

Brew

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JULY 1999, VOL.5, NO.7

Annual Extract
Recipe Issue!

THE HOW-TO HOMEBREW BEER MAGAZINE

Great Summer Beers

18 Recipes

'How I
Created
Hempen
Ale'

Brewing
with Fruit

Styles: IPA,
Belgian
Tripel

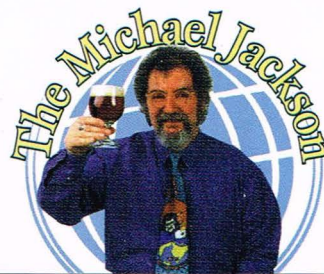


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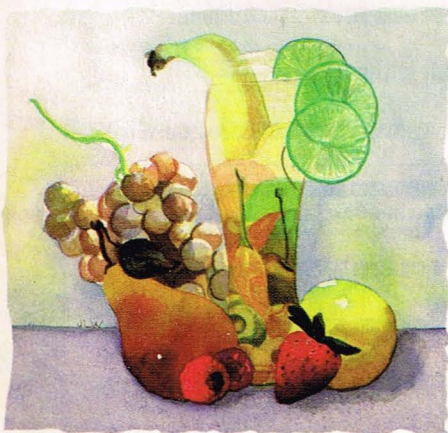
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The Recipe Bingo Caper

Summer is my favorite time of year. I've always preferred the heat to the cold and frankly, winter can't end soon enough to suit me. Maybe that's why I live in central California, where the winter only lasts two months and the summer temperatures range from a scorching 110° F to a balmy 106° F.

The summer heat does make us a little wacky here sometimes. At least that's one way to explain why the city where we live built a tunnel under the road one summer so the toads could hop from one side to the other without having to look both ways and wait for traffic. (Though the "Toad Cam" installed by the local newspaper indicates that no toads have used the "Toad Tunnel.") This is also the town where someone sued a neighbor for snoring too loudly and the mayor tried to have the alley behind her house declared a historic district so it wouldn't be paved, but those are stories for another time.

Summer heat is the excuse my brewing partners and I use to explain a stunt we pulled called "Recipe Bingo." It all happened because we were logy from the heat, I swear. We couldn't decide what recipe to brew, so we wrote each ingredient from five separate recipes on slips of paper and put them in a shoebox. Then we took turns pulling out slips until we had a complete recipe.

The result was something in the neighborhood of a brown ale, with a couple of oddball variations: a little Munich malt and Saaz as the aroma hop — not exactly British standards. Fine, we could live with that. One hitch, though. One of the recipes had coriander in it, and that was chosen as an ingredient. It didn't sound so great for the beer that was taking shape, but we were committed. Then, near the end, we

drew a slip that wasn't part of any of the other recipes. Some wiseguy, who will remain nameless (David), wrote 5 oz. of pineapple juice on one of the slips.

We moaned, we grimaced, we used unfriendly words. But we bought the ingredients and made the beer. We couldn't bring ourselves to completely embrace the pineapple idea, though. So we separated out a half-gallon of wort, added a small amount of juice to it, and fermented it separately in 22-ounce bottles with airlocks.

In the end the main beer was, well, interesting. We enjoyed it, but I'm not so sure everyone we offered it to did. But the pineapple-coriander beer, which we were all afraid to taste, turned out to be quite, well, awful. A bit sour with a soapy nose. You were expecting a happy ending?

This month's issue features some tips to help you avoid our mistakes. "Brewing with Fruit" (page 20) offers some suggestions on fruit options, good base beers to use, and the best ways to use fruit effectively. It's written by Dawnell Smith, who has brewed professionally at breweries in California and Alaska.

Also, check out the cover feature, "Great Summer Beers" (page 26), for some terrific extract recipes from top homebrew retailers and extract manufacturers. You'll do well with any one of these recipes. Just don't mix and match — take it from me.

Craig Bystrynski

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Stale, Dry Hopping

Dear Brew Your Own,

I came across a reference in my April '99 BYO about stale, aged hops for use in Belgian- and Trappist-style beers. Can you tell me how this process is done and what types of hops to use?

Mike Driessen
via e-mail

Stale, dry hops are used for two main purposes in Belgian-type beers. Many Belgian beers use a high percentage of unmalted wheat in the mash. Since wheat has no husk, using even malted wheat can create run-off troubles. The Belgians add these old hops to the mash tun to create filter-bed materials that simulate the missing husks. If you don't have stale hops, you can add oat hulls to your mash tun.

Exposure to heat (above refrigeration temperatures) and oxygen oxidizes alpha acids quickly. Also, some hop varieties degrade more quickly than others.

Some hop oil oxidation might create "caprylic acid," the smell of which is described as "goaty." This seems to happen to Saaz hops very quickly. So if you are going to attempt to use stale hops, beware. Try to keep the temperature low (about 60° F), keep them out of the light, and use your nose.

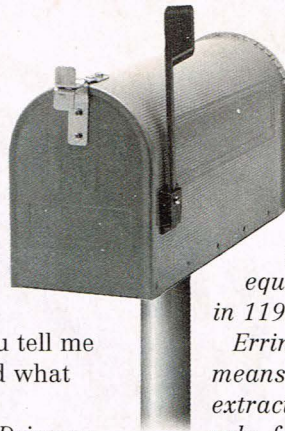
Converting Malt to Extract

Dear BYO,

I believe there is a typo in the extract with grain recipe for American Pale Ale (Style of the Month, May '99 BYO). Unless I'm missing something, it seems that eight pounds of pale malt extract syrup would produce more than an original gravity of 1.056 and 5.75 percent alcohol by volume. Should it be maybe seven pounds instead?

Bill Orr
Columbia, Mo.

As a rule of thumb, one pound of malt equals 14 ounces of extract



*syrup. Substituting the 8.5 pounds called for in the all-grain recipe into this equation (8.5 * 14) results in 119 ounces, or 7.4 pounds.*

Erring on the high side is a means of compensating for extracts that don't fit this rule, for brewers who are unable to boil vigorously enough, and for brewers who are unable to do a full-wort boil and must top off in the fermenter. Also, it's a lot easier to reduce the gravity of your wort (by adding water) than to increase it. And using the rule of thumb, the increase from the extra malt extract boosts the gravity to 1.060, not a major difference.

Contamination Concerns

Dear BYO,

"Four Classic Beers and How to Make Them" (March '99 BYO) provided instructions on making clones of several beers, one of which is my favorite, Celebrator Doppelbock. The directions call for the wort to be placed in the primary and fermented for two weeks at 55° F and then to add wine yeast and ferment two more weeks. The directions then say to transfer to secondary and store cold. My question concerns the amount of time the beer is to be left in the primary fermenter. I would think that leaving the beer in the primary for four weeks is just asking for a contamination problem.

Andrew C. Hall
via e-mail

At a cool temperature (55° F fermentation), and if care is taken when adding the wine yeast, there shouldn't be a contamination problem. Strong beers need extra time for their primary fermentation, this one being in two parts. Another option is to rack to a secondary with a lot of head room and add the wine yeast, then re-rack after another couple of weeks for conditioning/lagering purposes.



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Behind the Labels

Susie Holley
Clarksville, Tenn.

The inspiration for Twister Brew literally took us by storm. The brew date was set — January 22. Early that morning the weather radio alarm blasted. My husband, Mike, and 18-month-old son slept soundly, but I got up and listened to the warning: “Tornado in Clarksville.”

The family moved into the basement, and we were soon joined by my brother and his family. We spent most of the day in the basement, kids bouncing off the walls. Mike brewed the beer, my brother assumed the role of helper, and the power went on and off, all while an F5 tornado flattened downtown Clarksville (about seven miles from our home). Fortunately, there were no fatalities and only a



What better way to pass a day in the basement than making an eye-of-the-storm brew?

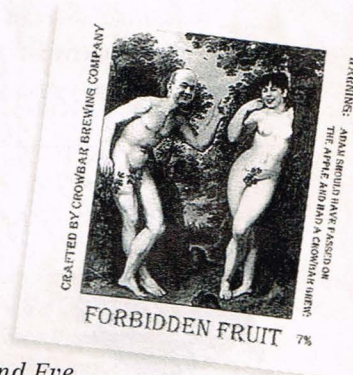
few minor injuries.

Whenever we're asked what we were doing when the twister hit, we reply that we were brewing. After all, the date was set.

Michel VanRavestyn
Haverhill, Mass.

I am Belgian. When I came to the United States and couldn't find the beer that I enjoyed so much in Europe, I started to brew my own. One of my favorites is Forbidden Fruit from Hoegaarden, Belgium. I made my own version of this beer, right down to the label.

On the original bottle is the famous painting of Adam and Eve by Peter Paul Rubens. When this beer is imported into the United States the label must be changed because it is considered too risqué. For my Forbidden Fruit label I placed my head on Adam and my wife Kellie's head on Eve.



A famous painting of Adam and Eve was the inspiration for this label.

John Lochridge
Spokane, Wash.

Dog Pounders was conceived in a Deer Lake, Wash., basement known as the “Dog Pound” (now a brewery, recreation room, and watering hole).

Ben “Dude Man” Chadwell, Matt “Ebe” Eby, and I conceptualized Dog Pounders beer. We visualized brewing Dog Pounders, drinking them, and playing pool, darts, foosball, and horseshoes (two of which could be dangerous if not played early on).



Below is John Lochridge's original sketch for the label. Artist Tami Hensley turned the cat-looking canine into an ornery, blue bulldog.



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An Everyday Beer from Belgium

by Scott R. Russell

I had an acquaintance say to me once that Belgian beers suck. That's what he said, and naturally I was flabbergasted.

I, at first respectfully, then less so, disagreed with him. I tried to pry out of him what nightmarish experience might have caused him to develop such a phobia, such an unnatural, irrational hatred. Finally it came out, sort of: "They're all sour, too strong, and they don't taste like beer."

I agreed that, yes, some Belgian beers are sour (such as lambics and gueuze) and many are quite strong (such as dubbels, tripels,

and strong golden ales). But there is more variety in a few hundred square miles of Belgium than on most entire continents. For him to generalize that all Belgian beers are bad...well, he was obviously a lost cause.

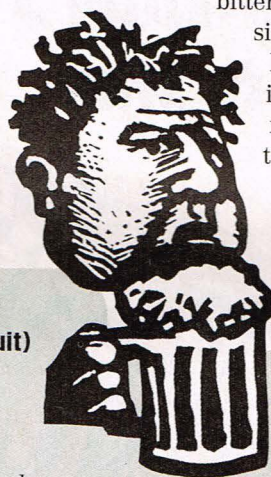
But I couldn't really accept this. There had to be a Belgian beer that he would classify as decent. A Belgian variation on a mainstream beer, such as a pilsner or a pale ale wouldn't be enough; it had to be something

typically Belgian. So I did some research and decided to brew him a legendary farmhouse style, saison.

The typical saison is slightly stronger than a pale ale, slightly tart but not sour, hoppy but not hugely

bitter. Many Belgians consider it their everyday beer, and for others it's a refreshing summer beer. What's not to like about a saison?

I should have asked him if he liked fruit beers. Turns out he doesn't, and I



Saison Vrucht (5 gallons, partial mash with fruit)

Ingredients:

- 3 lbs. unhopped light dry malt extract
- 3 lbs. Belgian pale malt
- 0.125 lb. (2 oz.) medium crystal malt, 40° to 60° Lovibond
- 1 tsp. chocolate malt
- 0.5 lb. malted wheat
- 1.25 oz. Saaz hops (3.1% alpha acid, 4 AAUs) for 90 min.
- 0.4 oz. Goldings hops (5.4% alpha acid, 2 AAUs) for 5 min.
- 0.5 lb. clear candi sugar
- 0.25 oz. crushed coriander seed
- 2 to 4 oz. apricot flavoring essence
- 1 quart yeast slurry — recultured Belgian saison yeast, or a blend of a Belgian ale strain and a Belgian witbier yeast
- 2/3 cup corn sugar for priming

Step by Step:

Heat 1.25 gal. of water to 164° F, mix in crushed grains, and hold at 152° F for 90 min. Sparge with 2 gal. of 169° F water.

Add the candi sugar and the dry malt, bring to a boil. Total boil is 90 min. Add the Saaz hops and boil

85 min. Add the Goldings hops, boil another 5 min., turn off the heat. Add coriander (in a fine mesh bag, preferably), steep about 15 min., and remove. Begin chilling, add to fermenter along with enough pre-boiled, chilled water to make 5.25 gal. At 65° to 68° F, pitch yeast.

Ferment relatively warm (65° to 70° F) for three to four weeks. Rack to secondary and condition for six weeks. Prime with corn sugar, add apricot essence, and bottle. Age in bottles for three to four weeks. Serve chilled.

OG = 1.050

FG = 1.013

Bitterness = 20 IBUs

Notes:

Hops: An alpha acid unit is the hop's alpha acid percentage multiplied by the ounces added. Divide 4 (Saaz) and 2 (Goldings) by your hops' percent alpha acid to figure the amount of each addition.

All-grain: Omit the dry malt extract and increase the Belgian pale malt to 7.5 lbs. Mash in

2.5 gal., sparge with 3.5 gal. Proceed with

candi sugar, boil as above.

Extract: Steep the crystal, wheat, and chocolate malts in 2 gal. of 150° F water for 30 min. Omit the pale malt, increase the dry malt to 5 lbs., and boil as above.

Coriander: Be cautious with the coriander — it easily can be overdone. Steep it for only a few minutes and then remove it quickly.

Fruit: Apricot is a nice flavor to contrast with the sweetness of the malt and the pungency of the coriander, but experiment with other fruits, such as cherries, raspberries, peaches, and currants.

Yeast: Maybe someday there will be a commercially packaged liquid yeast for brewing saisons, but at the moment I don't know of any that I would rely on. If you can track down a really fresh bottle, use the yeast from an authentic Belgian saison that you like. The next best thing, in my opinion, is to use a blend as I suggest above.

wasted a bottle on him. I give up.

Nevertheless, here's a pretty good take on a classic, with the twist of adding apricot flavoring (or real fruit, if it's in season) to soften and balance it. This recipe is based on a beer in Pierre Rajotte's *Belgian Ale* (Brewers Publications), a great source for information and recipes to combat any beer experts who tell you that all Belgian beers suck.

Reader Recipes

Allegheny Anise Ale (5 gallons, extract)

This recipe is based on brewer and author Fred Eckhardt's "Pennsylvania Swankey," a low-alcohol German-style beer. My version is strengthened considerably, and I double the anise seed or use brewer's licorice sticks. I serve it at

our annual Allegheny, Pa.-area Yeast Feasts at the Harley Bikers Club in Woolrich, Pa.

Matt Clarke
Williams Park, Pa.

Ingredients:

- 3.3 lbs. light malt extract
- 12 to 16 oz. pale crystal malt, 40° Lovibond
- 4 to 6 oz. dark crystal malt, 60° Lovibond
- 3 oz. Kent Goldings hop pellets (4% alpha acid) for 90 min.
- 1 oz. Saaz hop pellets in secondary
- 1 lb. wildflower or clover honey
- 4 oz. anise seed, crushed (not powdered); for a more subtle licorice taste, use 2 oz. or less
- Wyeast 1214 (Belgian ale) or any dry lager or ale yeast
- 2/3 cup corn sugar for priming

Step by Step:

Steep grains in 2 gal. of 150° F water for 60 min. Remove grains, add malt extract and honey, and bring to a boil. Total boil is 90 min. Add Kent Goldings hops and boil 90 min. Add anise and turn off heat. Cool to 70° F and add enough pre-boiled, chilled water to make 5 gal. Pitch yeast at 65° to 70° F.

Ferment at 65° to 70° F for 10 days. Transfer to secondary and add Saaz hops. Condition 10 days to two weeks. Or lager for three months at 55° F for a smoother and cleaner-tasting beer. Prime and bottle.

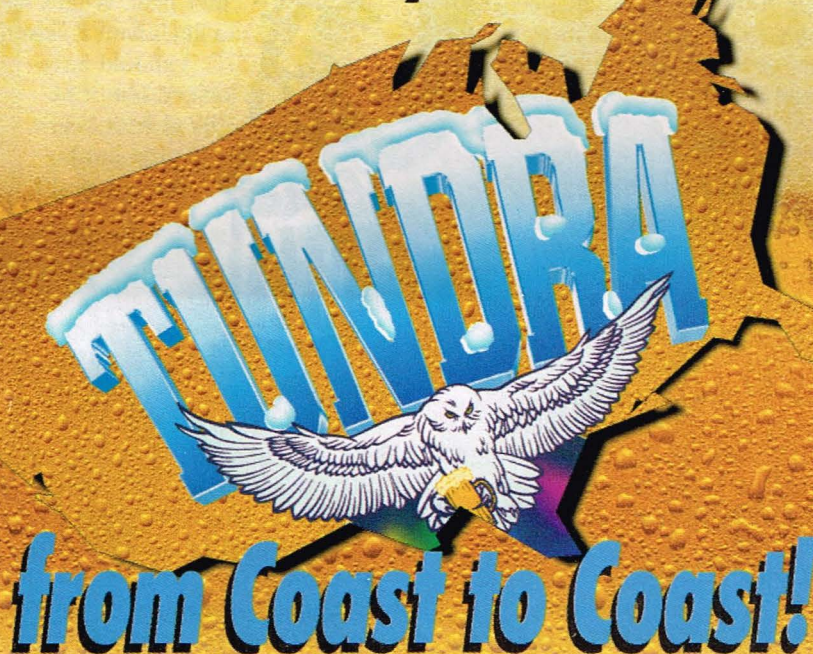
Note: Anise flavor and aroma weaken gradually; if it shocks you at first, wait until the flavor has decreased.

OG = 1.040 to 1.044

FG = 1.008 to 1.010

Bitterness = 55 IBUs ■

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The brewing team of

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Healthy Yeast for Healthy Carbonation

Mr. Wizard

I recently brewed a lager recipe that failed to properly carbonate in the bottle. It is the third batch of the same recipe, with the prior two batches being perfect. It's a simple recipe: six pounds of dry malt extract, five ounces of assorted hops, Irish moss, and White Labs San Francisco lager yeast using a one-pint starter made the day before.

The batch in question fermented fine in a primary for about eight days. Then I transferred it to a glass carboy for about two and a half weeks. The primary was kept at 50° F, while the secondary was kept at 40° F. At bottling time I added a primer of three-quarters cup corn sugar dissolved in boiling water.

After storing the filled bottles at room temperature for about 10 days, I noticed the beer was extremely clear (usually the beer is still somewhat hazy at this point). I did use Irish moss in the last 15 minutes of the boil. When I opened a couple of beers as a test, I was disappointed to find that the beer was fairly flat. The bottles were capped tightly with no apparent leakage. What do you suppose went wrong?

Dennis Myers
via e-mail

Two possible explanations to your low carbonation problem come to mind. If your beer was extremely clear on bottling day, there is a good chance that the yeast concentration was very low. In addition to a low yeast count, the yeast left in the beer might have been less than vibrant after being held at 40° F for two and a half weeks. Although Irish moss helps produce a clearer beer,

it doesn't cause yeast to flocculate like isinglass.

In the future if you feel that you might have a low yeast count at bottling time or if the yeast in the beer is very old, consider adding a small amount of fresh yeast. The

amount of yeast needed at bottling time is about one-fiftieth of that required for primary fermentation. This might seem too small to make

much of a difference, but the amount of sugar being fermented for carbonation is also very small.

Liquid and dry yeast each do the trick for bottle conditioning.

The second possibility is a low dose of priming sugar.

Although you have brewed this same beer before, there is no guarantee that all variables governing the priming dose were the same. The two mistakes many homebrewers make are not checking the

volume of beer being primed at bottling time and using volumetric measures for priming sugar instead of weight. This mistake is not helped by recipes that clearly state to blindly add three-quarters cup of priming sugar at bottling time.

My advice regarding bottling is to calibrate your bottling bucket by fixing a piece of tape to the outside of the bucket and placing marks at one-quart or one-liter increments, depending on your unit preference. This is best accomplished by adding one quart of water to the bucket, marking its level, and continuing to mark one-quart increments until the entire bucket is calibrated.



Next, use a kitchen scale to weigh three-quarters cup of priming sugar to get an idea of how much sugar you have been using. The sugar particle size (fineness) and your method used to fill a measuring cup both influence the weight of sugar contained in a measuring cup. Just for fun, do this 10 times to get a feel for how much variation is introduced into your conditioning step by using a measuring cup. The number you should calculate is ounces of sugar per quart of beer or, if you're metrically inclined, grams of sugar per liter of beer.

If you begin measuring beer volume at bottling time, most likely you will discover that every batch is a little different and as such requires a different amount of sugar to achieve a consistent carbonation level. Armed with more information, you should have more success in hitting your desired level of carbonation.

Mr. Wizard

I have a couple of questions I haven't seen addressed in BYO. Is it okay to mash and lauter your grain and then store the wort in the fridge until you have time to go through the boiling/cooling/racking-to-fermenter procedure? When you cold condition beer in a keg, does it matter whether it is carbonated or not?

Carey Lewis
via e-mail

Some brewers use a technique called flotation to separate cold trub (the solid matter) formed during wort cooling from the wort. The old method of flotation occurs before yeast is pitched and lasts up to a day. Brewers who still use the flotation method add yeast prior to flotation because of the microbiological problems associated with storing un pitched wort. I know

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of at least one manufacturer of malt extract that stores the wort near 30° F for about a day prior to concentrating the wort. This process helps make the finished beer clearer, and the very cold temperatures greatly slow microbiological growth.

The rule of thumb is to cool your wort, add yeast, and get a vigorous fermentation going in the shortest period possible. The result of this practice is that the wort pH is quickly reduced from about 5.2 to 4.5, and the population of yeast in the wort rises. These two factors are strong inhibitors to microbiological spoilage and help the brewer produce a beer from a single strain of yeast. Contrast this to the technique used by Belgian lambic brewers in which the hot wort is cooled in large, shallow coolships exposed to outside air. The result of that practice is a fermentation by many species of yeast and bacteria.

If you really want to homebrew but find the brew day too long and don't mind the possibility of a bad batch, try what you propose. I would cool the wort as fast as possible and store it very cold in a closed container. You might be able to hold the wort for a day or two before boiling it, but I wouldn't shoot for the moon and attempt to store it for a week with such a perishable ingredient.

Your second question about cold-conditioning beer is one that has always intrigued me. I prefer to cold condition after carbonation, because you can aggressively remove yeast by racking the beer from keg to keg without worrying about having enough yeast in the beer at bottling time or having yeast that is too tired to work.

The traditional method of lagering, in which the beer is transferred to the lagering tank with some fermentable sugars and healthy, active yeast, gets the carbonation step knocked out in the first few days. The remaining weeks of lagering allow the yeast to mature the beer flavor (by reducing diacetyl, a buttery flavor) and give the beer sufficient time to become very clear. This is the essence of cold conditioning.

Some brewers cold condition flat

beer before bottling to achieve flavor maturation and clarity. This method works, but the carbonation step must be addressed. Many find it is easiest to use bottled carbon dioxide for carbonation of these beers. The yeast load is very low, and they wish to keep the beer very clear without worrying about the slug of yeast at the bottom of the keg or bottle. Others want to have a naturally conditioned beer and find it easiest to add a small dose of vibrant yeast to the beer at bottling time. Both methods work, and they both have their pros and cons. I happen to like the all-in-one nature of the traditional lager process.

Mr. Wizard

I have a four-tap kegging system (no more bottling — great!), which I think is the best method for home-brewing. I do have a problem and seek your advice. Let's say I have a keg that is half full connected to the system and then connect a full keg to the system. Beer is sucked out of the full keg through the carbon dioxide "in" line and starts filling the other half-full keg. I currently control this by turning off the CO₂ to all the kegs and turning on the one I want beer from. How can I connect a full keg without back-filling others in the system?

*Barry Westwood
Ashburn, Va.*

It sounds to me as if the full kegs you are bringing on-line have enough beer in them to cover the carbon dioxide "in" tube. This is the only way beer could exit through that fitting on your keg. You might want to make the CO₂ "in" tube shorter by removing it from the keg and carefully cutting it with a hacksaw.

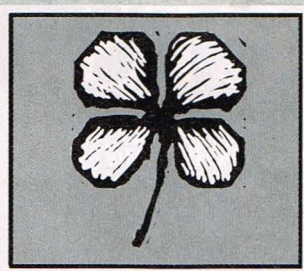
The other half of your dilemma is that the full kegs you bring on-line are probably at a higher pressure than the other kegs in the system and are higher than the CO₂ supply pressure set at your gas regulator. When the full keg at a higher pressure is hooked into your gas manifold, the system pressure (all kegs and gas supply) equilibrates.

Unfortunately, your fresh beer is moving around in your gas lines!

This problem should be easy to solve if you shorten the "in" tube. If you still want to be safe, bleed the pressure from the headspace of full kegs immediately before you hook them up to your gas supply. This will cause gas to move from the high-pressure system into your full keg with a lower pressure.

This problem is really quite common, and commercial keg-tapping equipment is equipped with "check valves" that only allow CO₂ to enter the keg and only allow beer to exit the keg. These check valves prevent the movement of beer and gas between kegs connected to a common manifold. The check valves also protect your gas regulator, which would quickly be ruined if

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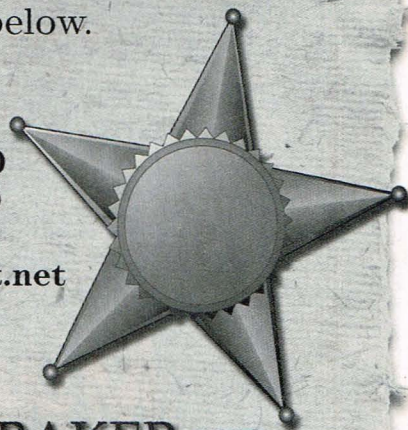
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beer found its way into it. Although beverage gas regulators have a built-in check valve designed to prevent such damage, check valves can fail. Having multiple safeguards is always the best way to go.

water — water that has been purified using the reverse osmosis process. Is that wrong? Should I be using water with minerals in it?

*Rich Tuell
via e-mail*

Mr. Wizard

I have been using virtually pure

I like using pure water as the starting point for brewing water, but I don't recommend using pure water without adjusting

it with minerals. The great thing about starting with pure water is that you can tailor it to match any classic brewing water you want. The most important mineral to add is some form of calcium. Calcium sulfate (gypsum) and calcium chloride are the most common sources of calcium for brewers. Calcium is very important because of its effect on mash pH, alpha-amylase activity, protein precipitation during the boil, and yeast flocculation — just to name a few.

In general the reduction of mash pH to around 5.2 associated with calcium is viewed as favorable, but some mashes that have a lot of roasted malts naturally have a very low pH — sometimes as low as 4.8. These mashes benefit from carbonates in the water that help raise the pH. Calcium carbonate and sodium bicarbonate are two good sources of carbonate for darker beers.

Minerals also have a dramatic effect on beer flavor. Magnesium lends a metallic bitterness found in many English ales. Sulfate gives dryness and accentuates bitterness, chloride produces a fuller and sweeter beer, and sodium adds sweetness at low levels and causes beer to taste salty at higher levels. Pure water is a great blank canvas to start with for brewing because you can make your water right with respect to mash pH and can also add different minerals at different concentrations to affect the flavor of your finished beer. ■

Mr. Wizard's Address

Do you have a question for Mr. Wizard? Write to him c/o *Brew Your Own*, 216 F St., #160, Davis, CA 95616. Or send e-mail to wiz@byo.com.

Mr. Wizard, BYO's resident expert, is a leading authority in homebrewing whose identity, like the identity of all superheroes, must be kept confidential.

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Tripel Play and IPA

by Mikoli Weaver

This month's styles tend to be very popular with brewers. They're fun to brew, and they're delicious to drink. What homebrewer can resist a massively hopped IPA and a potent Belgian tripel?

But first, it's time to run through the cellar to check on some of the beers that have been aging. If you have been patient, there should be untouched bottles of barleywine for New Year's Day 2000, at least some of the Imperial stout, some maibock, Belgian golden, and last month's pilsner, which will be ready to taste on July 25.

If there is any steam beer or Dublin stout left, it is time to check it and start drinking. Next month, check any remaining dunkelweizen and ESB. As a general rule the five-month mark is a good time to see how your beers are progressing. Since all of the beers in this series are bottle conditioned, they should last for much longer than five months — if they were bottled

without contamination. However, the freshness, hop aroma, bitterness, and balance are all affected by age.

The fact is some of these styles, such as imperial stout and doppelbock, are meant to lay down for months. Others, such as pale ale and nut brown ale, are for drinking now. So test your beers periodically for faults and changes. Keeping a beer such as the dunkelweizen for seven months is futile, since it was in its prime at the three-month mark.

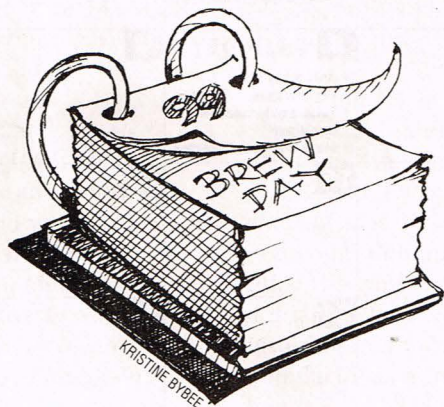
Belgian Tripel

Tripel is strong, Belgian-style ale, bottle conditioned, fairly sweet to finish, and generally pale gold in color. It is brewed by many monasteries, but it is not exclusively a monastery beer as, for instance, Trappist ale is.

Some classic examples of tripel are La Trappe Tripel, Westmalle Tripel (slightly darker than normal), Lucifer, and La Fin Du Monde brewed by the French Canadian Unibroue. All of these products are indeed tripels, but they each have a unique taste.

Corsendonk Monk's Pale is the model for this month. It is named for the Corsendonk Abbey, which was founded in 1400 by the youngest daughter of the Duke of Brabant. Corsendonk stopped brewing in 1784, but the beer was revived by Brouwerij du Bocq (founded in 1906) and its brewer, Jef Keersmaekers.

Corsendonk is a deep golden, cloudy ale with distinct clove and fruit esters. The bitterness is light to moderate at 30 IBUs but is well balanced by malty sweetness and yeast character. Although not as sweet as many in the tripel style, it is a fairly well attenuated beer from 1.071 (17.75° Plato) original gravity wort and to an ending alcohol by volume of 7.7 percent.



The style specifications for a Belgian tripel are: original gravity 1.070 to 1.096 (17.5° to 24° Plato), bitterness 20 to 25 IBUs, color 3.5° to 5.5° SRM, and alcohol by volume 7 percent to 10 percent.

Malt

As with the Belgian golden from April, the Belgian tripel includes authentic malt and hop varieties for the best flavor possible. Similarly, the mash is longer than normal (90 minutes), like the golden, but the boil is the standard 90 minutes for all-grain and 60 minutes for the extract version. Because the gravity is not exorbitantly high and requires only 13 pounds of grain for the all-grain version, extract or candi sugar normally would not be necessary. But candi sugar does more than boost the gravity; it adds a sweetness to the finished beer that is both unfermented and unmistakable. The candi sugar used to fortify this particular lighter-colored ale should be of the clear type, although it will be used in very reserved portions.

The actual malts or extract syrup used as the base of the recipe

are the same varieties as used in the Belgian golden: Belgian pale, carapils, and crystal malts.

Hops

The numbers for our version of Corsendonk tripel fall within the style guidelines except for the bitterness. But when you drink a bottle of the Monk's Pale, you will notice that it is really not bitter at all. The hops are Styrian Goldings and French Strisselspalt from Alsace, France, which are pretty common in Belgian beers, along with Hallertauer and other noble varieties.

Some Belgian beers, notably lambic, use hops that are aged and very oxidized. This is not necessary here, but a slightly oxidized flavor is common to many Belgian profiles. If you decide to brew this beer again, leave the hops out for a month and see the difference in the aroma and bitterness. Oxidized hops lose much of their bittering power, so you will need to use more if you intend to hit the same target numbers.

India Pale Ale

IPA is a beer steeped in British military history. But it is also the

result of a very specific need and circumstances that forced changes in brewing practices at the time. The full name, India pale ale, refers to the beer produced for delivery to troops and a growing number of citizens in the Indian market during England's occupation of that country.

The style developed into its current form during a period of experimentation and evolution that stretched from the early 1700s to the mid-1800s. Early attempts to bring beer to India were met with failure for a number of reasons. Primarily to blame were the warm temperatures on the ships, even down in the depths of the cargo holds, and the warm surface temperatures of the tropical waters in which the ships had to sail. These, coupled with the constant motion of the beer within the casks and three to five months of storage time, led to very challenging conditions for shipping beer. The darker, sweeter beers of the time fared no better than lighter styles and were much less desirable in the hot climates to which they were sent.

By 1722 several methods for shipping paler beers were being

July 1999

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 PREP DAY • Assemble Belgian tripel ingredients • Soak equipment in sanitizer • Start tripel yeast starter	2	3 BREW DAY • Brew Belgian tripel • Primary fermentation starts; check original gravity, and record
4 TASTE DAY • Nut brown ready to drink	5	6	7	8 PREP DAY • Assemble IPA ingredients • Soak equipment in sanitizer • Start IPA yeast starter	9	10 BREW DAY • Brew IPA • Primary fermentation starts; check original gravity and record
11 TRANSFER • Rack tripel to secondary • Check and record gravity • Check for off-flavors • Continue fermenting for 14 more days	12	13	14	15	16	17 TRANSFER • Rack IPA to secondary • Check and record gravity • Check for off-flavors • Continue fermenting for 7 more days
18	19	20	21	22	23	24 BOTTLE DAY • Sanitize bottles and bottling vessel • Record final gravity of IPA • Rack, prime, and bottle IPA • Age IPA 7 more days
25 BOTTLE DAY • Sanitize bottles and bottling vessel • Record final gravity of tripel • Rack, prime, and bottle tripel • Age 14 more days • Taste barleywine and pilsner for off-flavors	26	27	28	29	30	31 TASTE DAY • IPA ready to drink

tried. One involved concentrating the beer before shipping and adding water to it after arrival. Another called for fermenting the beer on the ship. These methods helped, but the hot conditions and long voyages were still too much.

The breakthrough came when George Hodgson of the Bow Brewery in London created a recipe that was based on his pale ale. Hodgson heard that some of the concentrate held well in cooler waters when fortified with spruce or extra hops. He decided that a higher-gravity beer with high hop rates would be better suited to travel. In 1790 he shipped his first India Ale. In addition to the gravity and hop factors, it had a yeast strain that stayed in suspension longer, keeping the beer "alive" longer and in turn helping to prevent spoilage. Shortly afterward Bass and Allsopp's both produced IPAs that were even more pale and had higher hop rates.

The shipping of IPA declined starting in 1827 when a cargo ship wrecked shortly after leaving port. The damaged casks were sold locally, and for the first time the people were able to taste what had been previously reserved for the foreign market. The demand for IPA exploded.

The style guidelines for IPA (both American and English) are: original gravity 1.050 to 1.070 (12.5° to 17.5° Plato), bitterness 40 to 60 IBUs, color 8° to 14° SRM, and alcohol by volume 5 percent to 7.5 percent.

There are hundreds of IPAs to try in your search for the perfect example. From England, Bass, Fuller's, Allsopp's, and Whitbread are very famous and well respected. In the United States, Goose Island, Pike Place, Old Dominion (Tupper's), Full Sail, Anchor Liberty Ale, and the winter beer Sierra Nevada Celebration Ale are all excellent examples of IPA.

Hops

For the past few years the dominant bittering hop for American IPA has been Columbus. This variety

Brewing Schedule Notes

July 1, Thursday
Prep day for tripel

Assemble all ingredients for Belgian tripel, sanitize equipment, and start yeast culture for brewing on Saturday.

July 3, Saturday
Brew day

Brew tripel, record original gravity, and begin fermentation.

July 4, Sunday

Nut brown from last month's schedule is ready to drink.

July 8, Thursday
Prep day for IPA

Assemble all ingredients for India pale ale and sanitize equipment. Start yeast culture for brewing on Saturday.

July 10, Saturday
Brew day

Brew IPA, record original gravity, and begin fermentation.

July 11, Sunday
Transfer

Rack the tripel to a secondary and record the gravity. Check for off-flavors. Continue for 14 more days.

July 17, Saturday
Transfer

The IPA should be ready for

transfer to secondary. Record gravity and check for off-flavors. Continue for seven more days.

July 24, Saturday
Bottle IPA

The IPA should be ready to prime and bottle. Age for seven more days before drinking.

July 25, Sunday
Bottle tripel

The tripel should be done fermenting and ready to bottle today. Age at least two more weeks before drinking (August 8).

Taste the barleywine, which has been in the bottle for four months (16 weeks). It should still be very sweet but should show signs of maturity. It will taste very alcoholic, which coupled with the cloying sweetness will give it a warming, cough-medicine type of feel: alcoholic, sweet, very warming, and thick. But don't worry unless it actually has a strong medicinal taste, which is a sign of contamination.

Also taste the pilsner for off-flavors.

July 31, Saturday

IPA is ready for drinking.

August brews: Kölsch and witbier

has all but taken over for previously popular high-alpha-acid types grown in America, such as Centennial, Eroica, and Chinook. As shortages of these varieties came and went, Columbus eventually filled the gaps, and since it is really a dual-purpose hop (used for both bittering and aroma), it has gained popularity as a finishing and dry hop, too.

As with other types of pale ales, the finishing hops are the same in both English and American varieties. Microbrewed IPAs in the United States typically use lots of Cascade,

Willamette (an American version of Fuggle), and Liberty hops. British styles primarily stick with Fuggles and Goldings, although some breweries do use Bramling Cross hops and other traditional varieties as well.

There are many breweries in the United States creating hybrid beer that employs both English and American hops. The hop programs in the recipes here are Fuggles and Goldings for the English style and a Columbus and Liberty combination for the American.

American IPAs tend to be very

hoppy, so the American example is dry hopped with Columbus. Dry hopping should be done during cold conditioning for the best results and to keep contamination risk to a minimum. But since we are bottle conditioning, it will be done in the secondary. Dry hopping in the primary drives off too much of the desirable aromatic properties. And to dispel any misgivings, using this high-alpha variety for dry hopping will have no effect on the end bitterness. Hops impart bitterness only when they are heated.

Yeast and Fermentation

Yeast selection and fermentation for the IPAs is Wyeast 1056 (American ale) or White Labs WLP001 (California ale) for the American and 1318 (London ale III) or White Labs WLP023 (Burton ale) for the English. Good alternatives for the American are Wyeast 1272 (American ale II) and 1087 (Wyeast ale blend), while English varieties are endless. Wyeast 1084 (Irish ale), 1098 (British ale), and 1968 (London ESB ale) are but a few. You can also experiment with White Labs WLP002 (English ale) and WLP004 (Irish ale) for the English variety, and WLP008 (East Coast ale) for the U.S. version.

The yeast selection should fit the profile you desire for your beer. An American-style IPA may be drier and have no diacetyl flavor, it should be crisp, and the hop presence should overshadow the yeast character completely. A great deal of the overall flavor of an English IPA is the result of the yeast, as the hop presence and bitterness are often much less than the American versions. They also will exhibit some of the typical diacetyl flavors (buttery taste) one expects with English beers.

Since the original IPA was shipped in Lithuanian oak barrels, many brewers have tried to create an oaken flavor. Oak chips (raw or toasted) added to the secondary are the most common method. However, the barrels might have been lined, so that no oak flavor was imparted to the beer.

Malt and Gravity

The grain bill reflects higher gravities for American IPA, complemented by a more pronounced caramel malt presence and darker color. The difference in caramel malts and amounts clearly distinguish the American and English recipes. The terminal gravity is also different for the two, with the American IPA finishing about 1.004 (1° Plato) lower than

the English recipe, again to give a drier finish and more crisp sensation during drinking.

Belgian Tripel (5 gallons, all-grain)

Ingredients:

- 8 lbs. Belgian pale malt, 1.8° to 2.5° Lovibond
- 2 lbs. Belgian aromatic pale malt, 3.5° to 5° Lovibond

1999 Style Calendar

January Barleywine, Imperial Stout

A cold winter month with two powerful, warming beers. The barleywine will be aged for drinking on New Year's Day 2000. Coming off of December's highly hopped Christmas beers, this really starts off the year with a bang.

February Steam Beer, Dublin Stout

A refreshing steam beer to break up the dark season and a classic Dublin stout to drink in March for St. Pat's day.

March Dunkelweizen, ESB

Two nice beers to begin the early spring. Full of flavor and fun to drink.

April Maibock, Belgian Golden

Starts off with a seasonal maibock, lagered to drink in May, and a nice Trappist ale such as Orval.

May Amber Ale, Pale Ale

Two solid styles, an amber ale and a good American-style pale ale, to add some more hops to the spring season.

June Pilsner, Nut Brown Ale

A pils to start the summer and a nut brown to add a little variety to the summer season.

July IPA, Belgian Tripel

IPA is a summer must, plus a powerful Belgian tripel to mix it up a bit.

August Witbier, Kölsch

Something for everybody, here are two light beers to fight the heat of the dog days of August.

September Oktoberfest, Hefeweizen

An Oktoberfest to be lagered for drinking in October and a traditional Bavarian hefe-weizen to usher in the fall.

October Doppelbock, Scottish Ale

A big doppelbock and a Scottish ale to warm us as the nights cool and the leaves fall.

November Porter, Frambozenbier

Two festive beers for the Thanksgiving holiday. A big porter and a French raspberry ale that makes fruit beer acceptable.

December Christmas Ale, Old Ale

Starts off with a hoppy Christmas ale such as Sierra Celebration and an old (strong) ale such as Pyramid Snow Cap.

- 0.5 lb. carapils or dextrin-type malt, 1.5° Lovibond
- 1.5 lbs. caramel malt, 10° Lovibond
- 1 lb. clear candi sugar
- 1.25 oz. Styrian Golding hops (5% alpha acid): 0.5 oz. for 90 min., 0.75 oz. for 15 min.
- 1 oz. French Strisselspalt hops (3% alpha acid) at end of boil
- Wyeast 1214 (Belgian ale) or 1 qt. yeast starter from Corsendonk Monk's Pale
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 3.75 gal. of 150° F water for 90 min. Sparge with enough 168° F water to yield 5.75 gal. of wort.

Total boil is 90 min. At start of boil, add 0.5 oz. Styrian Golding hops and boil for 75 min. Add 0.75 oz. Styrian Golding hops and boil for 15 min. more. At end of boil, add French Strisselspalt hops. Whirlpool and cool to 68° F to

pitch starter. (Note: Corsendonk Monk's Pale contains yeast in the bottle. Making a starter from it is a great way to make your beer authentic.)

Ferment at 68° F for seven days, then rack to secondary fermenter. Continue fermentation for 14 more days until gravity is about 1.012 (3° Plato). Prime and bottle condition for two weeks before drinking.

OG = 1.071 (17.75° Plato)

Bitterness = 30 IBUs

Color = 4° SRM

7.5% ABV

Belgian Tripel (5 gallons, extract with grain)

Ingredients:

- 9.5 lbs. Belgian pale malt extract
- 0.5 lb. carapils or dextrin-type malt, 1.5° Lovibond
- 1.5 lbs. caramel malt, 10° Lovibond
- 1 lb. clear candi sugar

- 1.5 oz. Styrian Golding hops (5% alpha acid): 0.75 oz. for 60 min., 0.75 oz. for 15 min.
- 1 oz. French Strisselspalt hops (3% alpha acid) at end of boil
- Wyeast 1214 (Belgian ale) or 1 qt. yeast starter from Corsendonk Monk's Pale
- 2/3 cup corn sugar for priming

Step by Step:

In a nylon bag, steep crushed grains in 5 gal. of 150° F water for 30 min. Remove bag and rinse with enough 168° F water to make 5.5 gal. Add extract. Total boil is 60 min. At start of boil, add 0.75 oz. Styrian Golding hops and boil for 45 min. Add 0.75 oz. Styrian Golding hops and boil for 15 min. more. At end of boil, add French Strisselspalt hops. Whirlpool and cool to 68° F to pitch starter.

Follow the fermenting instructions and refer to the specifications for the all-grain version.

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CIRCLE 9 ON READER SERVICE CARD

American IPA (5 gallons, all-grain)

Ingredients:

- 9.5 lbs. two-row pale malt such as Gambrinus or Great Western
- 0.5 lb. carapils or dextrin-type malt
- 1.5 lbs. crystal malt, 20° Lovibond
- 0.5 lb. crystal malt, 40° Lovibond
- 2.5 oz. Columbus hops (13% alpha acid): 1 oz. for 90 min., 1.5 oz. for dry hop
- 2 oz. Liberty hops (4.5% alpha acid): 0.5 oz. for 45 min., 1.5 oz. at end of boil
- 1 pt. starter of Wyeast 1056 (American ale)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 3.75 gal. of 150° F water for 60 min. Sparge with 168° to 170° F water to collect 5.75 gal. of wort.

Total boil is 90 min. At start of boil, add 1 oz. Columbus hops and

boil 45 min. Add 0.5 oz. Liberty hops and boil 45 min. more. At end of boil, add 1.5 oz. Liberty hops. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Ferment at 69° F for seven days, then rack to secondary fermenter. Dry hop with 1.5 oz. Columbus hops and continue fermentation for seven more days until gravity is about 1.010 (2.5° Plato) or fermentation stops. Let settle, rack, prime and bottle. Age seven more days before drinking.

OG = 1.066 (16.5° Plato)

Bitterness = 65 IBUs

Color = 14° SRM

7% ABV

American IPA (5 gallons, extract with grain)

Ingredients:

- 9 lbs. pale malt extract syrup
- 0.5 lb. carapils or dextrin-type malt

- 1.5 lbs. crystal malt, 20° Lovibond
- 0.5 lb. crystal malt, 40° Lovibond
- 2.5 oz. Columbus hops (13% alpha acid): 1.25 oz. for 60 min., 1.5 oz. for dry hop
- 2 oz. Liberty hops (4.5% alpha acid): 0.5 oz. for 45 min., 1.5 oz. at end of boil
- 1 pt. starter of Wyeast 1056 (American ale)
- 2/3 cup corn sugar for priming

Step by Step:

In a nylon bag, steep crushed grains in 5 gal. of 150° F water for 30 min. Sparge grains with enough 170° F water to make 5.5 gal. Heat to boiling and add extract syrup. Total boil is 60 min. At beginning of boil, add 1.25 oz. Columbus hops and boil 15 min. Add 0.5 oz. Liberty hops and boil 45 min. more. At end of boil, add 1.5 oz. Liberty. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

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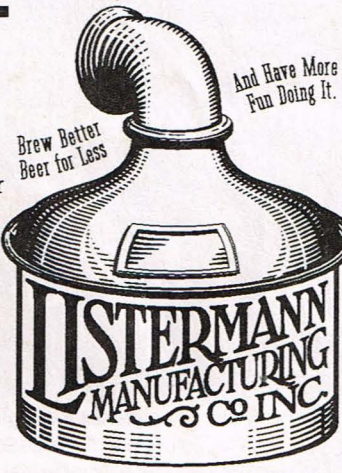
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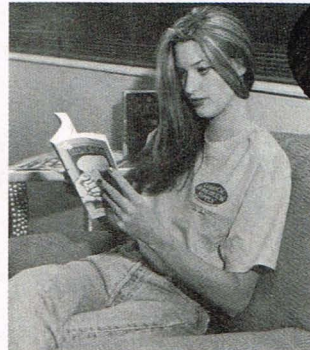
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CIRCLE 23 ON READER SERVICE CARD

instructions and refer to the specifications for the all-grain version.

English IPA (5 gallons, all-grain)

Ingredients:

- 8.5 lbs. Maris Otter malt
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 40° Lovibond
- 2.5 oz. Fuggle hops (4.2% alpha acid): 1 oz. for 90 min., 1.5 oz. for 60 min.
- 1 oz. Kent Goldings hops (5.4% alpha acid) at end of boil
- 1 pt. starter of Wyeast 1318 (London ale III)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 3.25 gal. of 150° F water for 60 min. Sparge with 168° to 170° F water to collect 5.75 gal. of wort.

Total boil is 90 min. At start of boil, add 1 oz. Fuggle hops and boil 30 min. Add 1.5 oz. Fuggles and boil 60 min. more. At end of boil, add Kent Goldings hops. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Ferment at 69° F for seven days, then rack to secondary fermenter. Continue fermentation for seven more days until gravity is about 1.014 (3.5° Plato) or fermentation is finished. Let settle, rack, prime, and bottle. Age seven more days before drinking.

OG = 1.056 (14° Plato)

Bitterness = 40 IBUs

Color = 10° SRM

5.5% ABV

English IPA (5 gallons, extract with grain)

Ingredients:

- 8 lbs. English pale malt extract
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 40° Lovibond
- 3 oz. Fuggle hops (4.2% alpha acid): 1.5 oz. for 60 min., 1.5 oz. for 45 min.
- 1 oz. Kent Goldings hops (5.4% alpha acid) at end of boil

- 1 pt. starter of Wyeast 1318 (London ale III)
- 2/3 cup corn sugar for priming

Step by Step:

In a nylon bag, steep crushed grains in 5 gal. of 150° F water for 30 min. Sparge grains with enough 170° F water to make 5.5 gal. Heat to boiling and add extract syrup. Total boil is 60 min.

At start of boil, add 1.5 oz. Fuggle hops and boil 15 min. Add 1.5 oz. Fuggles and boil 45 min. more. At end of boil, add Kent Goldings hops. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Follow the fermenting instructions and refer to the specifications for the all-grain version. ■

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CIRCLE 11 ON READER SERVICE CARD

Brewing with Fruit

Fruit lures hungry bellies and quenches parched lips. Found in the sound center of the food-group pyramid, it bestows health, growth, and cellular prosperity.

Sometimes it tastes as sweet as a ripe red grape and other times as sour as a new green apple. It can be mushy like an overripe pear or sickly like a blackened banana.

As a readily available and easily accessible sugar source, fruit deserves respect, even from brewers who disdain beer novices who want berries in their ales and apricots in their lagers.

Really, it comes down to people seeking the promise of fruit — pure lightness of being. Translating this airy, yet potent force into beer takes patience and practice.

When it works, it works divinely. Highly acclaimed beers have been brewed with all types of fruit: apples, passion fruit, apricots, pumpkins, blackberries, lemons, blueberries, chilies, raspberries, cherries, peaches, bananas, pineapples, currants, grapes, and more.

Picking the Beer Style

Fruit beers often start with a generic wheat beer recipe aimed at achieving a starting gravity of 1.045 to 1.055. Fruit sugars boost the beer's original gravity, but this provides a solid base. This kind of beer tastes refreshing, light, and

nondescript, the perfect medium for a jolt of huckleberry or lemon.

Any light ale or lager recipe will do. An all-grain brew might include 25 percent wheat malt, 65 percent pale malt, and 10 percent crystal or carapils malt. Generally, use one hop addition for bitterness and one for aroma. Saaz, Cascade, Hallertauer, and Tettnanger hops all work well at 25 IBUs or so (about the bitterness level of a standard pale ale). The idea is to contribute hop character without stealing the show.

To let the fruit flavors shine, use a clean or slightly fruity yeast strain, such as an American ale yeast. If you're feeling a bit more adventuresome, consider the implications of bolder yeast such as a Danish lager or Irish ale strain.

As an alternative to wheat beer, try blessing the wonderful marriage of fruit and tradition by using a classic beer style. Chances are that if a fruit exists, brewers have used it. Beers have ranged from cherry amber lager to banana barleywine. Often, these eccentric blends taste surprisingly good.

More conservative brewers can branch out by putting their own flavor on classic beer gems such as raspberry porter, cherry stout, peach lambic, and pumpkin ale.

Choosing the Fruit

If daring creativity has a place, this is it. Almost any combination seems

by Dawnell Smith



possible. How about a kiwi lager, an orange ale, or a papaya dunkel?

Over the years some fruits have gained more popularity than others. Raspberries continue to dominate the fruit-beer market, probably due to their ease of use, affordability, and availability. With enough zing to stand up to dark, rich beers as well as light ones, raspberries can complement almost any recipe.

Other fruits have more mild attributes. That's why choosing the type of fruit goes hand in hand with choosing the type of beer. Strawberries, pumpkins, and peaches would get lost in a big beer, so using

them requires a little more finesse. Choose a light base recipe, such as an American wheat or lager.

Preparing the Fruit

The form of the fruit also makes a difference. For instance, you should use fresh pumpkin, not canned, to avoid preservatives. You should also make sure to use 100 percent fruit sources rather than those with extra sugar.

Fresh fruit needs extra attention. You need to assess ripeness and flavor ahead of time, then use the fruit before it goes bad. Some fruits will ripen nicely after picking, while others will not,

so do some research before using unfamiliar produce.

Once you pick your fruit, clean, stem, and crush it before use. Toss the fruit in a colander and run cool water over it while individually pulling stems and wiping off debris. When crushing it, apply just enough pressure to break the skin and expose the innards.

Packaged purees and frozen fruits are easier to work with and require less preparation. Pureeing and freezing makes fruit sugars more accessible, therefore eliminating the need to crush the fruit. This is true if you buy frozen berries or freeze them yourself after

Tips On Using Fruits In Beer

Type of Fruit	Form Used	Notes
Raspberry and Blackberry 	Fresh	These popular and assertive fruits complement almost any beer recipe. Clean, stem, and crush the berries, and steep at end of boil. Use fresh, very ripe berries at less than 1 lb./gal. wort to minimize haze.
Chili Pepper (serrano, green, Thai, jalapeño, cayenne, Szechuan, etc.) 	Fresh	This intense fruit can cut through even the strongest beers, so use it in any brew to add bite and personality. To stay on the safe side, add roasted chili peppers to the secondary, let them steep a few days, and then taste the beer. If it needs more heat, add more and try again.
Cherry 	Fresh/ Frozen	Cherries work particularly well with stouts and lambics. Use about 2 lbs./gal. Toss pits and all into the secondary to pick up the bitter almond flavors found in great Belgian beers, or remove the pits and steep at the end of the boil.
Blueberry 	Fresh/ Frozen	These mild berries taste delectable in light beers and moderate dark brews. Use 2 lbs./gal. wort to get a good blueberry flavor. Use less for subtle flavors. Clean, stem, and crush before steeping at end of boil.
Strawberry 	Fresh	Another mild fruit, strawberries work best in lighter beer styles. Steep 1.5 to 2 lbs./gal. wort at end of boil. Try them in cream ale.
Peach and Apricot 	Fresh	These fruits turn lagers, wheat beers, and pale ales into thirst-quenchers. Remove skin and pits, cut into small pieces, and steep at end of boil.
Mango 	Fresh	Here's another mild yet exotic fruit that works well in light beers. Use about 1.5 lbs./gal. wort. Cut, clean, and chop before steeping at end of boil.
Passion Fruit 	Fresh	This strong-flavored fruit can handle a range of beer styles. Use less than 1 lb./gal. wort. Cut, clean, and slice before steeping at end of boil.
Pumpkin 	Fresh	Add pumpkin at 5 to 10 lbs./5-gal. batch. Peel, cut into two-inch chunks, and add to the wort with 30 minutes left in the boil. Or bake the chunks for a few hours, puree, and add to the mash. Don't forget to add pumpkin pie spices.

Blueberry Porter (5 gallons)

Ingredients:

- 7 lbs. two-row malt
- 12 oz. crystal malt, 50° to 60° Lovibond
- 6 oz. Munich malt (optional)
- 10 oz. chocolate malt
- 7 oz. black malt
- 2 oz. Willamette hops (5.1% alpha acid): 1.5 oz. for 60 min., 0.5 oz. for 30 min.
- 1.25 oz. East Kent Goldings hops (5.6% alpha acid), 0.5 oz. for 30 min., 0.75 oz. at end of boil
- 7.5 lbs. fresh blueberries, cleaned and crushed
- American ale yeast: White Labs WLP001 (California ale) or Wyeast 1056 (American ale)
- 3/4 cup corn sugar for priming

Step by Step:

Mash in to 2 to 2.5 gal. water at 152° F for 45 min. Sparge with 168° F water to collect 5.5 gal.

Total boil is 90 min. Boil for 30 min. and add 1.5 oz. Willamette hops. Boil for 30 min. more and add 0.5 oz. Willamette and 0.5 oz. East Kent Goldings hops. Boil 30 min. more. Turn off heat and add 0.75 oz. East Kent Goldings and 7.5 lbs. fresh, cleaned blueberries, crushed. Steep for 20 to 25 min. Cool to 75° F and pitch yeast. Rack the wort into the fermenter, using a sieve to keep most of the fruit from getting into the carboy. Aerate well.

Ferment for three to four days at 65° to 68° F. Transfer to a secondary and age for a week or two weeks. Bottle or keg as usual.

Options:

For an extract version, add 6 to 7 lbs. pale malt extract in place of the two-row, then increase the amounts of specialty malts by a third each.

picking and cleaning.

Regardless of the form of whole fruit, all fruits work about the same when it comes to quantity. As a rule of thumb, use one-half to two pounds of fruit per gallon of beer.

The exact amount depends on the type of fruit used, the type of beer made and, perhaps, the method of adding the fruit. You might use a half-pound of raspberries per gallon of wheat beer but 1.5 pounds per gallon of stout. Blueberries have a fairly mild flavor, so the Blueberry Porter recipe (left) uses 1.5 pounds of berries per gallon of beer. Even at that amount, the blueberry flavor is moderate rather than overwhelming.

If you make a beer that seems too subtle, you can add fruit extract in the bottle or keg. If you make a beer that seems too heavy with fruit flavor, you can sit on it for awhile; the flavors tend to mellow with age.

When and How to Add the Fruit

Now that you know the type and quantity of fruit you want to add, you need to decide when and where to add it. Truth is, you can add fruit flavor at any time from the kettle to the pint glass. Plenty of folks add lemon to pale or wheat beers, and it makes just as much sense to add fruit flavors to the glass if you have only a few fruit-beer lovers in the bunch.

Usually, however, it behooves the brewer to control the intensity of fruit flavor. Just when and how to do it depends on your own preferences and sanitation paranoia.

To avoid most of the mental anguish, many brewers add highly concentrated fruit flavors known as fruit extracts. They may seem unaesthetic to a brewer's inherently artistic spirit, but extracts allow for incredible consistency while making the brewing process a lot easier. Instead of scrubbing fruit residue from kettles and carboys or dealing with blocked transfer lines, the

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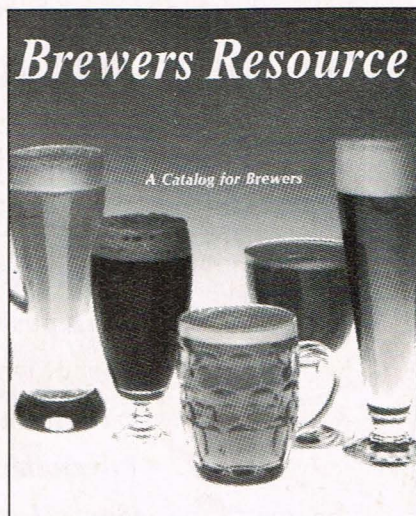
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brewer simply makes the beer, then doses it with fruit flavor.

Extracts also work well when dealing with milder fruits such as peaches. You can get the desired effect without the incredible bulk of fresh fruit you would need to get the same strength of flavor.

If you decide to use extract, prepare a test sample to determine how much extract to add to each bottle or keg. A few drops usually does the trick, but only you know how you want the beer to taste.

If you opt for pureed, frozen, or fresh fruit, you can add it at the end of the boil or sometime during fermentation. One method is to steep fruit for 15 to 20 minutes at 150° to 180° F at the end of the boil. This not only brings out the fruit's flavors, it also pasteurizes it without boiling it. When fruit boils, it releases pectins, which can lead to haze problems in the final product.

Brewer and author Ray Daniels prefers adding fruit after racking to

a secondary fermenter. In *Designing Great Beers* (Brewers Publications) he describes some of the advantages of this method. By waiting until the latter part of fermentation, the brewer has more control over how much time the fruit is in contact with the beer. Moreover, it lets the brewer detect off-flavors before adding fruit. As for the risk of bacteria, Daniels notes that the alcohol produced during primary fermentation mitigates the possibility of contamination.

Either choice comes with its own set of problems. If you decide to steep fruit, you can deal with haze later on using filters during transfer to kegs or bottles or by adding the enzyme pectinase during aging. If you choose to add fruit to the fermentation process, you can pasteurize it beforehand to reduce microbiological complications.

As you see, steeping brings brief, intense fruit contact of up to 30 minutes while putting fruit in the

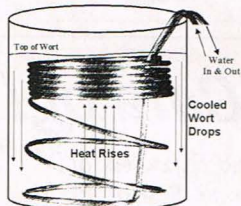
fermentation vessel results in long-term fruit contact of up to a few months. Though the two methods differ considerably, they both produce terrific results.

What method you choose matters less than the time you spend putting together the beer recipe and following standard brewing procedures. Rushing through the process may thwart your attempts to make a quality beer.

Though some brewers treat fruit beers like an afterthought for the benefit of the untrained masses, others recognize the innate beauty of the union of fruit and beer. After all, some of us squeeze beer into our own food-group pyramids and do our darn best to stick to a balanced diet. 

Dawnell Smith has brewed professionally at breweries in California and Alaska. She studied at the American Brewers Guild.

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CIRCLE 5 ON READER SERVICE CARD

Great Sum

Wolf Creek Cream Ale

(5 gallons)

A clean-tasting summer brew with subtle hop character and a slight honey sweetness resulting from the honey malt. Unmalted wheat berries contribute to the smooth mouthfeel and body. Perfect with a monster jalapeno burrito!



Gene Almquist,
Homebrewers Outpost &
Mail Order Co.
Flagstaff, Ariz.

Ingredients:

- 5 lbs. extra light dry malt extract
- 2.25 lbs. Great Western two-row malt, 1.8° Lovibond
- 7 oz. Gambrinus honey malt, 25° Lovibond
- 5 oz. rye malt, 4° Lovibond
- 4 oz. Hugh Baird carastan malt, 30° Lovibond
- 4 oz. unmalted wheat berries, 2° Lovibond
- 0.75 oz. Hallertauer Tradition hop pellets (5.5% alpha acid) for 75 min.
- 1 oz. Crystal hop pellets (4.5% alpha acid) for 30 min.
- 0.5 oz. Willamette hop plugs (5% alpha acid) for 2 min.
- 1 tsp. Irish moss
- 1 Tbsp. Burton water salts
- White Labs WLP001 (California ale) yeast
- 5 oz. corn sugar for priming

Step by Step:

Add 1 Tbsp. of Burton water salts to 2.5 gal. of water. Add grains and heat to 155° F. Hold for 40 min. Remove grains. Add dry malt extract and bring to boil.

Total boil is 75 min. Add Hallertauer Tradition hops and boil for 45 min. Add Crystal hops and boil for 10 min. more.

Add Irish moss and boil for 18 min. Add Willamette hops and boil 2 min. more. Cool as quickly as possible with wort chiller or ice bath. Add to fermenter and fill to 5 gal. with cool water. Aerate well and pitch yeast at 68° F.

Ferment for six days at 68° F. Transfer to secondary for eight days at 63° F or cooler. Prime with corn sugar or force carbonate. Allow to condition for at least two weeks.

OG = 1.044

FG = 1.011

A "Wry" Smile Rye Beer

(5 gallons)

The rye offers just the right amount of thirst-quenching sharpness.



Jon Mendrick,
Evergreen Brewing Supply
Bellevue, Wash.

Ingredients:

- 1.5 lbs. rye malt
- 1 lb. six-row pale malt
- 3.3 lbs. Coopers light malt extract
- 1 lb. Briess light dry malt extract
- 1.5 oz. Liberty hop pellets (4.5% alpha acid) for 40 min.
- White Labs WLP001 (California ale) or Coopers ale yeast
- 1/2 tsp. calcium chloride
- 3/4 cup corn sugar for priming

Step by Step:

Place rye and six-row malts in large grain bag and add to 3 qts. water heated to 160° F in your brew pot (steep temperature should be 150° to 155° F). Cover and place in oven on lowest heat setting. Leave for 60 min. and then add additional 1 to 2 gal. of water heated to 140° to 170° F. Stir gently for a couple of minutes.

mer Beers

Remove grain bag.

Mix in malt extract syrup, dry malt extract, hops, and calcium chloride. Bring to a soft boil. Boil softly for 40 min. Cool wort to room temperature. Transfer to fermenter, top up to 5 gal. if necessary. Pitch yeast at 69° F.

Ferment at 69° F for seven days. Transfer to secondary for seven days. Prime and bottle. Age in the bottle for seven days.

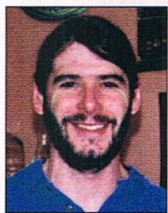
OG = 1.040

FG = 1.008

Y2K APA

(5 gallons)

This is a light- to medium-bodied, happy, refreshing ale with a citrus aroma and flavor. Homebrewers get ready for the year 2000!



Jason Courtney,
Lubbock Homebrew Supply
Lubbock, Texas

Ingredients:

- 6.6 lbs. pale malt extract
- 0.5 lb. carastan malt, 17° Lovibond
- 0.5 lb. crystal malt, 70° Lovibond
- 1 oz. Perle hops (8.6% alpha acid) for 60 min.
- 2.5 oz. Cascade (5.6% alpha acid): 0.5 oz. for 30 min., 1 oz. for 5 min., 1 oz. dry hop
- White Labs WLP001 (California ale)
- 3/4 cup corn sugar for priming

Step by Step:

Steep grain at 150° F in 3 gal. of water for 20 min. Sparge with 168° F water to make 5.5 gal.

Total boil is 60 min. Add Perle hops and boil 30 min. Add 0.5 oz. Cascade hops and boil 25 min. Add 1 oz. Cascade hops

and boil 5 min. Cool to 68° F and pitch yeast. Add to fermenter and top off to 5 gal. water.

Ferment at 68° F for seven days. Dry hop with 1 oz. Cascades at the end of primary. Rack to secondary for seven days. Prime and bottle.

Wunderbar Hefeweizen

(5 gallons)

A wonderful yeasty wheat beer. Makes a great base for adding fruit flavors.



Larry Johnson,
The Home Brewer
Bend, Ore.

Ingredients:

- 7 lbs. wheat liquid malt extract (60%/40% wheat to barley)
- 2 oz. Hallertauer whole hop flowers (3.5% alpha acid): 1 oz. for 60 min., 1 oz. for 5 min.
- 1 to 2 tsp. gypsum
- 1/2 tsp. Irish moss
- Wyeast 3068 (Weiherstephan weizen)
- 3/4 cup corn sugar for priming

Step by Step:

Total boil is 60 min. Boil the wheat extract, 1 oz. Hallertauer hops, and gypsum for 30 min. in 2 gal. of water. Add the Irish moss and continue to boil for 25 min. Add the rest of the Hallertauer hops and boil 5 min. more. Remove hops, cool, transfer to primary fermenter, and top up to 5 gal. Pitch yeast at 65° to 75° F.

Optimum fermentation temperature is 68° F for about two weeks. Bottle after adding priming sugar and fruit flavor of your choice (optional). Age two to four weeks.

5% ABV

Wee Willy's Watermelon Ale (5 gallons)

A refreshing, thirst-quenching, interesting summer brew. Taste the watermelon to make sure that it is flavorful and sweet. We use the sugar baby watermelon and extract the juice in our juice machine!



Mark and Tess
Szamatulski,
Maltose Express
Monroe, Conn.

Ingredients:

- 12 oz. crystal malt, 60° Lovibond
- 4 lbs. Alexander's pale malt syrup
- 2½ lbs. Munton's light dry malt
- 4 oz. maltodextrin
- 1 oz. Willamette hops (5% alpha acid) for 60 min.
- 1 tsp. Irish moss
- Wyeast 1098 (British ale)
- 3 qts. fresh watermelon juice
- Juice of 10 Bing cherries (for color)
- 20 drops peptic enzyme
- 1¼ cup dry malt extract dissolved in 0.5 qt. water for priming

Step by Step:

Steep crushed crystal malt in 0.5 gal. of water at 150° F for 20 min. Strain the grain water into your brewpot. Sparge grains with 0.5 gal. of 150° F water. Add water to brewpub for 1.5 gal. total volume. Bring to a boil and add malt syrup, dry malt, maltodextrin, and Willamette hops. Add water until the total volume in the brewpot is 2.5 gal.

Total boil is 60 min. Boil for 45 min. and add Irish moss. Boil 15 min. more and cool with cold water. Strain into fermenter and top off to 5 gal. Pitch yeast when temperature falls below 80° F.

Ferment at 68° to 70° F for five days. Heat watermelon and Bing cherry juice to 150° F for 10 min. Cool and add to 5-gal. carboy along with and peptic enzyme. Ferment at 68° to 70° F until fermentation slows. Transfer to glass carboy for a

third fermentation to clear the beer. Prime and bottle. Condition at 68° to 70° F for two weeks until carbonated.

OG = 1.052
FG = 1.014
Bitterness = 16.5 IBUs
Color = 15° SRM
ABV 5.4%

Stevie Ray Vaughn Blues Ale (5 gallons)

Developed in tribute to the hot licks of the great bluesman, this is a nicely hopped ale that will quench any summer thirst. It's become a big favorite.



Jack Bradt,
Assembly Required
Hendersonville, N.C.

Ingredients:

- 3.3 lbs. Briess Golden light malt syrup
- 2.5 lbs. Munton's light dry malt extract
- 1 lb. crystal malt, 60° Lovibond
- 1 lb. Munich malt, 10° Lovibond
- 2 oz. Challenger hop pellets (8.2% alpha acid): 1 oz. for 60 min., 0.5 oz. for 45 min., 0.5 oz. for 30 min.
- 2 oz. Cascade hop plugs (5.8% alpha acid): 0.5 oz. for 10 min., 0.5 oz. for 5 min., 1 oz. for 2 min.
- 1 tsp. Irish moss
- Wyeast 1056 (American ale) or Edme dry ale yeast
- ¾ cup dextrose for priming

Step by Step:

Place crystal and Munich malts in a steeping bag in 2 gal. of cold water and slowly bring to a boil. Before boil begins, remove from heat and take out grains. While still off heat, stir in both the dry malt and malt syrup.

Return to heat and bring to a boil. Total boil is 60 min. Add 1 oz. Challenger hops and boil for 15 min. Add 0.5 oz. Challenger hops and boil for 15 min. more. Add last 0.5 oz. of Challenger hops and boil for 15 min. more. Add Irish moss

and boil for 5 min. Add 0.5 oz. Cascade hops and boil for 5 min. Add 0.5 oz. Cascades and boil for 3 min. more. Add 1 oz. Cascades and boil for 2 min. Strain off wort and add to cold water in primary fermenter to 5-gal. mark. Cool to 75° F and pitch yeast.

Ferment at 65° to 75° F until krausen (foamy head) falls, then rack to secondary and allow to finish fermenting and clarifying at 65° to 75° F for 10 days. Prime, bottle, and condition for at least three weeks at 65° to 75° F.

OG = 1.058
FG = 1.016
Bitterness = 68.9 IBUs
Color = 21.1° SRM
5.5% ABV

Bohemian (Czech) Pilsner (5 gallons)

This style is exemplified by the most famous pilsners in the world: Pilsner Urquell and Budweiser Budvar (not the U.S. version) from the Czech Republic. These beers are full bodied and malty yet have a dry character from the pilsner lager yeast. They also have the highest hop rate of all the pilsners, about 12 alpha acid units.



Steve Bader,
Bader Brewing Supply
Vancouver, Wash.

Ingredients:

- 6 lbs. Coopers light malt syrup
- 0.5 lb. crystal malt, 20° Lovibond
- 1 lb. pilsner malt (Belgian or German)
- 0.5 lb. dextrin malt
- 4 oz. Saaz hops (3.5% alpha acid): 2 oz. for 45 min., 1 oz. for 30 min., 1 oz. for 15 min.
- 1 tsp. Irish moss
- White Labs WLP800 (Pilsner lager)
- ¾ cup corn sugar for priming

Step by Step:

Steep crushed grain in 2 gal. of 150° F water for 30 min. Remove

the grain from the hot water, then bring water to a boil. When boiling starts, remove pot from burner and add malt syrup.

Total boil is 45 min. Add 2 oz. Saaz hops and Irish moss and boil 15 min. Add 1 oz. Saaz hops and boil 15 min. more. Add last Saaz hops and boil for 15 min. more. Fill your sanitized carboy with 2 gal. of cold water. Strain the hot wort into the carboy and top off to the 5-gal. mark. Add yeast when beer is cooler than 75° F and leave at room temperature for the first 24 hours.

Ferment at 50° to 55° F. Cooler temperatures cause fermentation to go slower, about three to four weeks. Be patient! Bottle as usual.

OG = 1.049

FG = 1.014

4.37% ABV

Paradise Ginger Weisse (3 gallons)



Doug Faynor,
Homebrew Heaven
Salem, Ore.

Ingredients:

- 3 lbs. wheat dry malt extract
- 8 oz. carastan malt, 35° Lovibond
- 24 g. whole Ultra hops (3.5% alpha acid) for 60 min.
- 3.5 oz. ginger, peeled and sliced very, very thin: 2 oz. for 15 min., 1.5 oz. for dry hop
- 3 g. grains of paradise seed, crushed: 2 g. for 15 min., 1 g. for dry hop
- 1 oz. sweet orange peel, dried
- Wyeast 3333 (German wheat), 1 qt. starter
- 6 to 6½ Tbsp. corn sugar for priming

Step by Step:

Steep carastan malt in 1 qt. water at 150° to 155° F for about 30 min. Remove grain. Add water to bring total to 3.5 gal. and heat to boiling. Remove from heat and add malt extract.

Return to boil. Total boil is 60 min. Add Ultra hops and boil 45 min. Add 2 oz. peeled and sliced ginger and 2 g. crushed grains of paradise seed. Boil 15 min. more. Stop boil, remove from heat, and cool to 65° F as rapidly as possible. Aerate well and then pitch yeast starter.

Ferment for four days. Rack to secondary fermenter and add 1.5 oz. peeled and sliced ginger, 1 g. crushed grains of paradise seed, and dried sweet orange peel, all in the manner of dry hopping. Allow to rest in the secondary for two to 2½ weeks. Prime and bottle.

Witless in Indianapolis (5 gallons)

The right yeast, a hint of coriander, and bitter orange peel make this a thirst-quenching beer.



Anita Johnson,
Great Fermentations of
Indiana
Indianapolis

Ingredients:

- 6 lbs. wheat dry malt extract
- 0.25 lb. flaked oats
- 1 oz. Saaz hops (3.1% alpha acid) for 60 min.
- 0.8 oz. crushed coriander
- 0.6 oz. bitter orange peel
- 1 tsp. Irish moss
- Wyeast 3944 (Belgian witbier)
- ¾ cup corn sugar for priming

Step by Step:

Make at least a quart of yeast starter prior to brewing. Rehydrate Irish moss in ½ cup warm water. Set aside. Using a muslin bag, steep oats and flaked wheat in 2 gal. 150° F water for 30 min. Remove bag, gently squeeze out water, and discard grain bag.

Total boil is 60 min. Add malt extracts and Saaz hops and boil 40 min. Add rehydrated Irish moss and boil 15 min. Add the crushed coriander and bitter orange peel and boil 5 min. more. Remove from heat, chill wort, and transfer to primary fermenter. Pitch yeast at 75° F.

Ferment around 68° F. If more coriander or orange peel flavor and aroma are desired, place 0.25 oz. of each in a sanitized muslin bag and add to the fermenter. Prime and bottle when bubbles are at least four minutes apart and specific gravity is stable below 1.015.

OG = 1.051 to 1.056

FG = 1.008 to 1.015

Chocolate Rye (5 gallons)

A slight hint of chocolate and toasted biscuit flavor. Hint of sweetness but with a refreshing aftertaste as a result of the rye.



Shirley Martin,
Country Wines & Beer
Pittsburgh

Ingredients:

- 3.3 lbs. Morgan's extra pale malt extract (or 4 lb. can of Mountmellick light or Alexander's pale malt)
- 2 lbs. Dutch extra light dry malt extract
- 2 lbs. honey malt
- 1 lb. malted rye
- 0.5 lb. malted chocolate rye, uncrushed
- 0.5 lb. Victory malt
- 1 oz. Kent Goldings U.K. hop pellets (4.8% alpha acid) for 50 min.
- 1.5 oz. Saaz hop plugs (3.1% alpha acid): 1 oz. for 20 min., 0.5 oz. for 5 min.
- 1 tsp. Irish moss
- 1 vial Pitch 5 liquid American ale yeast
- 7/8 cup corn sugar dissolved in 2 cups wort for priming

Step by Step:

Bring yeast to room temperature. Crack grains in malt mill. For best results, crack the rye along with the honey malt and put in a fine mesh nylon bag. Put Victory malt and uncrushed chocolate rye in another nylon bag. In a medium-size glass bowl put 2 cups warm water and 1 oz. Saaz hop plugs. In a

second bowl put 1 cup warm water and the other 0.5 oz. Saaz hop plugs. This helps the plugs to open.

Add 2.5 gal. water to 5-gal. pot. Heat to 150° F. Remove from heat. Steep both bags in water for 30 to 40 min. and then remove bags. Bring liquid to a boil and remove from heat. Stir in the malt extract syrup, then return pot to heat. Sprinkle in the dry malt extract, stirring constantly until it's thoroughly dissolved.

Total boil is 50 min. Add 1 oz. Kent Goldings hops and boil 30 min. Add 1 tsp. of Irish moss and 1 oz. of Saaz hops (along with the steeping water), and boil 15 min. Stir in the last 0.5 oz. Saaz hops along with the water and boil 5 min. more. Put 2.5 gal. of cold water into fermenter. Pour the wort through a strainer into the cold water in the fermenter. Stir wort thoroughly. Top up to 5 gal. Cool to 75° to 80° F. Shake vial of yeast and pitch, making sure to stir wort before adding yeast. (Yeast does not need a starter.)

If you prefer to ferment in glass, then siphon wort into a glass carboy and attach fermentation lock. When fermentation is complete, siphon beer into another sterilized vessel. Prime and bottle. Store at room temperature for two weeks. Then store at colder temperature (40° to 50° F) for two weeks of aging.

OG = 1.048 to 1.052

FG = 1.012 to 1.016

"Frozen North" Honey Beer

(5 gallons)

This is a refreshing summer beer. It features the delicacy of the finest clover honey, complemented by the rich aromatics of honey malt and classic German-style hops.



Byron Burch,
The Beverage People
Santa Rosa, Calif.

Ingredients:

- 3 lbs. light dry malt extract
- 1.5 lbs. Canadian clover honey

- 1 lb. dried rice extract
- 8 oz. U.S. two-row malt
- 2 oz. carapils malt
- 4 oz. Gambrinus honey malt
- 2 oz. Belgian aromatic malt
- 1/2 tsp. gypsum
- 1/4 tsp. salt or calcium chloride
- 1.8 oz. Hallertauer hops (3.5% alpha acid): 0.8 oz. for 55 min., 1 oz. for 5 min.
- 1 pint starter of Wyeast 1056 (American ale)
- 3/4 cup corn sugar for priming

Step by Step:

Steep grains in 2 gal. of 150° F water for 30 min. Rinse with hot water until run-off is clear, collecting all liquid as part of the wort. Dissolve honey, dry malt extract, dried rice extract, gypsum, and calcium chloride in enough water to leave you with 5 gal. of wort.

Total boil is 60 min. Add 0.8 oz. Hallertauer hops and boil for 55 min. Add 1 oz. Hallertauer hops and boil for 5 min. Quick chill the wort to 68° F and add yeast.

Ferment at 60° to 70° F until done. Transfer to topped-up secondary fermenter or settling tank for at least three days. Prime and bottle, and wait two weeks.

Golden Ale

(5 gallons)

A nice, light summer beer, crisp and somewhat hoppy.



Mark Garetz,
HopTech Homebrewing
Supplies
Pleasanton, Calif.

Ingredients:

- 7 lbs. Alexander's pale malt extract
- 4 oz. Cascade hops (5% alpha acid); 2 oz. for 60 min., 1 oz. for 5 min., 1 oz. dry hop (optional)
- 1 Tbsp. Irish moss
- 15 g. Coopers dry ale yeast
- 3/4 cup corn sugar for priming

Step by Step:

Bring 3 gal. of water to a boil.

Turn off heat and add extract.

Total boil is 60 min. Bring to boil, add 2 oz. Cascade hops and Irish moss and boil 55 min. Add 1 oz. Cascades and boil 5 min. Cool to 70° F. Pitch yeast and aerate.

Ferment at 70° F for 14 days. When the krausen (foamy head) starts to fall, dry hop with 1 oz. Cascade hops (optional). Prime and bottle. Age in the bottle for seven days before drinking.

Canoe Paddler

(6 gallons)

When the flesh is willing but the liver is weak, this recipe will keep body and soul together.



Tim Vandergrift,
Spagnol's Wine and Beer
Delta, B.C.

Ingredients:

- 1 The Brew House American Premium Lager Kit
- 1 lb. carapils malt
- 0.75 oz. Saaz hops (3.1% alpha acid) for 5 min.
- Wyeast 2272 (North American lager)
- 1 1/4 cups corn sugar for priming

Step by Step:

Crack grains and place them in grain bag. Add grain bag to 2 gal. cold water in 3 gal. or larger pot. Place over medium heat and bring to 170° F and hold 20 min., stirring occasionally.

Remove and discard grains and boil liquid for 20 min. At the end of boil, add Saaz hops, remove pot from heat, and steep hops for 5 min. Cool liquid and use it to top up the kit to a full 6 gal. Top up with boiled, cooled water. Do not forget to add the pH adjustment package that comes with The Brew House kit. Cool to 46° F and pitch yeast.

Ferment at 46° to 54° F. Lager for four weeks. Prime and bottle.

Extract Manufacturers

West Coast Ale

(5 gallons)

Classic creamy ale great for summer barbecue with spicy meats and fresh vegetables.



Thomas Alexander,
Alexander's
Acampo, Calif.

Ingredients:

- 8 lbs. Alexander's light malt extract
- 1.5 lbs. Klages malt, toasted on a cookie sheet for 10 min. at 350° F
- 1.5 oz. Northern Brewer hops (8.5% alpha acid) for 60 min.
- 1 oz. Cascade hops (5.8% alpha acid): 0.5 oz. for 30 min., 0.5 oz. for 1 min.
- Wyeast 2112 (California lager)
- 3/4 cup corn sugar for priming

Step by Step:

Steep the grain in 3 qts. water at 150° to 152° F for 30 min. Rinse grains with warm water. Add water to bring volume to 5.25 gal. and bring to a boil. Remove from heat, add malt extract, and bring to a boil again.

Total boil is 60 min. Add Northern Brewer hops and boil for 30 min. Add 0.5 oz. Cascade hops and boil for 29 min. more. Add remaining 0.5 oz. Cascade and boil for final minute. Cool, transfer to primary, aerate, and pitch yeast at 60° F.

Ferment at 60° F for seven days. Transfer to secondary for seven days. Prime and bottle. Age in the bottle for 14 days.

OG = 1.048

FG = 1.010 to 1.012

Maple Wheat

(5 gallons)

This is a light, sweet, maple-flavored beer that makes for a refreshing summer drink.



Mary Anne Gruber,
Briess Malting Co.
Chilton, Wis.

Ingredients:

- 3.3 lbs. CBW Bavarian Weizen malt syrup
- 1 lb. CBW Sparkling Amber malt syrup
- 2 lbs. maple syrup
- 0.5 g. Mt. Hood hop pellets (6% alpha acid) for 60 min.
- 0.3 g. Saaz hop pellets (3.1% alpha acid) for 25 min.
- 0.3 g. Hallertauer hop pellets (3.5% alpha acid) for 15 min.
- 1 tsp. Irish moss
- 10 g. (2 packages) Nottingham Gold yeast, dry
- 2/3 cup CBW Brewers Gold Dry malt extract for priming

Step by Step:

Heat 2 to 3 gal. of water to 160° F. Add malt extract and bring to a boil. Stir vigorously to get a complete mixing without scorching the extract.

Total boil is 60 min. Add Mt. Hood hop pellets and boil 35 min. Add Saaz hop pellets and boil 10 min. Add Hallertauer hop pellets and boil 15 min. Add maple syrup and Irish moss at end of boil. (While the wort is boiling, prepare the yeast by removing 1/2 cup of the wort and cooling it to room temperature. Completely dissolve two 5-g. packages of dry Nottingham Gold ale yeast in the 1/2 cup of cooled wort.) Cool rapidly. Allow the spent hops and trub to settle.

Carefully pour the wort into a previously prepared 5-gal. carboy. Aerate the wort by bubbling sanitized air through the cool wort for 5 min. or shaking the container for 10 min. Add enough cold water to bring the volume up to 5 gal. and pitch the yeast at 72° F.

Ferment at 68° to 72° F for five to six days. Cool to 43° to 45° F and ferment two days more. Rack to sanitized carboy, seal, and let

stand in a cool, dark place for seven to 10 days. Prime, bottle, and store at room temperature for seven days.

"Hasta La Vista, Baby" Mexican Light Beer

(5 gallons)

A mild light ale. Add a lime, drink icy cold, and think "Cancun!"



Mark Henry,
Coopers Brew Products
Seattle

Ingredients:

- 3.3 lbs. Coopers light malt extract
- 1 lb. light dry malt extract
- 1 lb. rice syrup or rice syrup solids
- 1.5 oz. Hallertauer leaf hops (3.1% alpha acid) for 45 min.
- 1 tsp. Irish moss
- White Labs WLP001 (California ale) or Coopers ale yeast
- 3/4 cup corn sugar for priming

Step by Step:

Bring water to a boil for 5 to 10 min. Remove from heat. Mix in malt extract syrup and dry malt extract, and bring to a soft boil (watch for boilover).

Total boil is 45 min. After hot break, add Hallertauer hops and boil 25 min. (Top up periodically if necessary.) Add Irish moss and rice syrup. Cool wort in pot to lukewarm (about 70° F). Transfer to fermenter and top up to 5 gal., if necessary. Pitch yeast at 68° F.

Ferment at 68° F for seven days. Transfer to secondary for seven days. Prime and bottle. Age in the bottle for seven days.

OG = 1.039

FG = 1.012

Morgan's Honey Wheat

(5 gallons)

A pleasant golden amber color with a hint of honey flavor. Great for summer. Very amenable to adding fruits or spices.



Grant Sampson,
Morgan's
Brewing
International
Australia

Ingredients:

- 3.75 lbs. Morgan's Golden Sheaf Wheat Kit
- 2.2 lbs. Morgan's Wheat Malt Master Blend
- 2.2 lbs. honey
- 0.53 oz. Hallertauer hops (3.5% alpha acid) for 10 min.
- 1 tsp. Burton water salts
- 1 tsp. Irish moss
- Wyeast 3056 (Bavarian wheat)
- 3/4 cup corn sugar for bottling

Step by Step:

Add Golden Sheaf Wheat Kit, Wheat Malt Master Blend, Irish moss, and Burton water salts to 1 gal. water. Slowly bring mixture to a boil, stirring occasionally.

Total boil is 10 min. Add honey and Hallertauer hops. Stir occasionally. Strain wort into fermenter and top up to 6 gal. with cold water. Allow to cool to 77° F and pitch yeast.

Ferment at 68° F for four days. Transfer to secondary for one week. Prime and bottle.

Big Bill's Easy Drinkin' Lawn Mower Beer (5 gallons)



Charlotte Creech,
Northwestern Extract Co.
Brookfield, Wis.

Ingredients:

- 6 lbs. Northwestern light extract
- 3 lbs. Northwestern liquid corn extract
- 3 oz. Saaz hops (3.1% alpha acid):

1 oz. for 60 min., 1 oz. for 30 min., 1 oz. for 10 min.

- Ale yeast
- 1 package of PrimeTab tablets

Step by Step:

Add malt extract and enough water to make 5 gal. Total boil is 60 min. Add 1 oz. Saaz hops and boil 30 min. Add 1 oz. Saaz hops and boil 20 min. Add last Saaz hops and boil 10 min. Cool to 80° F and pitch yeast.

Ferment at 50° to 70° F for five to seven days. Add three PrimeTab tablets to each 12-oz. bottle and fill directly from fermenter. Age in bottle for seven to 10 days.

Calling All Recipes

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Brewing **Hemp** Ale

How the controversial beer was created

by Steve Nordahl

It has been two years since Frederick Brewing Co. introduced the first commercially available hemp beers in North America, Hempen Ale and Hempen Gold. Many, many volumes could be

written of the quest to develop, get ATF label approval for, and launch these two products, and as the brewer who developed them, I have answered the “why hemp” question a thousand times. In a brewing industry today where fruits, chocolate, coffee, nuts, hot peppers, and even garlic are finding their way into the brew kettles and bottles of some of the finest breweries in the country, I say: Why not hemp?

Frederick Brewing Co. was not necessarily pioneering brewing with hemp, just doing it legally. Over the years hemp has made its way into a few brews. An early attempt was made in the 1960s at an underground brewery on the island of Oahu, Hawaii. The brewers produced an oil from the leaves and blossoms of marijuana plants and added it to the beer, rumored to have sold illegally for as much as \$45 per case. Another brewer began brewing Hi-Brew in 1979 using the leaves and trimmings of the marijuana plant to “dry hemp” — like dry hop — the beer prior to bottling. Obviously, neither of these strategies would hold up in the real world of the ATF, FDA, DEA, and the rest of the acronym agencies.

Hemp is a fabulous natural resource, and when I began doing some research on how I could incorporate it into the brewhouse, using the seeds as a portion of the grain bill in the mash became an obvious choice. Hemp seeds are a grain of sorts, like oats, rye, and barley, all of which have found their way into other recipes here at Frederick Brewing Co. However, being a very close relative to marijuana, industrial hemp does still contain minimal quantities of THC (tetrahydrocannabinol), the active ingredient in



marijuana. This makes it a controlled substance and illegal to cultivate in the United States.

The hemp seeds imported into the United States must be sterilized to render them nonviable. Although the seeds themselves do not contain any traceable THC, planting them produces a plant that contains THC. In fact the seeds must be thoroughly cleaned and free of virtually all — in government speak — “extraneous vegetative material.” When the seeds are harvested, a bit of the leafy greens generally ends up among the seeds. If this is not properly cleaned out, traceable quantities of THC can exist in the seeds.

This has never been a problem with Hempen Ale and Hempen Gold since our seeds are always thoroughly cleaned and THC is not water soluble, so it won’t carry forward into the finished product.

I still remember quite vividly the first phone calls when I began the search for hemp seed. The first person laughed and referred me to another, who chuckled and referred me to another. This continued for a dozen calls over many days, but eventually the guy who laughed the loudest and the longest sent me a 50-pound bag free of charge. It turned out to be a pretty good speculation, since we have purchased more than 200,000 pounds of seed from his company over the last few years.

Preparation

During my first attempt at a pilot batch, I wanted to lightly roast the seeds to get a nice character. I took about 15 pounds of seed to a local coffee shop that has a small roaster. Once convinced that she was not going to be arrested for her efforts, the owner was more than willing to help in the quest. The seeds were roasted at 450° F, and I took about three pounds out every minute to get some varying degrees of color and character. The last few pounds that came out of the roaster were not particularly dark, but a few had exploded like popcorn.

This all sounded like a great plan until we had to try to cool and

separate what had become five different batches of 450° F seeds. The whole process was not exactly OSHA friendly, but I got what I was looking for.

In formulating a product like this, I wanted to make sure that the hemp could be used in a significant proportion to make a legitimate contribution to the character of the beer. We were prepared for the fact that many people would be looking to tear the product apart, claiming every reason to cry “gimmick.” We did not want them to infer that we were just waving a few hemp seeds over the kettle so we could say it was brewed with hemp. I never even attempted to determine what the minimum proportion of hemp would be; I actually started with the maximum amount I thought we could realistically use and backed up from there.

Experimenting

The varying degrees of roasting did not yield much variation in color, and there was very little overall difference in the seeds that were removed after one, two, and three minutes. The seeds that roasted four and five minutes were almost too acrid to use. The first dozen five-gallon pilot batches focused on using the seeds from the first three minutes in proportions varying from 15 percent to 40 percent. We also brewed a batch with no hemp at all for comparison.

Because the primary focus at this point was to discover what the hemp was contributing to the wort, I used a single hop variety contributing 15 to 20 bitterness units. The results of the first batches of Hempen Ale were very exciting to say the least. There was a pleasing nutty character and a nice thick and creamy character from the seed, which has a protein content of nearly 33 percent. However, the brews with more than 20 percent hemp did not end up with enough malt character and got a little oily on the palate.

Once I determined that there was definitely an interesting character and flavor contribution from the hemp, a couple of our

other brewers and I began to put the finishing touches on the recipe. We were aiming for a finished product with a floral hop character to complement the earthy qualities of

Original Hempen Ale (5 gallons, all-grain)

Ingredients:

- 10 lbs. two-row pale malt
- 1 lb. Munich malt, 20° Lovibond
- 1 oz. black patent malt
- 1.5 lbs. mild hemp seed, roasted on a cookie sheet in a 450° F oven for 3 min.
- 2.75 oz. Cascade hops (6% alpha acid, adjust to approx. 37 bitterness units): 0.75 oz. for 90 min., 0.75 oz. for 45 min., 0.5 oz. for 10 min., 0.75 oz. at end of boil
- Wyeast 1056 (American ale), 1 pint starter
- 2/3 cup corn sugar for priming

Step by Step:

Mash grains and hemp seed with 3.5 gal. of approx. 175° F water to achieve a 156° F mash for 60 min. Sparge with enough 170° F water to collect 5.75 gal. of wort.

Boil for a total of 90 min. Add 0.75 oz. of Cascade hops at beginning of boil. Boil 45 min. and add 0.75 oz. more of Cascade hops. Boil 35 min. and add 0.5 oz. of Cascade hops. Boil 10 min. more, turn off heat, and add remaining 0.75 oz. of Cascade hops. Whirlpool, cool to 68° F, and oxygenate/aerate well. Pitch yeast.

Ferment at 68° F for seven to 10 days or until fermentation is complete. Condition, bottle or keg as desired, and enjoy!

Variations:

Try adding roasted hemp seed to your favorite pale ale and stout!

the hemp. After a few pilot brews using what we had determined to be the ideal grain bill and changing the hop variety and target bitterness units, we really enjoyed the qualities of Cascade hops. We decided to use them from kettle to whirlpool.

Big Batches

Having finalized what we thought was the perfect formulation for Hempen Ale, we began the difficult task of trying to acquire, handle, and roast the thousands of pounds of seed we would require to produce at a commercial level. We were just relocating to a new facility and would be brewing in 50-barrel batches (1,550 gallons). Sales projections were calling for at least 600 barrels (18,600 gallons) of beer necessary for the product rollout. It was becoming painfully obvious that using roasted seed would be a huge logistical problem.

I met with two regional coffee companies about doing some contract roasting, but their equipment was not able to handle the small size of the hemp seeds. I even had a meeting with a barley malting company about the feasibility of the company roasting and handling the seeds for us. However, after a few tests the company had to decline due to the possibility of cross-contamination of the hemp seed into their products.

We went back to the drawing board and many pilot brews later, we had formulated a new version of Hempen Ale. It was brewed using raw seed that had been prepared for us by another company. The product was very similar to the original and the raw seed contributed a good hemp quality to the beer, but I was a little disappointed. I saw it as a compromise to the product I had originally developed. Still, I was very anxious to begin production on what we all knew would be an exciting and controversial beer.

First Out

The motivation behind spending years of research and development and many thousands of dollars in attorneys' fees to make these

products and get the label approval was tremendous. We had the excitement of blazing the trail, a chance to shake up the brewing industry a little, and the desire to prove all the "you can't do that" people wrong. But if we were going to do this product, we were going to do it right.

All of these concerns were put to rest with the bronze metal Hempen Ale received at the 1997 Great

American Beer Festival in the herb/spice category. Since then many other breweries have jumped on the bandwagon with hemp beers of their own. Imitation is the sincerest form of flattery — right? ■

Steve Nordahl is a brewing consultant to and co-founder and former head brewer of Frederick Brewing Co. in Frederick, Md.



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HOT

Heat Sources and How They Affect Your Brew

In telling non-brewers about the process of brewing beer, homebrewers often say “the boil” is the “heart of the brewing session.” Have you noticed this? Well the heart of the boil must be the heat source that produces the boil — maybe the aorta of the brewing session.

Most homebrewers need the ability to boil wort. Even if you use a no-boil method such as concentrated wort, you might not use it every time. Boiling wort serves a lot of beneficial functions. Boiling kills microorganisms, adds hop flavor, removes some undesirable aromatics, and helps reduce the chances of haze (by helping unwanted proteins clump together). Sometimes brewers use the boil to add darker colors or deeper flavor.

Anatomy of a Boil

As the temperature of a liquid rises, the molecules move faster and faster, moving toward their gaseous state. As the liquid reaches the boiling point, the part of it closest to the heat source turns immediately to gas and escapes through the slightly cooler liquid above. As more heat is applied, the boil gets increasingly active — the liquid turns to gas at an even faster rate. These faster and faster bubbles agitate the liquid, in turn leading to more heat transfer and even more motion. The activity is followed by boilover (super-rapid volume reduction) unless the heat is turned down.

When the liquid under discussion is wort, the action of the boil should be fairly robust: More motion leads

by Craig Hartinger





to a better “hot break” (or clumping together of proteins) because the tumbling action makes proteins accessible to one another. Wort gets its hop flavor by temperature — the hop resins gradually isomerize during the boil, meaning that they change to a more soluble state — but also by mechanical action during the boil. The action reduces the oils and plant bits to smaller bits with more surface area.

More heat, more motion, and a more rapid boil all lead to a faster reduction of liquid volume as larger amounts leave via the atmosphere. Serious homebrewers and pro brewers talk about volume reductions of more than 20 percent in a 75- to 90-minute boil. Of course they also are implying that their hot break and their hop utilization are so powerful that *their* beer is even better.

Going to the Source

Fortunately, humans have pretty much mastered the task of boiling liquids; even the simplest dwelling tends to have a kitchen range. In

this comparison of heat-source options for homebrewers, please note: All we are doing here is systematically applying heat to a liquid-filled vessel to raise the temperature, then balancing the heat input with some degree of control to achieve a desired boil pace.

For grain mashers, the degree of control can become more critical because sometimes heat is gently applied to the mash to bring the temperature up without getting hot enough to denature enzymes (make the enzymes stop working). Heat output (more heat

output means faster boils and therefore time saved) matters more to all-grain brewers for sure — bringing mash water, sparge water, and full-volume wort boils up to temperature takes time, time, time.

The unit of measure often used to compare heat sources is the British Thermal Unit or BTU. A BTU is the amount of heat required to raise one pound of water by one degree Fahrenheit.

Open Fire

Certainly the use of open fire is a historically relevant option. However, it is difficult to regulate the heat on a bonfire, and open fire is inconvenient in comparison to burners designed to heat pots. Those are the negatives. On the positive side, a beer brewed over a campfire — trout stream nearby, birds chirping, snowy mountains around, columbine and wild lupine blooming — just might have some magic never to be found in beer brewed at your home.

If you attempt a fire-brewed beer, wait until you have extremely hot coals so you have enough heat to maintain a boil. Use a heavy grill

or oversized hanger setup. The brewkettle will be the heaviest pot you ever put on a fire, so don't risk burning yourself or wasting wort.

Electric Range

Many homebrewers start out on their kitchen's electric range. For smaller volumes of wort, especially less than four gallons, electric ranges work well. Almost all brewers who get into larger volumes or who desire to boil the full volume of their wort so they don't have to top up in the fermenter run up against a time issue. Electric range elements often run well below 10,000 BTUs, meaning even a few gallons come to a boil slowly. More liquid is just going to take more time, and it might be difficult to keep the larger volume boiling rapidly.

Try turning on two burners and getting both under the pot, if the pot's base is wide enough to reach two (or more!) burners. Heavier, hotter “canning elements” are available for some electric kitchen ranges.

Some homebrewers get a rapidly rolling boil by covering or partly covering the kettle. If you do this, pull the lid off after you achieve the boil — boiling drives some potential off-flavors out of wort, and a top won't allow all of them to escape. If you can't maintain a rolling boil without putting a top on, you need a better heat source or a smaller volume of wort.

Electric Brewkettles

Specifically designed for the homebrewer but rarely seen in recent years, the plastic BruHeat boiler uses an electric element to heat the wort. The 220-volt version heats faster and maintains a boil better than the 110-volt version.

Gas Range

People who have gas ranges tend to love them. They are very hot and very adjustable. And while homebrewers don't have the type of huge annual utility budgets that commercial breweries do, natural gas is generally less than half the cost of electricity as a heating fuel.

The “instant heat” of a gas range is a significant advantage to poor planners and brewers who run out of sparge water, then realize that they had better get a small extra pot going on another burner immediately.

Propane or Gas Ring Burner or Cooker

Main attraction: You get out of the kitchen for outdoor or garage brewing. This is a large gas burner, typically 30,000 to 38,000 BTUs but available up to 50,000, that hooks up to a portable propane tank or outside gas hookup. (A propane burner can be rejacketed for natural gas, but the two fuels can't be used interchangeably in one burner.) Very adjustable, adequately hot, stingy on gas, a great choice. The Superb Cooker and Cache Cooker are examples.

Propane or Gas Venturi Burner or Cooker

Instead of a ring with many small holes in it for the gas, a venturi burner has one big burner

hole and an air intake that draws additional air to the flame by design. The increased airflow makes the flame larger and hotter. This style of cooker burns with an aggressive roar that sounds like a rocket engine and uses fuel prodigiously. However, it can produce up to 200,000 BTUs of heat and really speed up your brew day. Even if you use two gallons of propane for a typical five-gallon, all-grain batch instead of the one you used when you had a ring burner, you've barely spent an additional dollar. There are many variations, among them the Cajun Cooker and the King.

Not all gas burners have an adjustable air intake, but this is a nice feature. The brewer can optimize the fuel-to-air ratio by opening and closing the intake and can get a clean flame at any level. With a fixed air intake, the flame only burns completely clean at one setting.

Often these venturi burners come in the form of restaurant wok burners, and homebrewers have successfully used them in brewing setups. Similarly, many brewers

have adapted gas water-heater burners for use as homebrew heat sources, although these are usually oversized ring-style burners.

Propane Precautions

Some brewers use propane cookers indoors, ignoring or discounting the big “for outdoor use only” stickers on the unit. To do this, a couple of open windows doesn't count as a safety feature. Use them completely outdoors or in the doorway of your garage.

If you choose to reinterpret the manufacturer's instructions and fire up your burner indoors (a possibly deadly idea), have a forced-air method that draws air in from outside, past the burner, and back outside. You need makeup air because those big flames use a lot of oxygen — a single kitchen gas-range burner might produce 10,000 BTUs, and the propane cookers pretty much start at three times that. In an enclosed area they can deplete oxygen and actually be competing with your lungs for air.

These burners also produce carbon monoxide, a deadly gas. The exhaust must be moving away from the brewer, not hanging around. Beware of “brewer's headache,” an ailment sometimes cured by walking away from the burner and into fresh air.

A final precaution is to store your propane tank outdoors. Propane gas can pool in low areas, creating an ignition hazard. Outdoors, a leaky tank or fitting will lead to some loss of fuel. Indoors, it could lead to fire and a very bad situation.

Steam

Many professional brewers assert that steam is the ultimate heat source for brewing. At typical delivery pressure, steam might be at only 240° F at your kettle, minimizing the risk of inadvertently scorching the wort. Some steam kettles have extra surface area in the kettle in the form of a collandria, an internal steam jacket shaped like a short cylinder. This speeds up boil time, and collandria

Choosing a Heat Source

Heat Source	Pros	Cons
open fire	• aesthetically pleasing	• difficult heat regulation • awkward and inconvenient
electric range	• convenient	• extended time to boil • difficult to maintain boil
electric brewkettle	• portable	• difficult to find
gas range	• cheap • fast • adjustable	• not as hot as some propane burners
propane or gas ring burner	• adjustable • portable • adequately hot	• not as hot as venturi burner • needs adequate ventilation
propane or gas venturi burner	• extremely hot	• requires ventilation • consumptive of fuel
steam	• limits mash scorching • some models are fast to boil	• not widely available to homebrewers

Playing with Caramelized Wort

Learn what caramelized wort tastes like in beer. First, have a small volume — a pint or two — of wort ready, or begin your mash run-off into a small pitcher. Put two tablespoons of water in your empty kettle, and put it on the heat.

Be careful! Don't walk away to answer the phone at this point, or you could seriously burn your kettle. The small volume of water will heat very quickly and boil away with a hiss. Always be careful about boiling your pot dry — the liquid distributes the heat and the bottom of an empty pot can get extremely hot, even damaging the metal. (So you don't ruin an expensive kettle, you can try this experiment in a less important vessel.)

At this point, pour in your small volume of wort or direct your run-off to the kettle. Once again, be cautious. A big cloud of steam will rise, and your wort will bubble dramatically, hissing like a giant snake and creating caramely, rich flavors appropriate for Scotch-style ales or other big beers. This flavor is quite forward, and would probably overwhelm a lighter-colored or smaller beer.

After the small volume of wort has been scorched for a moment, add the rest of your wort or continue your run-off, always keeping an eye on your kettle to avoid boiling it dry.

Finish the brew session as usual, and be ready for a very identifiable and often extremely tasty element at sipping time.

geometry can contribute to an active boil.

Homebrewing with steam is feasible for the obsessed hobbyist who also happens to be a plumber. It also could be possible for brewers who live near a steam utility (still found in some city metropolitan areas).

Multiple Burners

One ultimate upgrade can make your brewday faster and your brewing system safer. The brewkettle can be heating during run-off, the sparge water temperature can be fine-tuned, you can step mash, and you can do all these things without wrestling around heavy pots filled with 211° F liquids. A three-tier system consisting of reserve sparge water (the hot liquor tank), mash tun, and boiler usually has a permanently mounted burner under each vessel.

This system is not only fun to use, it's safer and quicker because the need to move around heavy hot stuff is kept to a minimum.



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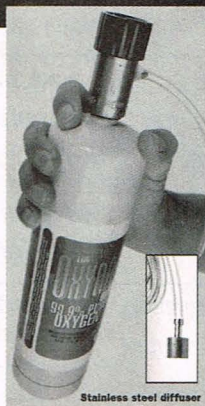
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CIRCLE 20 ON READER SERVICE CARD

Brewing Science: Flocculation

by Christopher White

Yeast strains can be categorized into three groups (high, medium, and low flocculation) according to how quickly they clump together and drop out of solution.

Brewers have created a unique vocabulary. Words such as pitching, attenuation, and flocculation take on special meaning to brewers. Pitching is adding yeast to wort to start fermentation. Attenuation is the percentage of sugars that yeast consumes during fermentation. The magical process of yeast cells coming together and dropping to the bottom of a fermenter is called flocculation.

Flocculation is a desirable and important characteristic that is unique to brewer's yeast. When brewer's yeast nears the end of fermentation, single cells aggregate into clumps of thousands of cells and drop to the bottom of the fermenter, leaving clear beer behind. If yeast flocculates too early, the beer will be underattenuated (not all of the available sugar will be consumed by the yeast) and sweet. If yeast does not flocculate, the beer will be cloudy and have a yeasty taste.

Most strains of yeast, which brewers call "wild" yeast, do not flocculate well and remain in suspension for an extended time. The ability to flocculate is a result of natural selection. Brewers collect yeast either from the bottom or top of a fermenter. In choosing this yeast that clumps, they select for increasingly flocculent strains.

Yeast flocculation can be classified as high, medium, or low. Ale yeast strains are found in each category, while lager yeasts are predominantly medium flocculators. An English/London ale strain would be a high flocculator, while a California/American Ale strain a medium flocculator. A hefeweizen

strain is an example of a low flocculator. It is difficult to tell which category of flocculator is used to produce individual commercial beers, because most commercial beers are filtered before being bottled or kegged.

High Flocculators

High flocculation is a characteristic of many yeast strains of English origin. The yeast begin to clump in three to five days, and it drops to form a compact yeast cake at the bottom of the fermenter. When the fermenter is swirled, the yeast cells stay together as a large yeast cake. Some yeast is so flocculent that it can clog openings and valves.

High flocculators can require special attention to produce a well-balanced beer. The yeast cells often need to be "roused" back into the beer by gently swirling the carboy or, for a commercial fermenter, gently blowing CO₂ into the bottom of the fermenter. High flocculation can be associated with lower attenuation and increased levels of diacetyl (with a butterscotch flavor) and esters (with a fruity aroma and flavor). These compounds lend themselves to English-style ales.

Medium Flocculators

Medium flocculators tend to produce "cleaner" beers. They stay in suspension longer and can also reduce diacetyl and esters to a greater degree. The attenuation will likely be greater. In commercial breweries medium flocculators are slightly more difficult to work with than high flocculators because of the increased work and filtering material (or additional time to let

them flocculate) required. Because homebrewers usually do not filter, using a medium flocculator simply means having to give it a little more time to settle out than you would for a high flocculator.

Medium flocculators flocculate best at cold temperatures, while high flocculators can flocculate well at 65° F. Medium flocculators are well suited for American-style ales, which are usually heavily hopped. The clean flavors from the yeast allow the hop aroma and flavor to come through.

Low Flocculators

Low flocculators are rarely used in brewing. Because they do not settle out of the beer, they create filtering problems and haze. There are some beers that are intended to have yeast in suspension. For example German hefeweizens and Belgian wit beers are fermented with yeast strains that do not flocculate well, leaving the desired cloudy appearance.

Flocculation in Brewing

Most lager yeast is between medium and low in flocculation. Lagers go through an extended cool fermentation and lagering process, and the yeast needs to stay in suspension during this process. The more contact the yeast has with the beer, the better the yeast is able to reduce the diacetyl and ester levels.

The primary determinant of flocculation level is the particular yeast strain itself. Proteins on the cell surface determine the degree of flocculation, and proteins are coded by the DNA of yeast. Each strain has subtle differences in DNA, so a different set of proteins is displayed on the cell surface of each strain. Other factors that can influence the degree of flocculation include the original gravity of the wort, temperature of the fermentation, pitching rate of the yeast, and initial oxygen content of the wort.

Low temperatures promote

flocculation. More yeast cells will drop out of solution at 40° F than at 70° F, and more yeast cells will drop out at 38° F than at 40° F. Some yeast strains require two weeks at 40° F to completely clear.

The flocculation character of a yeast strain has a direct impact on flavor and performance. Highly flocculent yeast generally is less attenuative (ferments a lower percentage of sugars in the wort). The ideal yeast strain for most beers is highly flocculent, has good attenuation, and provides the desired flavor contribution. Yeast companies publish the flocculation characteristics of their yeast strains. Use this information to help design your beers. ■

Christopher White is president of White Labs Inc., a San Diego-based yeast company. He holds a Ph.D. in biochemistry from the University of California, San Diego.



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CIRCLE 34 ON READER SERVICE CARD

Brewing Balanced Low-Alcohol Beers

by Julie Slama

Brewer: Jennifer Yohe

Brewery: Squatters Brewpub, Salt Lake City

Years of experience: Pro one year, homebrewer eight years

Education: Siebel Institute

House Beers: Vienna Lager, Millcreek Cream Stout, Emigration Amber, Beehive Lager, Hop Head Red

Hops, malt, and yeast are all easily identifiable as flavor components of beer. But many of us forget one of the most important beer flavor aspects — until we try to remove it.

“Alcohol is a primary flavor constituent,” says Jennifer Yohe, head brewer at Squatters Brewpub in Salt Lake City. Without it you have, well, you have Utah beer. According to state law, Yohe is only allowed to make beers with alcohol by weight of 3.2 percent or less. Controlling the alcohol content while maintaining flavor, body, and character can be quite a brewing challenge — one that has made her a better brewer, Yohe says.

“The major challenge can also be the biggest benefit,” she says. “You have to create body elsewhere. You have to find a way to create a great beer that has flavor without the alcohol.”

“It (alcohol) is easy to hide behind,” she says. Because of its flavor contributions, it can hide off-flavors and undesirable characteristics. Low-alcohol beers allow the process and ingredients to come through — for better or worse. “Every mistake you’ve made is there,” Yohe says.

There are many beers that Yohe can’t make because of their high

Squatters Brewpub



“Brewing low-alcohol beer forces you to get creative. You have to find a way to create a great beer that has body and flavor without the alcohol.”

Brewer: Jennifer Yohe

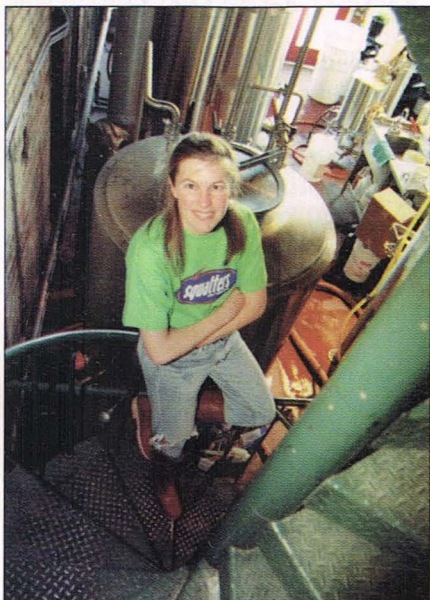
alcohol content, including IPA, bock, Imperial stout, and barleywine. But making a good 3.2 beer, with body and character, is challenging. “You have to be more creative. Alcohol gives beer its backbone,” she says, and the brewer has to compensate for its absence.

Two ways brewers control beer alcohol content are limiting fermentation times and mashing at different temperatures to create unfermentable sugars. Yohe adjusts her mash to control the amount of fermentable sugars produced. She mashes in at 156° to 158° F instead

Low-Alcohol Brewing Tips

- Mash at higher temperatures (156° to 158° F) to create more nonfermentable sugars.
- Use dextrin malts, such as carapils, to add body without increasing fermentability.
- Pay particular attention to balancing the hops with malt.
- Choose styles designed to have lower alcohol levels.

of the average of 150° F, creating more non-fermentable sugar. This high temperature is the primary means of controlling



Utah's stringent alcohol laws forced Jennifer Yohe to learn the art of brewing delicious low-alcohol beers.

alcohol content.

One of the reasons Yohe has been successful at producing low-alcohol beer is the way she treats her yeast. "You have to let the yeast take its course. I do not want to halt fermentation," she says. She keeps starting gravity low — such as 1.050 (12.5° Plato) for the stout and 1.040 (10° Plato) for the golden. The beers are then fermented down between 1.016 and 1.008 (4° and 2° Plato). "You don't want a lot of residual sweetness," she says.

Yohe uses Wyeast 1087 (Wyeast ale blend) and Wyeast 2124 (Bohemian lager).

Yohe says some low-alcohol brewers start fermentation at a higher gravity and monitor the beer very closely, crash cooling when the beer hits 1.013 (3.2° Plato). The yeast falls out when the beer is crash cooled, and the result is a very sweet, thin beer. She prefers to control the sugar in the mash tun so the yeast can take its natural

course. "Starting with a low gravity will create body through the malt," she says.

Body Building

Like alcohol, body is one of those things that you miss most when it is gone. People come to microbrewed beer looking for body. Dextrin malts, such as carapils, can be used to add body to the beer without increasing fermentability (and thus the alcohol content). Yohe recommends experimenting with them but doesn't use them herself. Instead she uses Munich malts. However, Munich provides increased fermentability, so she must be careful to keep her starting gravities low.

The grain bill for most of her beers consists of 50 percent to 60 percent pale malt, 20 percent to 30 percent Munich, and 20 percent to 30 percent specialty malt. The Vienna lager uses 100 percent imported German malts. Specialty

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malts give the beers their individual characters. The Millcreek Cream Stout uses chocolate, 45° Lovibond caramel, and roasted malts, creating its dark color and full body. The Emigration Amber takes 10 percent honey malt (which has no honey), 45° Lovibond caramel, and crystal malts, making it medium bodied and copper. The Full Suspension Pale Ale — named after Yohe's favorite hobby, mountain biking — contains Maris Otter pale, caramel, and Munich malts. Yohe also adds flaked barley to the stout for increased head retention and body.

Injecting nitrogen is another way to add body to beers. The espresso stout, to which extra-strength espresso is added to the whirlpool, is served on nitrogen as is the ESB. "Nitrogen is great for 3.2 beers," Yohe says, adding that it also adds diversity to her lineup. Yohe uses a one-step infusion mash for all her beers as allowed by her seven-barrel system.

Inside Squatters

Brewing beer for a living in Utah might not seem like a good investment, but it certainly has paid off for Paul Cole and Jeff Polychronis. The former real estate partners decided after much research that Salt Lake City needed a brewpub and that the old Boston Hotel was the perfect place for Squatters Brewpub. Located in downtown Salt Lake, the turn-of-the-century hotel was renovated, exposing brick walls, wooden floors and ceilings, and original structural columns.

The fireplace in the dining room is a reminder that when Squatters opened in 1989, it was skiers who comprised its core customers. The cyclical sales grew with Salt Lake and Cole and Polychronis added three 14-barrel

(434-gallon) fermenters, bringing capacity to 70 barrels (2,170 gallons). Still not able to meet demand, Salt Lake Brewing Co. opened a microbrewery in 1994. The core brewery operation is still visible from the restaurant at Squatters. Sitting at the bar, guests face the stainless steel system that has been with Cole and Polychronis since the beginning.

When skiers are gone, locals and summer tourists fill the patio, complete with hop-covered trellises. A full menu is available outside.

If you happen to be passing through the Salt Lake airport, you can still get a Beehive Lager. At gate C4 there's a smaller version of Squatters offering a limited beer and food menu.

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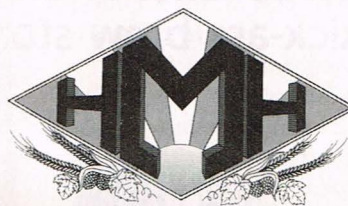
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Balance With Hops

Balance is important for any brewer, but it's especially important when the alcohol is removed. "You don't have the alcohol there to back up the bitterness," Yohe says. "You have to watch the IBUs and make sure your bitterness is in line." Yohe recommends limiting your hops to fewer than 35 IBUs. Her most bitter beers have 30 IBUs, and her stout — balanced by a higher malt content — has 32 IBUs.

To create character, Yohe prefers dry hopping. "There is not a lot of latent bitterness in my beers, but lots of aroma and flavor," she says. Using your finishing hops to create aroma can leave the drinker with a bitter aftertaste, which is particularly harsh in low-alcohol beers. Dry hopping, though, creates a well-rounded beer, she says.

The dry-hop schedule for the Emigration Amber includes 65 percent Centennial and 35 percent Chinook hops. Other hop choices:

Czech Saaz in the Beehive Lager; Fuggle and American Northwest in the Hop Head Red; and Chinook for the Millcreek Cream Stout, a traditional Irish stout.

Learning Curve

Balancing malts and hops and controlling fermentation come with practice. There is a huge learning curve to brewing low-alcohol beers. Yohe assisted another brewer at Squatters while getting to know ingredients and learning to identify flavors in addition to learning the process. "Hops are a lot easier than malts," she says. "Malts are more delicate."

Yohe really gets to know her malts, tasting them, trying to match the flavor in the finished product to the raw malt. For example she uses old-style floor-malted lager malt for her pilsner, which is 90 percent lager malt and 10 percent Munich.

Experimenting and record keeping have helped her understand

the process and the effects of subtle changes. The more she learns, though, the more frustrating the limitation is. When she first started at the brewery, she was 20 years old and delighted to be scrubbing floors. But then she went to Siebel Institute of Technology, the Chicago brewing school, to learn more. "It wasn't until I became a well-versed brewer that I started to understand what it was all about," she says. Now, as a Great American Beer Festival judge, she recognizes the importance of alcohol as a flavor component. She is a little envious of brewers not restricted by the 3.2 law.

But if Yohe can't make a beer true to style, including alcohol content, she won't make it. If a style calls for 4 percent alcohol, she can modify it, she says. However, she won't try to alter an 8 percent or 9 percent beer style because she says part of Squatters' mission is education, and she doesn't want to confuse people by mislabeling beer. ■

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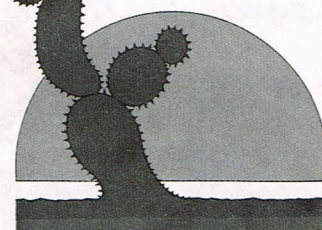
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Personalizing Your Wine Package

by Alison Crowe

Commercial wineries spend thousands of dollars to create attractive packaging for their wine. They know that how the bottle looks affects how the drinker perceives what's inside. Just like commercial wineries, you can create an attractive, appealing package for your creation. Even better, you can personalize it in ways they would never try.

What to Put It In

The bottle serves as the aesthetic grounding point for any wine and is

usually the first thing to be noticed (however unconsciously) when it is given as a gift, shown at a wine competition, or proudly brought to the table. Serving as protective container and attractive dispenser, a wine bottle is an important part of the perceived identity of the wine.

Wine bottles come in an array of shapes, sizes, and colors. There are three main considerations when choosing glassware for your wine: the color, the shape, and the functionality of the design.

Traditional wine bottles belong to one of three color families: brown, green, or clear. It is thought that these three glass colors developed as the most dominant due first to practicality — they were the most widely available — and then, as time went on, to tradition. Some villages that produce wine in France have always bottled their product in green bottles and continue to do so, while some wine producers from Alsace have always chosen brown.

Today, red “Bordeaux” varietals and blends (Cabernet Sauvignon, Merlot, Cabernet Franc) and the dominant red “Burgundian” varietal (Pinot Noir) are almost always bottled in dark green glass. Chardonnays and other dry white wines are sometimes bottled in lighter “leaf green” bottles, whereas white dessert wines and some dry Sauvignon Blancs are often bottled in clear glass. Brown glass is not typically used for many of the wines we see on the shelves today, though Alsatian varietals (Riesling, Gewürztraminer) are often bottled using dark brown or light brown glass. For a modern feel, choose the attractive blue bottles that have been making their presence felt in the marketplace.



One word of scientific caution when it comes to choosing a bottle color: Clear glass may look nice and show off the delicate hue of your finest Chenin Blanc, but ultraviolet rays from the sun can easily penetrate clear glass and damage the contents inside. This creates what is known as a "sunstruck" defect that can smell unpleasantly of sulfur, onions, or rotten eggs. Prevent this reaction by keeping your wine out of the sun. Colored glass has pigment that prevents most of the sun's rays from causing any damage.

Many centuries of winemaking tradition dictate which bottle shapes should be used for which varietal. The cylindrical wine bottle with pronounced shoulders is called a Bordeaux bottle and usually contains varietals that historically come from that region in France: Cabernet Sauvignon, Merlot, and Sauvignon Blanc to name the most famous ones.

The bottle with the gradually sloping shoulders is called a Burgundy bottle and contains the wine types traditionally made in Burgundy: Chardonnay and

Pinot Noir.

Alsatian varietals usually are bottled in tall, skinny bottles with narrowly sloping shoulders.

Sparkling wines need to be put into bottles specifically reserved for this purpose. The carbon dioxide gas requires the bottle to be thick and built to withstand some pressure.

Many home winemaking stores carry a variety of bottles. Of course you can save your used bottles and reuse them. Just make sure they are clean, free of defects, and fit the needs of the wine.

What to Put In It

The natural counterpart to a traditional wine bottle is the cork. Wine corks are essentially cylindrical plugs taken from the pliable bark of cork oak trees, the bulk of which are grown in Portugal. Even though they may seem impractical at times, corks are actually very well suited to the healthy long-term

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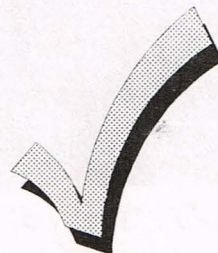
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aging of wine. Corks are very elastic. They form a tight — but not airtight — seal that keeps the wine from being exposed to damaging levels of oxygen as well as discouraging opportunistic spoilage microorganisms. The corks also let in minute levels of oxygen, thought actually to help the aging process.

Other options include artificial corks, plastic corks, and crown caps. Artificial corks, made of a silicon-type plastic, are cheap, colorful, and help save the fragile cork oak population from further decimation. They are widely used in the commercial wine industry and seem to do just as good a job as real corks. An extra bonus comes into play if you use a two-pronged wine opener to crack into your bottles. Artificial corks are harder to damage than real corks and can often be reused as long as you don't use a corkscrew to remove them. Just be sure to wash and sanitize them well before using them again.

Plastic corks and screw caps are almost exclusively used for sparkling wine. It is possible to bottle still wine in sparkling wine bottles and put a crown cap or plastic cork on, though the seal each forms is completely airtight. Crown caps are the type of metal cap found on bottles of beer, while plastic corks are common on bottles of cheap sparkling wine. Both are affordable, easy to use, and don't require anything but brute force or a bottle opener to crack into. But what you gain in convenience you lose in aesthetics.

Perhaps the major downside to not using real corks when you close your bottles of wine is that, well, for many people part of the wine-enjoying experience includes the traditional trappings. If you want to stick to tradition, it's best to use real corks.

What to Put on Top

If you have a tightly corked bottle of wine, putting a capsule on over the neck of the bottle really isn't necessary. Back in the days of questionable sanitation, dank cellars overrun with vermin, and corks that often leaked,

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lead or tin capsules fitted over the top of the bottle served a purpose. They provided an extra barrier of protection against marauding microbes, fungus, and molds.

These days capsules are stuck on the bottlenecks because, like so much that has to do with wine, people expect it. If you want to continue the traditional look, that's great. Winemaking supply stores and catalogs carry all sorts of capsules that come in many colors, materials, and lengths. Some are made of plastic, some of metal, and some of a combination of varying percentages of both. Capsules come in bagged stacks of 50 or so and are ready for you to slap on your bottle. They seal with a little pressure or a little heat provided by a hot towel or heating pad.

The best wines in the world are always capsuled with a sleeve that carries a high percentage of metal, usually tin. Lead used to be the material of choice for capsules, but now that the dangers of lead exposure are known, it is no longer used. Tin and other non-poisonous alloys make the best capsules on the market today and provide that oh-so-luxurious feel of breaking into a great bottle of wine. Plastic capsules are a lot cheaper, but so is their feel. For an upscale look that isn't too expensive, choose a capsule that contains a medium ratio of metal to plastic.

What to Put on It

Labels provide an opportunity for you to communicate something about your wine with words and pictures. The standard label contains important information such as the winery name, varietal, vintage date, and geographical origin. It also features what is seen in the wine industry as perhaps the most crucial bit: the winery logo.

In today's technology-rich world of computers and the Internet, it is easy to make your own great-looking label. It's easy to download grape and wine-related graphics off of the World Wide Web (www.winebottle.com and www.gaptech.com/winesupply), insert a few words here and there

with some graphics/text integrating software, and print out adhesive labels that will easily adhere to a finished wine bottle. Colors can be added by hand, and color printers make the job even easier.

If doing it yourself doesn't satisfy your urge for a really slick-looking label, there are companies that will take your text and your home winery's name or logo (if you have one) and integrate them into professionally printed labels made to your specifications.

If you don't want to deal with a paper label but still want to go for some look of authenticity, take a lesson from port producers in Portugal. In the days when port was shipped across the ocean in the creaky, leaky boats, Portuguese sailors found that paper labels were often eaten away by the damp sea air. Instead of battling with Mother Nature, the port producers would paint the crucial information onto the bottle with white indelible paint. This is still a tradition today; just check out the port section of any supermarket wine aisle.

Besides employing only the traditional trappings of bottles, corks, capsules, and labels, there are other ways to make each bottle of wine uniquely yours. Many home winemakers do this by employing humor, fun, and irreverence. Some use crazily colored bottles, some none at all. One home winemaker "bottles" his excellent wine in mason jars. No corks, capsules, or fancy bottles required. He made his own labels using his computer and even made up his own bogus government warning label.

Putting the finishing touches on your bottle can be a fun way to get even more enjoyment out of showing off your finest. From traditional and customary to creative and wacky, dressing up your wine is just one more of the many rewarding steps involved in home winemaking. ■

Alison Crowe is a graduate of the University of California, Davis, winemaking program and works in the university's Department of Viticulture and Enology.

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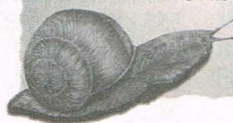
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What's Your Hobby?

by Naida Grunden

I will never take my husband, Larry, to the library again. A few years ago we moved across the country to Pittsburgh. To acquaint ourselves with our new community, we took a family trip to the library. Our son headed to Biographies, my daughter and I to Romance. Larry perused some displays the librarians had set up.

Set up indeed, like a baited hook. Larry was drawn to one called "What's Your Hobby?" There among the books on quilting, bee-keeping, and hang gliding, Larry found a book about homebrewing.

Life has never been the same.

"You're kidding, right?" I asked as we checked out our books.

"No, I think it might be kind of interesting," Larry said in a tone I knew not to mess with.

The book swallowed Larry whole. Within two weeks, equipment began to appear — a carboy, a plastic hose, rubber stoppers, packets of yeast, two orange cans of something called malt extract. I maintained a studied indifference.

Our house under construction, we lived in a small apartment with a tiny kitchen. So I was not amused the night Larry boiled up a cauldron of odoriferous goo. But by evening's end a five-gallon carboy of amber-colored liquid stood triumphantly in the middle of the kitchen. Larry insisted that it sit *right there* while it fermented. We walked around it for weeks.

Larry travels a lot. His nightly calls included the hasty obligations — "Hi, Honey, how are you? How are the kids?" — followed by the burning issues: "Did my beer kick off? Is it bubbling? How often?"

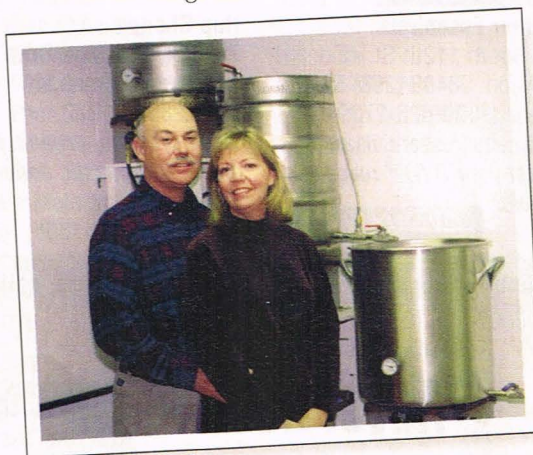
To my surprise, that first batch of beer was good.

Larry had only brewed one

batch of beer, but life had changed forever. Plans for a basement brewery mysteriously appeared on the blueprints, including plumbing, gas, electricity, and a big floor drain.

Three years passed. Meanwhile, Larry joined a club with the dubious acronym TRASH (the Three Rivers Alliance of Serious Homebrewers). He also bought a small library's worth of brewing books. His technique involved full immersion...of the brewer.

The key to that perfect brew, Larry was convinced, was having the perfect equipment and ingredients. No more extract — from now on it would be all-grain. He applied his single-mindedness to a) learning how to make all-grain



My husband, Larry, has traveled the nation in search of brewing equipment.

beer, and b) figuring out how to make all the equipment himself.

In his travels Larry scoured city after city for gizwidges and thingamabobs. In Seattle he located aircraft-grade stainless steel screen; in L.A., valves; in New York, fittings. A doctor friend procured laboratory-grade glassware. Kegs appeared, then temperature gauges, burners,

a triple-beam balance scale, refractometer. To me it was a collection of extraneous stuff, no one thing having to do with another.

One evening I found my son and husband on opposite ends of the basement with an outstretched 50-foot garden hose. Into it they were coaxing a 50-foot stainless steel tube that didn't want to go. Larry was making a counterflow wort chiller. My Tim Allen had gone mad.

In the new house the brewery took shape with sinks, lighting, and an exhaust hood. The place was somewhere between Betty Crocker's kitchen and Dr.

Frankenstein's laboratory. Here Larry installed his homemade masterpiece — a 10-gallon, three-tiered, gravity-flow brewing system.

After three years of reading, planning, procuring, and building, he had his all-grain brewing system. Now he made his second batch of homebrew, a pale ale. While on the road, he again checked on it night after night like a nervous parent. And again, to my amazement, what issued forth was delicious beer.

Every beer since has been, to my untrained senses, pretty and tasty.

Although beer has never been my thing, I have been spotted in the brewery with Larry, milling grain, recirculating extract, and hooking up the wort chiller. I admire the ingenuity and art of the hobby.

Could be right up there with hang gliding. ■

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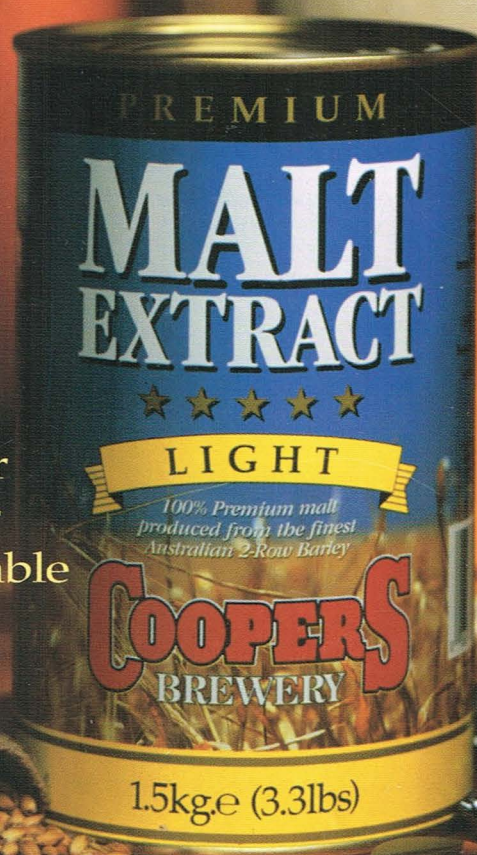
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