, CO 80014-3906  
[303] 680-8898  
[brewmaster@thebrewhut.com](mailto:brewmaster@thebrewhut.com)  
[thebrewhut.com](http://thebrewhut.com)

Colorado's largest homebrew shop! Extensive inventory of beer-, wine-, cider-, and cheesemaking supplies. Cutting-edge classroom. Enjoy beer from Dry Dock Brewing while you shop.

### Boulder Fermentation Supply

2510 47th St  
Unit A2  
Boulder, CO 80301-2301  
[303] 578-0041  
[info@boulderfermentationsupply.com](mailto:info@boulderfermentationsupply.com)  
[boulderfermentationsupply.com](http://boulderfermentationsupply.com)

Open 7 days! Unique selection of ingredients and equipment including local Colorado products. Also offering classes for all skill levels, custom fabrication, kegerators, and more!

### Altitude Homebrewing Supply

2801 Walnut St Unit C  
Denver, CO 80205-2235  
[303] 292-2739  
[altitudebrew.com](http://altitudebrew.com)

Come in for all your brewing needs or to brew on site with our equipment and learn from our knowledgeable staff. Centrally located in Denver's RiNo district.

### Hops & Berries

1833 E Harmony Rd Unit 16  
(directly Behind The Cinemark Theatre)  
Fort Collins, CO 80528-3414  
[970] 493-2484, x802  
[manager@hopsandberries.com](mailto:manager@hopsandberries.com)  
[hopsandberries.com](http://hopsandberries.com)

Northern Colorado's homebrewing and winemaking supply shop! Also check out our cheesemaking kits, hot sauces, and coffee-roasting supplies.

### Lil' Ole Winemaker

516 Main St  
Grand Junction, CO 81501-2608  
[970] 242-3754  
[lowlinemaker@gmail.com](mailto:lowlinemaker@gmail.com)  
Serving Colorado and Utah brewers since 1978.

### Brewers & Collectors

2012 Greeley Mall Ste 40  
Greeley, CO 80631  
[970] 353-1649  
[eliasg.brewer.collector@gmail.com](mailto:eliasg.brewer.collector@gmail.com)  
Brewing supplies and accessories, sports memorabilia, and collectables. Now open at the Greeley Mall. 2012 Greeley Mall Ste 40.

### Tom's Brew Shop/6 & 40 Brewery Taproom

883 Parfet St Ste I  
Lakewood, CO 80215-5548  
[303] 238-8343  
[tom@tomsbrewshop.com](mailto:tom@tomsbrewshop.com)  
[tomsbrewshop.com](http://tomsbrewshop.com)  
Lakewood and Denver's #1 choice for equipment, beer, wine, mead & cider ingredients. AHA & monthly discounts. Mon-Fri 9-6, Sat 9-5 & Sun 9-2.



Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru® App!



## Connecticut

### Stomp N Crush

140 Killingworth Turnpike (Rt 81)

Clinton, CT 06413

[860] 552-4634

[info@stompcrush.com](mailto:info@stompcrush.com)

[stompcrush.com](http://stompcrush.com)

Carrying a full line of beer supplies, offering knowledgeable service, well stocked, and friendly atmosphere. 20+ years of brewing experience! Now selling cigars, too!

### Beer & Wine Makers Warehouse

290 Murphy Rd

Hartford, CT 06114-2107

[860] 247-2969

[info@bwmwct.com](mailto:info@bwmwct.com)

[bwmwct.com](http://bwmwct.com)

Full line of beer-, wine-, and cheesemaking supplies and equipment. Specializing in kegging setups and custom beer recipes. Beginner and advanced beer classes offered.

## Delaware

### How Do You Brew

812 Pencader Dr. Suite E

Newark, DE 19702

[302] 738-7009

[joe@howdoyoubrew.com](mailto:joe@howdoyoubrew.com)

[howdoyoubrew.com](http://howdoyoubrew.com)

The best in homebrewing supplies and ingredients for the homebrewer, including beer, wine, kombucha, and sodas.

## Florida

### VetterBrew HomeBrew Supply

2705 Cypress Drive

Clearwater, FL 33763

[727] 330-3825

[info@vetterbrew.com](mailto:info@vetterbrew.com)

[vetterbrew.com](http://vetterbrew.com)

Pinella County's only dedicated homebrew supply store.

Located in the Clearwater/Countryside/Dunedin area.

We carry all your beer- and winemaking supplies and equipment.

### Hangar 41 Winery & Brew Shop (Time To Make Wine, Inc.)

10970 S Cleveland Ave Ste 304

Fort Myers, FL 33907-2350

[239] 542-WINE [9463]

[sandy@timetomakewine.com](mailto:sandy@timetomakewine.com)

[timetomakewine.com](http://timetomakewine.com)

On-premises winery with a great selection of equipment and ingredients for home beer- and winemakers! Friendly and knowledgeable staff!

Nothing tastes better than homemade! Check out our shop on Oahu or shop online. Supplying the Aloha state since 1996.

Proudly serving the Tri-state area since 2006 with a complete line of beer- & winemaking supplies.

## Urban Brewers

4600 SW 75th Ave.

Suite E

Miami, FL 33155

[866] 414-2739

[admin@urbanbrewers.com](mailto:admin@urbanbrewers.com)

[urbanbrewers.com](http://urbanbrewers.com)

Free shipping for all Florida customers!! Fresh ingredients!!

We also offer beermaking classes for beginners and experienced homebrewers.

## Gary's Homebrew Supply

3403 Gulf Beach Hwy

Pensacola, FL 32507

[850] 723-2739

[garyshomebrew@gmail.com](mailto:garyshomebrew@gmail.com)

[garysbrew.com](http://garysbrew.com)

Open Monday thru Friday: 11 a.m. to 5 p.m. and Saturday: 10 a.m. to 3 p.m. 5% off purchases for AHA members.

## BrewSRQ

6311 Porter Rd Unit 7

Sarasota, FL 34240

[941] 444-9665

[orderbot@brewsrq.com](mailto:orderbot@brewsrq.com)

[brewsrq.com](http://brewsrq.com)

Full-service supply offering our entire inventory online for your ordering convenience. Most FL orders arrive next business day. Flat-rate and free shipping available.

## Scortino & Son Brewery Supply

9599 Gator Dr. Unit 4

Sebastian, FL 32958

[772] 999-6242

[info@scortinoandson.com](mailto:info@scortinoandson.com)

[scortinoandson.com](http://scortinoandson.com)

Sebastian, FL based family-run brew store

## Hawaii

### Homebrew In Paradise

740A Moowaa St

Honolulu, HI 96817

[808] 834-2739

[bill@homebrewinparadise.com](mailto:bill@homebrewinparadise.com)

[homebrewinparadise.com](http://homebrewinparadise.com)

Nothing tastes better than homemade! Check out our shop on Oahu or shop online. Supplying the Aloha state since 1996.

## Iowa

### Bluff Street Brew Haus

372 Bluff St

Dubuque, IA 52001-6920

[563] 582-5420

[jerry@bluffbrewhaus.com](mailto:jerry@bluffbrewhaus.com)

[bluffbrewhaus.com](http://bluffbrewhaus.com)

Proudly serving the Tri-state area since 2006 with a complete line of beer- & winemaking supplies.

## Illinois

### Down The Hall Homebrew

122 E Main St.

Belleville, IL 62220

[618] 277-2550

[info@dthhomebrew.com](mailto:info@dthhomebrew.com)

[downthehallhomebrew.com](http://downthehallhomebrew.com)

## Gnome Brew Homebrew

2026 W. Montrose Ave.

Chicago, IL 60618

[773] 961-7750

[gnomes@gnomebrewshop.com](mailto:gnomes@gnomebrewshop.com)

[gnomebrewshop.com](http://gnomebrewshop.com)

## Pursuit Supply Company, The

4316 W. Irving Park Road

Chicago, IL 60641

[312] 985-6652

[contact@pursuitsupply.com](mailto:contact@pursuitsupply.com)

[pursuitsupply.com](http://pursuitsupply.com)

The Northwest side's independent homebrew shop. We offer fresh ingredients, quality supplies, friendly advice. 10% off all grain for AHA members.

## Perfect Brewing Supply

619 E Park Ave

Libertyville, IL 60048-2904

[847] 816-7055

[info@perfectbrewsupply.com](mailto:info@perfectbrewsupply.com)

[perfectbrewsupply.com](http://perfectbrewsupply.com)

We have an excellent selection of equipment and ingredients for beer, wine, cider, and more. Remember, great friends bring homebrew.

## What's Brewing? Supply

335 W Northwest Hwy

Palatine, IL 60067

[847] 359-2739

[Info@WhatsBrewingSupply.com](mailto:Info@WhatsBrewingSupply.com)

[WhatsBrewingSupply.com](http://WhatsBrewingSupply.com)

We have the freshest home beer- and winemaking ingredients as well as all your equipment needs. CO<sub>2</sub> refills! 10% AHA member ingredient discount.

## Chicago Brew Werks

14903 S Center St Unit 107

Plainfield, IL 60544-2177

[815] 531-5557

[brews@chicagobrewwerks.com](mailto:brews@chicagobrewwerks.com)

[chicagobrewwerks.com](http://chicagobrewwerks.com)

Midwest's largest selection of grain, hops, and yeast. Over 300 different whole grain malts, 110 hop varieties, and 220 yeast strains! Brew on!



## Indiana

### 3rd Horse Craft Beverage Supply

27751 County Rd. 26

Elkhart, IN 46517

(574) 276-2823

[facebook.com/3rdhorsecraftbeveragesupply](http://facebook.com/3rdhorsecraftbeveragesupply)

## Great Fermentations

5127 E 65th St

Indianapolis, IN 46220-4816

(317) 257-9463

[customerservice@greatfermentations.com](mailto:customerservice@greatfermentations.com)

[greatfermentations.com](http://greatfermentations.com)

*Indiana's largest selection of FRESH ingredients!*

*Extensive line of brewing and draft equipment. Beginning and advanced classes in our education center. Largest inventory of Blichmann replacement parts. Brewers serving brewers.*

## Kansas

### Cottin's Hardware & Rental

1832 Massachusetts St

Lawrence, KS 66044

(785) 843-2981

[hardware@sunflower.com](http://hardware@sunflower.com)

[cottinhardware.com](http://cottinhardware.com)

*Cottin's Hardware & Rental added brewing supplies to their selection in 2018. They stock a full line of yeasts, grains, hops, and equipment. If they don't have what you need, they will order it!*

## Brew Bros Hops and Sprockets

1110 Laramie St.

Manhattan, KS 66502

(785) 537-3737

[brewbroshs@gmail.com](mailto:brewbroshs@gmail.com)

[facebook.com/brewbroshopsandsprockets](http://facebook.com/brewbroshopsandsprockets)

*We're your local homebrewing supply and bicycle repair emporium! Homebrewing supplies and bike repair? We DID know we couldn't do that.*

## Kentucky

### Brewer Dude

211 East Seventh St.

Lexington, KY 40508

(888) 337-3137

[team@brewerdude.com](mailto:team@brewerdude.com)

[brewerdude.com](http://brewerdude.com)

*Brewer Dude is where good beer starts. Large selection of products, including grains sold by the ounce and nationwide, flat-rate shipping.*

The advertisement features a dark background with orange accents. At the top, the word "ANVIL" is written in large, white, distressed letters. Below it, the words "INTEGRATE WITH EASE" are displayed in a smaller, white, sans-serif font. A central text block reads: "Anvil's accessories keep you growing. Developed with compatibility and quality in mind, these accessories will help build your brew day without compromising on value." Below this, the text "Get brewing with Anvil." is shown. The middle section is a grid of six product images, each with a title: "BOTTLE CAPPER", "TEMPERATURE CONTROLLER", "CARBOY COOLING SYSTEM", "LARGE GRAIN SCALE", "PRECISION SCALE", and "O2 WAND WITH REGULATOR". The bottom section features the "ANVIL BREWING EQUIPMENT" logo in a stylized font, with "ANVILBREWING.COM" at the bottom.



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## Louisiana

### Brewstock Homebrewing Supplies

1300 S Broad Ave.  
New Orleans, LA 70125  
(504) 208-2788  
[oliver@brewstock.com](mailto:oliver@brewstock.com)  
[brewstock.com](http://brewstock.com)

*Louisiana's largest homebrew selection in the heart of the Crescent City. Beer, wine, cheese, and more.*

## Massachusetts

### Beer & Wine Hobby

87 Andover Street, Unit 3  
Danvers, MA 01923  
(800) 523-5423  
[bwhinfo@beer-wine.com](mailto:bwhinfo@beer-wine.com)  
[beer-wine.com](http://beer-wine.com)

*One-stop shopping for all your home wine & brewing equipment & supplies.*

## Maryland

### AleCraft Brewing Supply

319 South Main St.  
Bel Air, MD 21014-3704  
(410) 420-5102  
[estreett@alecraftbrewing.com](mailto:estreett@alecraftbrewing.com)  
[alecraftbrewing.com](http://alecraftbrewing.com)

*Free and private brewing classes available. Stop in for your beer, wine, cheese ingredients, and more! Taproom and brewery on-site.*

### Maryland Homebrew

6770 Oak Hall Ln Ste 108  
Columbia, MD 21045-4768  
(888) BREW-NOW  
[chrisanderson@mdhb.com](mailto:chrisanderson@mdhb.com)  
[mdhb.com](http://mdhb.com)

*For all your beer, winemaking, fermenting, and cheesemaking needs. Free shipping! AHA discounts!*

## Flying Barrel

1781 N Market St  
Frederick, MD 21701-4305  
(301) 663-4491  
[info@flyingbarrel.com](mailto:info@flyingbarrel.com)  
[flyingbarrel.com](http://flyingbarrel.com)

*Supply shop and brew on premises. Large selection of ingredients, equipment, and supplies for homebrew, winemaking, and more.*

## Annapolis Home Brew

836 Ritchie Hwy Ste 19  
Severna Park, MD 21146-4133  
(410) 975-0930  
[annahomebrew@gmail.com](mailto:annahomebrew@gmail.com)  
[annapolishomebrew.com](http://annapolishomebrew.com)

*We carry supplies to make your own beer, wine, cider, mead, kombucha, and more! Brew on premises available. Come in here and build a beer!*

## Maine

### Central Street Farmhouse

30 Central St  
Bangor, ME 04401-5106  
(207) 992-4454  
[josh@centralstreetfarmhouse.com](mailto:josh@centralstreetfarmhouse.com)  
[centralstreetfarmhouse.com](http://centralstreetfarmhouse.com)

*Maine's premier homebrewing destination, featuring extensive line of signature beer kits, winemaking classes and supplies, and everyday technical and emotional support! Check out our webstore!*

## Michigan

### Adventures In Homebrewing

6071 Jackson Rd  
Ann Arbor, MI 48103  
(313) 277-2739  
[hops@homebrewing.org](mailto:hops@homebrewing.org)

*The best homebrew shop in Michigan. We specialize in beermaking, winemaking, and spirits. Founded in 1999, we have the most experience and best customer service.*

### O'Connor's Home Brew Supply

619 Lyon St NE  
Grand Rapids, MI 49503-3445  
(616) 635-2088  
[info@oconnorshomebrew.com](mailto:info@oconnorshomebrew.com)  
[shop.oconnorshomebrew.com](http://shop.oconnorshomebrew.com)

*O'Connor's is a dedicated homebrew supply store that caters to the needs of all levels of homebrewers. Our knowledgeable staff is always eager to help!*

### Bell's General Store

355 E Kalamazoo Ave  
Kalamazoo, MI 49007-3807  
(269)382-2332  
[generalstore@bellsbeer.com](mailto:generalstore@bellsbeer.com)  
[store.bellsbeer.com](http://store.bellsbeer.com)

*Staying true to our roots, Bell's General Store has been supplying homebrewers since 1983. Visit us next door to Bell's Eccentric Cafe or online at [bellsbeer.com](http://bellsbeer.com).*

## Cap N Cork Homebrew Supply

16776 21 Mile Rd  
Macomb, MI 48044-2600  
(586) 286-5202  
[info@capncorkhomebrew.com](mailto:info@capncorkhomebrew.com)  
[capncorkhomebrew.com](http://capncorkhomebrew.com)

*We carry a full selection of beer and winemaking equipment!*

## Adventures In Homebrewing

23869 Van Born Rd  
Taylor, MI 48180-1226  
(313) 277-2739  
[homebrew@homebrewing.org](mailto:homebrew@homebrewing.org)  
[homebrewing.org](http://homebrewing.org)

*The best homebrew shop in Michigan. We specialize in beermaking, winemaking, and spirits. Founded in 1999, we have the most experience and best customer service.*

## UBREW - Traverse City

3054 Cass Rd.  
Suite F  
Traverse City, MI 49684  
(231) 943-2016  
[ubrewtc.com](http://ubrewtc.com)

## Minnesota

### Grains & Taps

710 SE 3rd St  
Lees Summit, MO 64063  
(816) 866-5827  
[grainsandtaps.com](http://grainsandtaps.com)

*Grains & Taps. Your home for homebrewing supplies and craft beer. Lee's Summit, Missouri.*

## Brew-n-Wine

219 S Victory Dr Ste 100  
Mankato, MN 56001-5329  
(507) 345-5733  
[dg@brew-n-wine.com](mailto:dg@brew-n-wine.com)  
[brew-n-wine.com](http://brew-n-wine.com)

## Midwest Supplies

5825 Excelsior Blvd  
Minneapolis, MN 55416-5371  
(952) 925-9854  
[nick.stephan@northernbrewer.com](mailto:nick.stephan@northernbrewer.com)  
[midwestsupplies.com](http://midwestsupplies.com)

*Everything you need to make beer, wine, cheese, and coffee with an extensive selection of hydroponics paired with unmatched service at an affordable price.*



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Our bottles and cans may not have the flag.  
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That's Independence You're Tasting.



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## Missouri

### St. Louis Wine and Beer Making

231 Lamp and Lantern Vlg  
Chesterfield, MO 63017-8209

[636] 230-8277

info@wineandbeermaking.com  
wineandbeermaking.com

*The complete source for beer-, wine-, and meadmakers!*

### Missouri Malt Supply

2275 Cassens Dr Ste 126  
Fenton, MO 63026-2574

[314] 779-6258

kent@momalt.com  
momalt.com

*Supermarket to the small-scale brewer. Fresh ingredients and quality brewing equipment at reasonable prices.*

*Friendly service and expert advice.*

### Homebrew Supply of Southeast MO

3463 State Highway FF  
Jackson, MO 63755-7086

[573] 579-9398

homebrewsupply@gmail.com  
homebrewsupplymo.com

*Southeast Missouri's one-stop-shop for all your beer, wine, mead, and distilling needs. Craft beer bar onsite with 12 taps.*

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9995 Winghaven Blvd  
O'Fallon, MO 63368-3823  
[636] 265-0751  
marc@design2brew.com  
design2brew.com

*Eastern Missouri's largest selection of FRESH ingredients! Extensive line of brewing and draft equipment. Beginning and advanced classes in our education center. Brewers serving brewers.*

### Home Brewery (MO), The

1967 W Boat St  
Ozark, MO 65721-6614  
[417] 581-0963  
brewery@homebrewery.com  
homebrewery.com

*Since 1984 The Home Brewery has been providing our customers with excellent customer service, selection and prices. Everything you need for homebrewing, winemaking, cheesemaking, and more!*

## North Carolina

### Asheville Brewers Supply

712 Merrimon Ave Ste B  
Asheville, NC 28804-2450

[828] 285-0515

brewgeeks@ashevillebrewers.com  
ashevillebrewers.com

*South's finest. Since 1994. Stocking the best in malts, hops, and yeast. Also carrying supplies for mead, cider, cheese, pickles, and kegging!*

### Alternative Beverage - Belmont

1500 River Dr Ste 104

Belmont, NC 28012-3578

[704] 825-8400

AB@ebrew.com  
ebrew.com

*alternativebeverage.mobi 20,000 sf warehouse. Large inventory, quick service, good advice, and reasonable prices. 150 beer recipe packages.*

### Alternative Beverage - Charlotte

3911 South Blvd.  
Charlotte, NC 28209

[704] 825-8400

SB@ebrew.com  
ebrew.com

### Alternative Beverage - Cornelius

19725 Oak St #10  
Cornelius, NC 28031  
[704] 527-2337  
ab@ebrew.com  
ebrew.com

### Bull City Homebrew

5410 NC Hwy 55 Suite AF  
Durham, NC 27713  
[919] 682-0300  
drew@bullcityhomebrew.com  
bullicityhomebrew.com  
*Beer and winemaking equipment and supplies.*

### American Brewmaster Inc.

3021 Stoneybrook Dr Ste 5  
Raleigh, NC 27604-3783  
[919] 850-0095  
abrew@americanbrewmaster.com  
americanbrewmaster.com

## Atlantic Brew Supply

3709 Neil St

Raleigh, NC 27607-5415

[919] 670-4043

info@atlanticbrewsupply.com

atlanticbrewsupply.com

*Atlantic Brew Supply is 3,000 square feet of beer geek paradise, nestled inside Raleigh Brewing Company's taproom. Shop online or grab a pint and visit our store!*

## Nebraska

### Patriot Homebrew Supply

2929 N 204th St # 107

Elkhorn, NE 68022-1201

[402] 510-1346

patriothomebrew@gmail.com

patriothomebrewsupply.com

*LIVE FREE and BREW! We provide high-quality ingredients, equipment and services including hands-on shopping, classes, social events, and seminars. Locally and veteran owned.*

## Kirk's Brew

1150 Cornhusker Hwy

Lincoln, NE 68521-2336

[402] 476-7414

kirk@kirkbsbrew.com

kirkbsbrew.com

*Serving beer- and winemakers since 1993!*

## Fermenters Supply and Equipment

8410 K Plaza, Suite #10

Omaha, NE 68144

[402] 593-9171

contact@fermentersupply.com

fermentersupply.com

*Since 1971, fresh beer & winemaking supplies. Six different start kits. We ship! Located at 84th & J Sts, BEHIND Just Good Meat.*

## New Hampshire

### Earth Eagle Brewings - Brewery, Pub & Homebrew Supply

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Portsmouth, NH 03801

[603] 767-8235

alex@aghomedbrewsupply.com

aghomedbrewsupply.com

*(Formerly A&G Homebrew Supply.) Quality equipment and ingredients for beer and winemaking. Classes.*

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## New Jersey

### Philly Homebrew Outlet - Oaklyn

215 W. Clinton Avenue - Suite 101

Oaklyn, NJ 08107

[215] 755-4556

info@phillyhomebrew.com

phillyhomebrew.com

Redefining homebrew! Philly Homebrew Outlet specializes in beer, wine, cheesemaking, kegging, and bar equipment for homebrewers and professionals alike, with only the best customer service.

## Nevada

### BrewChatter

1275 Kleppe Ln Ste 21

Sparks, NV 89431-7200

[775] 358-0477

customerservice@brewchatter.com

brewchatter.com

Check out our BrewCranium Blog, BrewChatterTV on YouTube, and our website for everything you need! Do you brew? We do! Brew on!

## New York

### Bitter & Esters

700 Washington Ave

Brooklyn, NY 11238-2265

[917] 596-7261

contact@bitterandesters.com

bitterandesters.com

Bitter & Esters is New York City's only homebrew shop and brew on premises. We provide supplies, classes, and expertise in store and online at bitterandesters.com

### Brewshop At Cornell's Hardware

310 White Plains Rd

Eastchester, NY 10709-2802

[914] 961-2400

brewshop@cornells.com

brewshop.com

Westchester's complete home beer- and winemaking supply shop, located in Cornell's True Value Hardware. Easy to get to from the tri-state area.

### Pantano's Wine Grapes & Homebrew

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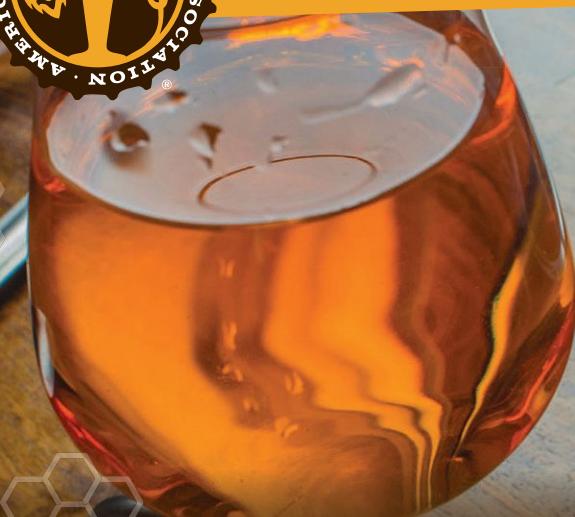
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## MEAD DAY 2020 TRADITIONAL MEAD

For 1 gallon (3.8 L)



### INGREDIENTS

**3 lb.** (1.4 kg) honey  
**0.75 gal.** (2.8 L) water, reverse osmosis or spring  
**0.17 oz.** (5 g) DV10 dry yeast  
**0.9 oz.** (25 g) Go-Ferm, dissolved in 4.2 fl. oz. (125 grams) of water  
**0.1 oz.** (3.75 g) Fermaid-O, added in 4 equal doses  
**0.04 oz.** (1 g) potassium metabisulfite to stabilize  
**0.07 oz.** (2 g) potassium sorbate to stabilize  
**0.48 lb.** (218 g) honey to back sweeten finished mead

### SPECIFICATIONS

Original Gravity: 1.108 (25 Brix)

### DIRECTIONS

#### General Notes

If you do not have R/O water, any potable water low in minerals that is dechlorinated will be acceptable.

Ferment at 62°F (17°C).

Prior to pitching the yeast, oxygenate must for 30 seconds.

Make sure you mix the must extremely well.

#### Yeast Rehydration

Yeast health is important, so Go-Ferm should be used to rehydrate the yeast. The formula is 1.25 grams of Go-Ferm per gram of yeast, so for this mead recipe it would be  $(5 \text{ grams} \times 1.25) = 6.25 \text{ grams}$ . You calculate the amount of water by multiplying the Go-Ferm amount by 20, which would give you 125 grams of water.

I only use reverse osmosis (RO) water, which I heat to 110°F (43°C) before adding the Go-Ferm. Add the yeast at around 90°F (32°C) and then pull some must and slowly temper the yeast mixture until its temperature is within 10°F (6°C) of that of the must. Whatever you do, do not let that mixture sit for more than 20 minutes without adding some must.

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For this batch, it would be  $[(25 \times 10) \times 0.75 \times 1] \div 50 = 3.75 \text{ grams}$  of Fermaid-O in four doses, which would be 1 gram per feeding. You will add 1 gram of Fermaid-O at 24, 48, 72, and 96 hours after pitching the yeast. If you are going to ferment cooler than 60°F (16°C) or warmer than 70°F (21°C), I suggest you change the YAN factor to 1.25.

#### Stabilizing

Before we add additional honey for back sweetening, you need to stabilize the mead so fermentation does not restart. To do that, you will add 1 gram of potassium metabisulfite and 2 grams of potassium sorbate. Mix these with a little water and then pour the mixture into the mead. Let this sit for 24 hours before you back sweeten.

Technically, this should be done based upon pH, but if you do not have the ability to measure that, I assure you the above calculations will be solid.

#### Back Sweetening

Say you would like your finished mead to have a final gravity of 1.020 (semi-sweet). That means you need to add 20 gravity points (1.020 – 1.00 = 0.020) to the finished mead. Divide those 20 gravity points by 35 (honey has 35 points per pound per gallon) to get  $20 \div 35 = 0.57$ . You probably have around 0.85 gallons that need to be sweetened. Multiply the gallons of mead you want sweetened by this ratio,  $0.85 \times 0.57 = 0.48$  pounds of honey. Mix that with some RO water and add this mixture to your mead after it has been stabilized.



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**ON THE ROAD WITH CHARLIE**

# Too Cold to Brew?

In the Mar/Apr 2016 issue of *Zymurgy*, I lamented my possible loss of temperature control for fermenting lagers. Fortunately, my fears of a catastrophic lagering chamber failure and inability to brew Pilsners, bocks, and Märzens never came to pass.

Unfortunately, my life circumstances changed drastically a couple of years ago (Last Drop, Jul/Aug 2019), and I had to give up most of my equipment in a major downsizing. Now I have the opposite issue: the fermenting cabinet in my schoolie has no temperature control, and it often gets too cold to ferment ale for much of winter. In the middle of winter, it can even get too cold for lager yeasts!

This situation cannot, *must* not, be allowed to prevail. I brew, therefore I am. (Technically I still *am*, of course, but not being able to brew is a real bummer.) If money were no object and space were abundant, I would simply purchase a freezer and temperature control unit and be done with it. But neither is what I'd wish, so cheap and small is my goal. And easy, of course.

I considered my predicament and came up with some ideas.

1. I could wait until spring to brew and force myself to survive the winter on store-bought beer. Ten to twelve bucks a sixer? Ain't gonna happen.
2. I could place the carboy in a large water-filled container, check the carboy's temperature day and night, 24/7, and add warm water as needed. This wouldn't cost much, but it's more effort than I care to expend. Ain't gonna happen.
3. I could get a heating device and control unit of some kind. Easy peasy once set up, but I am on a tight budget. Ain't gonna happen.
4. I could wrap and insulate the heck out of my fermenting vessel. I remembered saving an insulating jacket from my original mashing setup, thinking I

might use it in a brew-in-a-bag situation someday. DING! DING! DING! DING! DING! We have a winner.

My fermentation cabinet is easily in the 50s Fahrenheit (low teens Celsius), so I've taken to careful yeast selection depending on what I want to brew. Fortunately, most dry yeasts are quite capable of handling low fermentation temperatures.

For example, Chico strain derivatives such as Fermentis SafAle US-05, Lallemand BRY-97, and Mangrove Jack's M44 can work down into the mid 50s for American amber ale, brown ale, porter, stout, barleywine, and imperial stout. Lallemand Nottingham can ferment in the low 50s for British and Irish styles.

For malt-forward styles such as mild ale, ESB, milk stout, and the whole family of Scottish ales, I've found that Lallemand Windsor, Fermentis SafAle S-33, and Muntons Standard Yeast work well a little bit warmer, say, mid to upper 50s.

Fermentis SafAle K-97 and Lallemand Köln yeasts are great in the low to mid 50s for altbier and, of course, Kölsch. I've also used K-97 in a Widmer-style hefeweizen with good results. It's clean enough to use in many styles.

For Belgian pale ale, bière de garde, blonde, golden strong ale, and Trappist-style enkel, dubbel, tripel, and dark strong ale, Fermentis SafAle BE-256 and T-58 can handle the mid 50s. When I want to brew any German-style wheat beers or rogenbier, my choices are Fermentis SafAle WB-06 and Lallemand Munich Classic Wheat, which are good in the upper and mid 50s, respectively. I've also had good results using lager yeasts like Lallemand Diamond Lager and Fermentis SafLager W-34/70, S-189, and S-23 to brew "ales" at lower temperatures.

Of course, you can ferment beverages other than beer in the cold. Lalvin EC-1118 and Red Star Premier Cuvée will make great wine or mead as cold as the mid 40s Fahrenheit (mid to upper teens Celsius). Mangrove Jack's CL23, SN9, and BV7 all make wine or mead down into the mid to upper 50s. Mangrove Jack's M02 and Fermentis SafCider both work down to the low 50s for cider, and any of the wine or beer yeasts mentioned above can also be used to make cider.

After I got my systems figured out, my final step was to brew a pale mild ale (see "Del Norte Mild," Now on Tap, in this issue of *Zymurgy*). I pitched the yeast at 4:45 p.m. and had the airlock burping every nine seconds by 8 o'clock the next morning. The ambient temperature dropped to nearly 40°F (4°C), but the beer kept chugging along at the rate I'd previously achieved back when I had a freezer and temperature control unit. Problem solved.

**Steve Ruch** lives in Crescent City, Calif., and has been homebrewing for more than 20 years. He is a regular contributor to *Zymurgy*.





— HOME BREWER TO LEAD SOUR BREWER —

# MEET ELI TRINKLE



Eli Trinkle of Upland Brewing Co. was immediately drawn to home brewing after being introduced to it by his neighbor. After just one month of owning his own home brew setup, Eli was brewing all-grain with Wyeast smack-packs and kegging his own beer. He admits he was so intrigued by the process, it consumed his life. He spent countless hours researching and experimenting—he even worked as an assistant brewer while finishing his degree in engineering technology. Post-graduation, Eli decided that instead of pursuing more education, he'd turn his passion for brewing into a career.

Today, Eli has crafted a diverse portfolio of award-winning sours for Upland. He attributes his present-day brewing devotion to his colleagues at Upland, to the people of Bloomington, IN and the pride associated with pioneering a quality fermentation product. At Wyeast we share these same values, which is why we're pleased to toast the work of Eli and the rest of the Upland Brewing team.



See [wyeastlab.com](http://wyeastlab.com) for homebrewing recipes from Eli and other commercial craft brewers.

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