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BrewYour Own®

DECEMBER 2003, VOL.9, NO.8

THE HOW-TO HOMEBREW BEER MAGAZINE

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Where are those Elves When You Need Them?

'Twas

the night before Christmas
and the brew had been made.
But the kegs were all dirty –
and Santa dismayed.

"I'm too busy for this –
I cannot delay.
The elves are already
packing the sleigh."

But then he remembered
a great gift that he'd seen;
The Turbo Scrubber –
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It will clean all the carboys,
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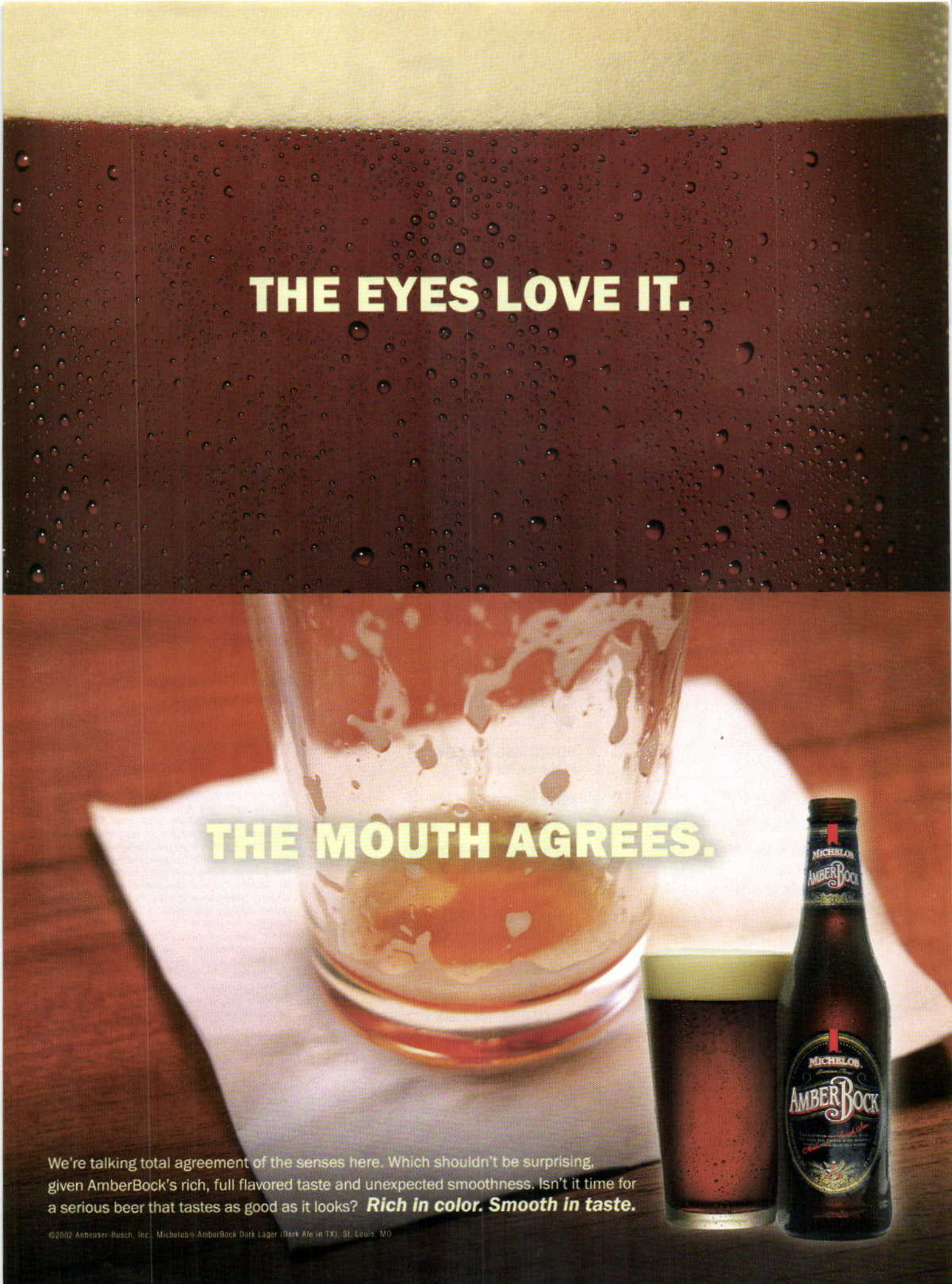
COVER photography: **Charles A. Parker**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RECIPE INDEX

BYO RECIPE STANDARDIZATION

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

Extract values for malt extract:
liquid malt extract (LME) = 1.037
dried malt extract (DME) = 1.045

Potential extract for grains:
2-row base malts = 1.037
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033-1.035
chocolate malts = 1.034
dark roasted grains = 1.024-1.026
flaked maize and rice = 1.037-1.038

Hops:
We calculate IBU's based on 25% hop utilization for a one hour boil at specific gravities less than 1.050.

Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

How to reach us

Editorial and Advertising Office
Brew Your Own
5053 Main Street, Suite A
Manchester Center, VT 05255

Tel: (802) 362-3981
Fax: (802) 362-2377
E-Mail: BYO@byo.com

Advertising Contact
Kiev Rattee
kiev@byo.com

Editorial Contact
Chris Colby
chris@byo.com

Subscriptions Only
Brew Your Own
P.O. Box 469121
Escondido, CA 92046

Tel: (800) 900-7594
M-F 8:30-5:00 PST
E-mail: byo@pcspublink.com
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Volume 9, Number 8: December 2003

WHO SAID YOU CAN'T TEACH AN OLD DOG NEW TRICKS.

PLAIN & HOP FLAVOURED

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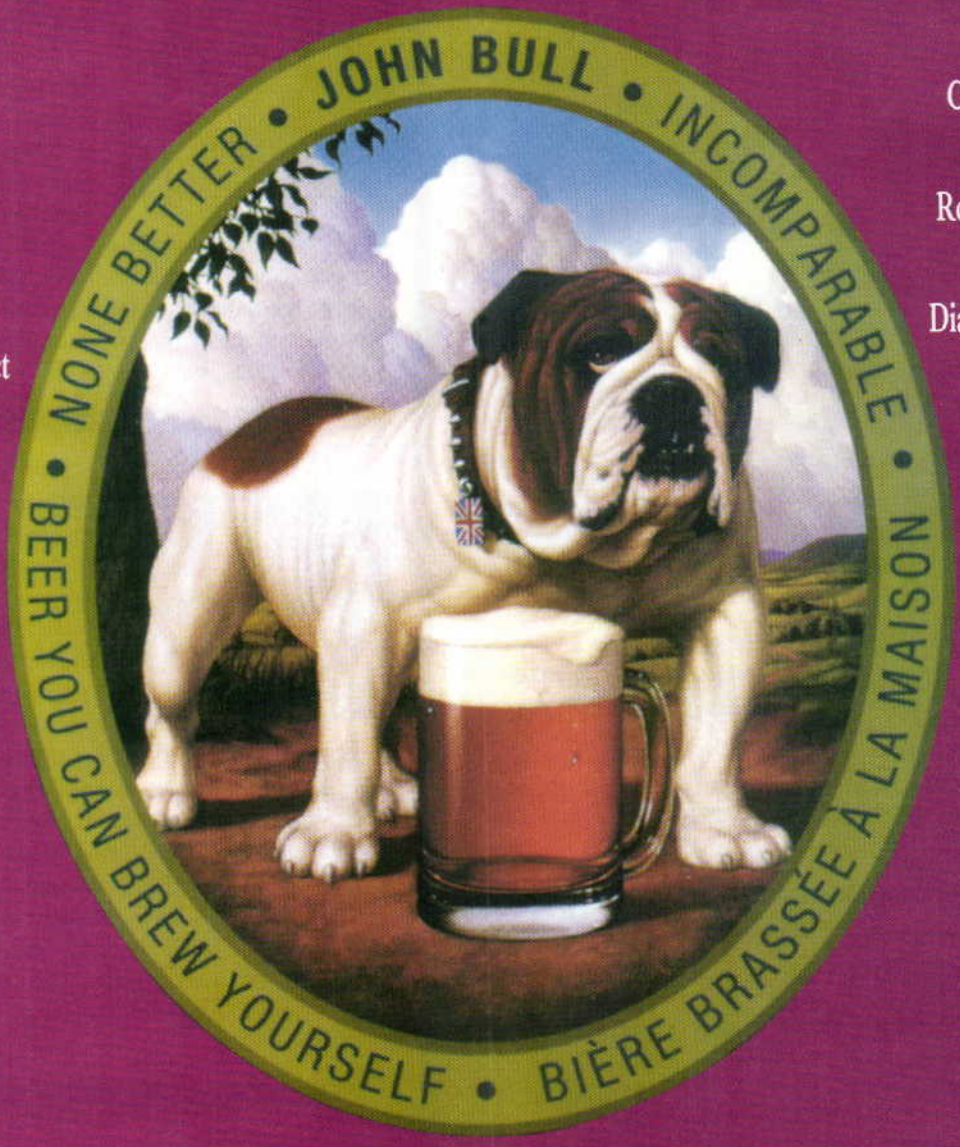
Dark Malt Extract

Amber Malt Extract



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Canine Contributors

Sam of Woodstock, Vermont lends her many talents, beauty and strong neck to this issue's cover. *Brew Your Own* was fortunate to land this 7-year-old (people years) Saint Bernard who turned down a conflicting modeling assignment with *Canine Cosmo* for their cover story "Dames who Drool." *BYO* photographer Charles Parker calls Sam, "A real pro. Much better than that sheep you made me work with back in 2000!" Good dog! Another photo of that fab girl named Sam appears on page 39 of this issue.

Duff of Manchester Center, Vermont has been unleashing his extensive publishing experience with *Brew Your Own* for almost four years. During his 13-year (people years) magazine career he has successfully chased tennis balls and UPS delivery men in publishing offices from Minnesota to Vermont. He has helped brew beer with his master his entire life and an occasional "hair of the dog" has made its way into more than one batch of porter. The elder canine on staff, Duff now does his best to imitate a bear rug during his 23 hours of sleep each day. When awake and not eating, Duff looks off longingly waiting for his first royalty check to arrive from "The Simpsons" for the use of his namesake beer on the show.

Heidi of Manchester Center, Vermont is a new addition to the *BYO* world headquarters. Heidi is of unknown black-and-tan parentage hailing from the Second Chance Animal Shelter down the road. Currently in charge of emptying all office garbage cans of leftover food, this 10-year-old (dog years) pup plans on adding database management and napping to her future work responsibilities. She has also proven herself a capable alternative to the office's shredding machine. When out of the office, Heidi enjoys homebrewing with Duff as well as chasing squirrels and unfortunately the occasional skunk.

Stainless Passivation

In response to an answer in Mr. Wizard's column ("I scrubbed and I scrubbed," November 2003), I wanted to clarify the role of oxalic acid in the cleaning and passivation of stainless steel. Oxalic acid dissolves rust and free iron though it is not as effective as nitric acid. The combination with an abrasive as used in cleansers makes it an effective means of removing rust, heat tint and iron contamination from machining. You need to rinse thoroughly afterwards. Achieving a clean rust-free surface allows the stainless steel to passivate itself.

John Palmer
metallurgist
via email

Mild Mullings

Horst Dornbusch's article on mild ale ("Mild Ale," November 2003) was interesting but missed out on a few important points. First, mild ale isn't always low gravity. There are examples, like Sarah Hughes Dark Ruby Mild, that come in at 5.6% but which qualify on the basis of mild hopping. Second, the decline of mild ale was more to do with quality of product sold than the rise of lager. In the UK, mild declined in the 1950's and 60's when commercial brewers started to fake the style and had all but died out by the mid-1970's as a style. Lager really took off in the late 1980's and 90's but these were not of the quality you'd find in Germany or Belgium. The good news is that at British beer festivals, we're seeing a resurgence in mild's popularity.

Dennis Howlett
Soucé, France

Error in Equation

I believe there is a mistake in equation 1 of Don Million's article on step infusion mashing ("Step Mashing," November 2003). The variable B1 should not be in the numerator of the fraction.

Britt Weiser
Champaign, Illinois

Editor Chris Colby responds: "You are correct. The first term in equation 1 (B1) should be a stand-alone term. While editing this piece, I worked a few examples using these equations, but then failed to notice that they did not get typeset correctly in the final article. Sorry for any confusion this may have caused."

Steep or Mash Made Clear

I thought the article "Steeping vs. Partial Mashing" by Don Million (November 2003 issue) was a great article. It was clear, to the point and easy to understand. Now I get it. Thanks and keep up the good work.

Bob Gionet
via email

Proper Priming

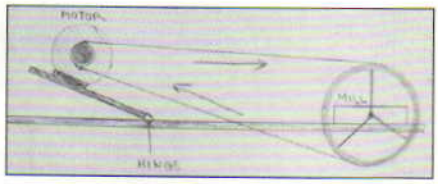
I would like to thank *Brew Your Own* for publishing my HBS Pale Ale recipe ("Foolproof Extract Beers," October 2003). However, there is a small error in it. The priming sugar was listed as 1 cup when it should be 3/4 cup. Otherwise, wine is fine and beer is not far behind.

Ed Seaman
Home Brew Shop
St. Charles, Illinois

Thanks, Ed. A little extra corn sugar (one cup instead of 3/4 cup) will cause the beer to be more carbonated, but won't cause any other problems with the finished beer.

Mill Modification

I would like to offer what I think is a design improvement to the one presented by Thom Cannell in "Motorized Mill" (*BYO*, October 2003). Instead of mounting the motor rigidly to the main platform, mount it on a hinged platform as shown in the attached drawing. The rotational direction is important — the lower part of the belt should feed toward the motor.



This design offers two distinct improvements. First, the weight of the motor on the hinged platform automatically guarantees correct belt tension, even if the belt stretches. Second, should the rollers jam, the rotation of the motor will cause the motor pulley to run towards the mill, thereby lifting the motor and the platform, and instantly loosening the tension on the belt. This will prevent damage to the mill rollers.

Tony Verhulst
Tewksbury, Massachusetts

Good idea. There are always alternate ways to approach any problem. In his article, Thom went with the fixed platform for two reasons — simplicity and safety. The hinged platform is (slightly) more complicated to build. More importantly, it is also harder to build an effective safety shield around the sheaves.

Darkening a Dunkelweizen

In the article "Dunkelweizen" by Horst Dornbusch (September 2003), his recipes use a color extract to darken the beer. I thought that, under the "German Beer Purity Law," only natural ingredients could be used in traditional German beers. What gives?

Harry Pariser
San Diego, California

Author Horst Dornbusch responds: "Although the color-enhancing product I referred to, SINAMAR, is an "additive," it actually meets the requirements of the Reinheitsgebot because it is essentially nothing but a highly condensed, very dark beer made only from dark grains." ■

brewer PROFILE

Roxanne Hastings • Edmonton, Alberta

PHOTO COURTESY OF ROXANNE HASTINGS

When not winning homebrew competitions, Roxanne enjoys performing on stage.

Brewing is an ephemeral art. A painter can point to a portrait created five years ago and say it was his best — but a brewer cannot. Even long-lived brews like barley wines will change with time. In that regard, beer is a unique expression of humanity and should be enjoyed during that perfect moment in which it exists.

Beer is for sharing but brewing is best done alone. Brewing, like all art, requires focus and concentration. That intense focus becomes meditative. I don't think when I brew . . . I just brew. That's za-zen, and that's one of the reasons that I like brewing. It takes me out of the world and is best done by keeping things as simple as possible — this includes having no one else around. Sometimes I do brew with others, but it is almost always from a teaching perspective. On teaching days, I let the brew go and focus on the person. That being said, I recognize that I have become a bit of a master at my craft.

I've entered more competitions than I can remember. Probably about 60 to 70. I've long lost track of my awards, but I've won well over 200. I've been awarded the Canadian Brewer of the year and won Brewer of the Year at the Canadian Masters Championship of Amateur Brewing (MCAB) qualifying round for the last five years. However, I've recently trained a competitive judge who just passed his BJCP exam and think he will give me a run for the award over the next few years. I hope so — change is good!

My basic philosophy on brewing is the same one I learned from my karate sensei: There is no greater honor for a master than to be beaten by a pupil. If you understand this philosophy, you will see why it is so easy for me to teach. You have to be true to yourself and look after yourself first, but what many people do not realize is that the best way to do this is helping others. Through sharing and teaching we all grow and the art of brewing grows with us.

It is in no small part due to my beloved friends in the Edmonton Homebrewers Guild and the brewing community at large that I have been able to succeed in my hobby.

Roxanne and friend greet the camera at an AIDS fundraiser in Canada.

Roxanne wraps her equipment in insulation to maintain appropriate temperatures.

reader RECIPE

Ceres Comes Early ESB

(5 gallons/19 L, all-grain)
OG = 1.062 FG = 1.014
IBU = 50 ABV = 6.1%

Ingredients

8.75 lbs. (4.0 kg) Westcan 2-row malt
3.0 lbs. (1.35 kg) Munich malt (12 °L)
9.0 oz. Hugh Baird crystal malt (75 °L)
9.0 oz. Beeston's crystal malt (35 °L)
5.0 oz. Weyermann CaraRed
9.8 AAU Nugget hops (60 mins)
(0.75 oz./21 g of 13% alpha acids)
3.8 AAU Bramling Cross hops (60 mins)
(0.75 oz./21 g of 5.0% alpha acids)
1.5 AAU Bramling Cross hops (20 mins)
(0.3 oz./8.5 g of 5.0% alpha acids)
3.2 AAU Cascade hops (20 mins)
(0.5 oz./14 g of 6.3% alpha acids)
1.2 oz. Bramling Cross dry hop
0.3 oz. Cascade dry hop
Wyeast 1028 (London Ale) yeast

Step by Step

Heat 4.75 gallons (18.1 L) of water to 166 °F (74 °C) and stir malt into the brew kettle. Let sit for 80 mins. Raise temperature to 185 °F (85 °C) to mash out. Sparge with 3.25 gallons (12.4 L) of water at same temperature. Boil for 20 mins. Then add your first hop addition. At 20 mins. before knock out, add your flavor hops, 1 tsp. of Irish moss and your immersion wort chiller. At end of boil, cool wort to 68 °F (20 °C). Pour contents into a hop back to strain out the hops and much of the hot and cold break. Rack to a carboy and pitch yeast. Keep it in a dark spot at 65 °F (18.3 °C) for about five days or until the airlock takes 15 seconds to pop. Drop the dry hops into a 5-gallon (19-L) carboy and siphon the primary fermented beer into this secondary. Let the beer sit for 14 days, then rack it into another 5-gallon carboy and add 5-10 mL of isinglass to clarify. After two weeks, rack into another 5-gallon carboy along with ½-cup of corn sugar that you have boiled in ½-cup of water. Bottle and enjoy!

– Roxanne Hastings

beer BASICS

BREWER'S DICTIONARY

E is for . . .

effervescence: the bubbling in beer primarily caused by dissolved carbon dioxide gas

enzyme: a protein that acts as a biological catalyst for chemical reactions, such as alpha-amylase, which converts starch to maltotriose and dextrin sugars, or beta-amylase, which converts dextrins to simpler sugars: maltose, glucose and smaller dextrins

esters: powerful flavor compounds formed by the combination of organic acids and alcohols during fermentation. They contribute fruity aroma to beer.

extract: the sugar left after mashing and lautering malted barley. By removing the liquid, sweet wort is reduced to a syrup or powder and packaged in cans for homebrewing.

extract brewing: making beer from malt extract syrup or powder as opposed to unprocessed malt (which is used in all-grain brewing)

F is for . . .

fermentation: the process by which yeast releases energy in the absence of oxygen by breaking sugar into carbon dioxide and alcohol

filler: a machine that pours liquid into bottles or other containers

filtration: the process of removing suspended solids, primarily yeast and proteins, to produce a brilliant beer (usually performed just before bottling)

final gravity: the specific gravity of a beer when measured after fermentation is complete

fining: the clarifying process in which a settling agent (or "fining" agent) is added during wort boiling or secondary fermentation to bond with suspended particles, causing them to sink to the bottom

finings (or fining agents): materials such as isinglass, gelatin, Irish Moss, bentonite or egg whites

finishing hops: hops added to the wort toward the end of the boil to impart aroma and character but not to increase bitterness (see dry-hopping)

flakes: unmalted adjunct grains in flake form added to the mash with ground malt, used to reduce cost and produce lighter, less malty beers

flocculation: the clumping of yeast cells toward the end of fermentation, causing them to sink to the bottom and improve clarity

homebrew CLUB

BABBLE

Lake County, Illinois

BABBLE was born in the winter of 1999 when Gene Whipple, Jim Buche, Doug Rhoades and John Straka sat in a basement imbibing their homebrews. Lamenting that the nearest homebrew club was quite a distance, they decided to form their own club right in Lake County, Illinois. After several hours of tedious ale-aided brainstorming, Doug babbled something like "Brewers Association of Beer and Beverage Libations Extraordinaire." The acronym BABBLE was quite appropriate!

Today BABBLE has a dozen brewers. What we lack in numbers we make up for in quality beer. We're proud of John Straka who graduated from homebrewing to working as a professional brewer at Brewmaster's Southport in Kenosha, Wisconsin — the oldest brewpub in the midwest. Club member Dan Morey was recently referenced in John Palmer's "Raise the Colors!" article in *Brew Your Own's* May-June 2003 issue, for his algorithm on how to predict the color of beer.

Recently we added the "Burying of the Beer" where we entomb high gravity beers six feet under for consumption in future years. Yes, we even remembered to mark where we buried them — please don't go looking for it . . . we want to keep this buried treasure for ourselves!

Although we're a small club, we've been making a name for ourselves in homebrew competitions. This year at the FebFest Homebrew Competition (hosted by the Brewers on the Bluff) our members received 12 out of the 24 ribbons including the top two in the Best of Show! Scott Lasky took best of show in the Brewer's Dream competition and was honored by brewing a batch of his Russian Imperial Stout at Flatlanders Restaurant and Brewery in Lincolnshire, Illinois. We select, brew and judge a beer style quarterly and a mead annually to be used in conducting our own friendly, in-house competitions. These always help us to learn more about beer styles and the judging process. As long as good beer keeps bringing friends together, the outlook for our club is great! For further information about the BABBLE Homebrew Club, please visit us at www.hbd.org/babble.

PHOTO COURTESY OF MICHAEL TOLLEFSON

Members of BABBLE gather to judge a batch of their competition homebrew.

replicator NUT BROWN ALE

by **Steve Bader**

Dear Replicator,

I moved from Apex, North Carolina to Chandler, Arizona almost two years ago. That means it has been nearly two years without a Carolina Nut Brown Ale from the Carolina Brewing Company, in Holly Springs, North Carolina. Those guys brew many tasty beers and have the best brewery tours around. My wife and I are lamenting our lack of the Nut Brown on an almost daily basis. This is the best nut brown I have ever had. Can you help us out? Our eternal thanks (and a cold one if you are in the area) would be yours.

Jeff and Tina Easter
Chandler, Arizona

Nut brown ales are one of the beer world's forgotten children. We love them but they are often hard to find. Nut brown ales do not have the same following as porter, stout or pale ale, but simply deserve more attention than they are getting. Most brown ales are blessed with complex layers of flavor from the malt bill and this particular brew has even more than most.

Head brewer John Shuck has been brewing this beer with the Carolina Brewing Company for the past eight years. John describes the flavor as "nutty chocolate, slightly sweet due to a relatively low hop bitterness, yet an overall dry finish." The dominant ingredient in this beer is the Briess Victory malt, which is where some of the "nuttiness" comes from. The malt, in combination with the other grains in this beer, creates the complex maltiness of the Carolina Nut Brown Ale.

Low hop bitterness allows for more of the malt flavor to come through. For more information, visit the Carolina Brewing Company at www.carolinabrew.com.

Carolina Brewing Company – Nut Brown Ale

(5 gallons, extract with grain)

OG=1.045–1.047 FG=1.011–1.012
IBUs = 25 SRM = 28 ABV=4.5–4.6%

Ingredients

3.3 lbs. (1.5 kg) Muntons light malt extract syrup
1.0 lbs. (0.45 kg) Muntons light dried malt extract
1.75 lbs. (0.79 kg) Briess Victory malt
6 oz. (170 g) crystal malt (120 °L)
4 oz. (113 g) special roast malt
4 oz. (113 g) chocolate malt
5.9 AAU Northern Brewer hops (bittering hop, 60 mins) (0.66 oz./19 g of 9.0% Alpha acid)
6.7 AAU Yakima Goldings hops (aroma/finishing hop) (1.5 oz./43 g of 4.5% alpha acid)
1 tsp. Irish moss
White Labs WLP001 (California Ale) or Wyeast 1056 (American Ale) yeast
0.75 cup of corn sugar for priming.

Step by Step

Steep grains in 3 gallons of water at 155 °F (70 °C) for 30 mins. Remove grains from wort, add malt syrup and bring to a boil. Add Northern Brewer hops and Irish moss. Boil 60 mins. Add Yakima Golding hops for last 3 mins. of boil.

After boil, add wort to 2 gallons cool water in a sanitary fermenter. Top off with cool water to 5.5 gallons. Cool wort to 80 °F (28 °C), aerate the beer and pitch yeast. Allow the beer to cool over a few hours to 68–70 °F (22–23 °C) and hold until the yeast has fermented completely. Bottle, age for 2–3 weeks and enjoy!

All-grain option:

Replace light syrup and dry malt extract with 6.8 lbs. (3.1 kg) of pale 2-row malt; mash grains at 155 °F (70 °C) for 60 mins. Collect enough wort to boil for 90 mins. and have a 5.5-gallon (21 L) yield. Decrease Northern Brewer hops to 0.5 oz. (14g) to account for utilization.

homebrew calendar

December 6 & 13, 2003
13th Annual Happy Holiday Homebrew Competition
St. Louis, Missouri

This is a BJCP sanctioned competition and the final MCAB qualifying event for 2003. The deadline for the event is December 6, 2003. Please include three 12-oz. bottles with plain caps per entry. The fee is $5.00 per entry. All results will be posted one week after the event on the St. Louis Brews Website: www.stlbrews.org. Cover sheets, score sheets and awards will be sent the week of December 21, 2003 through December 27, 2003. Any questions can be directed to Dan Stauder, Event Coordinator, at dstauder@imageprd.com. An online entry form can be found on the club's Website listed above.

December 13 & 14, 2003
Kerstbier Festival
Essen, Belgium

OBER (*O*bjectieve *B*ierproevers *E*ssense *R*egio) is hosting its Kerstbier (Christmas beer) Festival this year at the Parish Centre starting December 13. For two days, visitors can taste lots of Belgian Christmas and winter beers. More than 75 different beers will be tasted, including six types on draught and OBER's special occasion beer — "Kerstschaap" (Christmas sheep). Last year's festival attendance amounted to about 900. For more information, visit the event's Website at: http://home2.pi.be/gmarch/eng/kerst_eng.htm or send an email to kerstbier@ober.be.

January 9, 2004
Big Beers, Belgians & Barleywines Festival
Eagle, Colorado

High Point Brewing is sponsoring the 2004 Big Beers, Belgians & Barleywines Festival to be held on January 9. For competition deadlines and information contact Laura Lodge at (970) 949-0600 during the day, or (970) 977-0100 during the evening. Inquiries via email can be sent to bigbeersfestival@hotmail.com.

homebrew SYSTEMS that make you DROOL

Jim Kaufman • Bridgeville, Pennsylvania

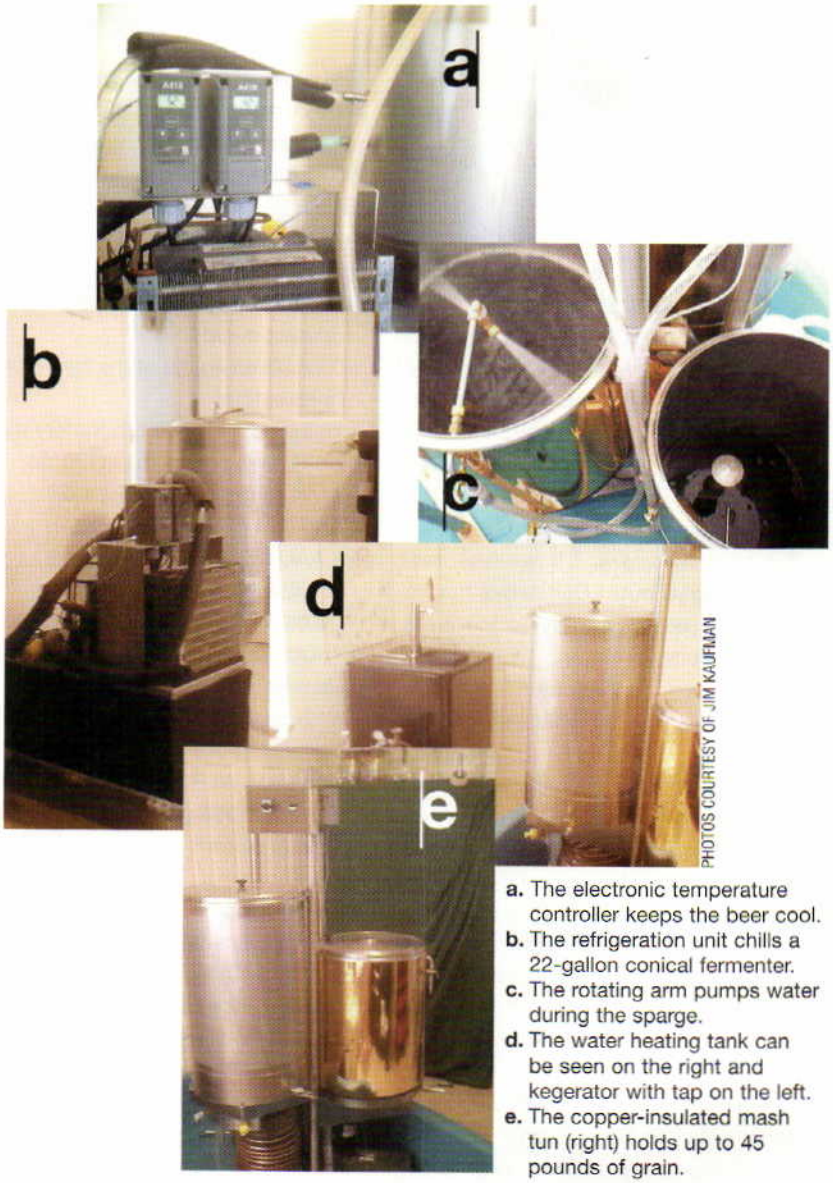
My brewing set-up is a full mash, 50–60 liter (13–16 gallon) system constructed of 16-gauge stainless steel. The mash tun is copper lined to help control temperature. The hot liquor tank has a temperature controller so you can prepare your water in advance. It is capable of holding the water within one degree of the needed temperature.

The copper mash tun has a perforated false bottom and a pump-driven rotating sparge arm. You can do a number of step mashes in many different ways. I have hooked up the recalculating unit to run in a HERMS fashion. I preset my temperature controller and let the pump and the sensor do the work.

This is a great unit for a small house or apartment as it runs on electricity rather than gas — there is no need to worry about ventilation. The brew kettle has a 3.5 kW element (as does the hot liquor kettle) and a sleeve that covers the element. This functions as a colander and helps to create a rolling boil more quickly. It brings 16 gallons (61 L) of run off to a boil in as little as 25 minutes. There is also a stand-pipe so you get less hops and trub in the fermenter.

My fermenter is a 60° conical Unitank with a racking outlet, internal chill plate well and thermometer. The internal chill plate runs from a separate chilling unit that can take over 30 °F (17 °C) off room temperature. This unit also has two electronic temperature controllers and sensors to set the chill tank and the fermenter at the desired temperature.

The magnetic pump moves the water or wort to the needed kettles or through the heat exchange cooler — this cools the wort to pitching temperature before it hits the fementer. All the hoses have quick connects and are easy to change when the wort or runoff needs to move.



PHOTOS COURTESY OF JIM KAUFMAN

a. The electronic temperature controller keeps the beer cool.
b. The refrigeration unit chills a 22-gallon conical fermenter.
c. The rotating arm pumps water during the sparge.
d. The water heating tank can be seen on the right and kegerator with tap on the left.
e. The copper-insulated mash tun (right) holds up to 45 pounds of grain.

we want you

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Cask Conditioning

Take our advice and make some real ale

by Thomas J. Miller

Cask conditioning can be as easy as putting homebrew in a keg. Some cask conditioning methods find their roots in ancient English ancestry; others are more modern and far less conventional. In this issue, our Tips professionals offer advice on the varying techniques, beginning with the traditional.

Brewer: Christian Kazakoff is the Head Brewer for the Triple Rock Brewery and Alehouse in Berkeley, California.

The difference between cask conditioned ale (AKA real ale) and "normal," draught beer is that cask ale undergoes a secondary fermentation inside the cask or keg that it will be dispensed from, while normal beer is conditioned in a secondary fermenter. The other main difference is the way both are dispensed. Cask ales are ventilated to the open air and are either drawn through English beer engines or tapped directly on the bar and poured by gravity through a cask faucet. Normal draught beer is pushed through a faucet by CO_2 or nitrogen and is never exposed to the air.

There is nothing I do differently to the actual brewing process when preparing a cask. The art of making real ale lies in the post-fermentation of beer. When I make a cask, I always use a beer that has completed the fermentation process and gone through a diacetyl rest.

The key to beginning the cask conditioning process is for the beer to be completely fermented and un-chilled. The cask filling window for me is days seven through ten, after the onset of fermentation. When I am harvesting high kraeusen as my primer, it has to be between days two and three of that fermentation. Once you're in the cask, the active kraeusen or priming sugar is going to ferment itself and any residual fermentables from the beer. This creates natural carbonation because the fermentation is in a sealed vessel and the CO_2 produced during that fermentation is absorbed into the beer. Leave the cask for a week.

If you happen to make a cask ale in a keg other than a Firkin (because a Firkin is sealed until it is ready to be dispensed), you can do a little quality control — i.e. testing for carbonation, mouthfeel and taste — by lowering the temperature of the cask to 55 °F (13 °C) and sampling it. Be careful not to expose any of the beer to oxygen or unsanitary tapping equipment when doing quality control.

Once the secondary fermentation has completed (about seven days), chill the cask to (or below) 55 °F (13 °C). This period lasts another seven days and is for maturation and clarification. During maturation, the flavors smooth out and balance. During clarification, the particulate matter in the cask (yeast, hops and proteins) naturally drop out to the bottom of the cask.

Here's a general tip you can take to the bank: Always use flocculent yeast!

Brewer: Ben Brower joined Bonfire Bistro and Brewery in Northville, Michigan as brewmaster in 2000.

I make every beer that I plan to turn into a cask conditioned brew the same as any of my standard ales. There is one difference however: I don't filter cask conditioned beer. The filtering process would remove yeast that I need in the cask to carbonate the beer. Without that yeast, I'd need to repitch in the cask. What I do is fine the beer to achieve better clarification. If clarity does not occur naturally, I suggest trying traditional finings like Irish moss and isinglass.

My process of cask conditioning begins at the end of primary fermentation. The beer is pretty much done fermenting, but not quite. There's still some residual sugar that the yeast will be able to slowly devour in the cask. Because I want that sugar in my cask, I force chill the beer to 41 °F (5 °C). This makes the yeast drop out, which in turn preserves the sugar for later use. I then add isinglass to remove more of the yeast and this brightens the beer.

I drop the temperatures on my bitter at 1.015 and on my porter at 1.017. In every case, though much of the yeast drops out, some yeast remains in solution. This yeast will go to work later as the beer rises to cellar temperatures — in our brewery, this is 60 °F (16 °C).

Once the beer is chilled, I transfer it to the casks and move it to the cellar. Cellar temperatures near 60 °F (16 °C) are warm enough for the yeast to become active again and complete fermentation on the remaining residual sugars. I allow the beer to condition in the casks for roughly one week. This is usually sufficient to achieve the low carbonation levels suitable to cask conditioned beers.

Brewer: Joe Kalish has been head brewer at Summit Station Restaurant and Brewpub in Gaithersburg, Maryland since 1993.

We begin making our cask conditioned beer at the end of fermentation. We rack the post-fermentation brew into 5-gallon (19-L) Cornelius kegs, then add 1 qt. (1 L) of high kraeusen wort to the post-fermentation beer. This adds the carbonation to the beer in the cask. Even in our capacity, it is not always possible to use high krauesen wort. Instead, it becomes necessary to resort to the standard homebrewing technique of using a dextrose solution to carbonate the keg. We add a dextrose solution that is boiled, dissolved and chilled to the post-fermentation beer in the cask.

It is important for carbonation's sake that the wort you employ be a close match to the beer you are going to put it in. For example, you don't want to put wort from a stout or porter into your favorite IPA or bitter. If you do, you will dramatically change the character of the lighter beers. In cases where you do not have matching wort, always use a dextrose solution instead. On the other hand, it is pretty safe to add light high kraeusen wort (from something like an IPA) to stout or porter, but you can still expect some flavor impact.

Once the sugar solution is added to the post-fermentation beer, you might choose to dry hop. This technique will impart additional cask character to the brew. I like to use leaf hops or hop plugs, which I then tie up in cheesecloth — without this, the loose hops will clog up the tap. I hang the hops about 12 inches into the Cornelius keg by tying a string to the bag and closing the keg onto the string. I leave the hops in the beer until the keg is empty.

The kegs I use have been converted slightly to suit my needs. I cut off about 1.5 inches of the spear that draws beer from the keg. This leaves a space on the bottom of the keg where sediment can settle and not be drawn into the tap. In the end, it accounts for about 8 oz. (237 mL) of lost beer — the clarity and quality, however, make that minor loss well worthwhile.

The beer matures in the keg for three or four days at room temperature (usually 68–72 °F or 20–22 °C). During this period, carbonation rises to 1.4–1.5 volumes of CO_2. I then store the beer in a walk-in cooler for three to five weeks, depending on demand. ■

Final Gravity in Five

Putting hops in the bag and a haze named chill

"Help Me, Mr. Wizard"

My lager is lagging

I prefer brewing German-style lagers. Although my beginning gravity is always close, my final is always two or three points higher than desired. I'm pretty confident in my brewing, conversion and fermentation techniques, so I think the problem may occur in secondary fermentation or in lagering. I have a temperature regulator and follow fermentation temperatures closely. When primary is complete, I rack into a five-gallon keg for secondary fermentation, flushing the head space with CO_2 and leaving just enough pressure to seal the gasket. After secondary fermentation is complete, I step down the temperature 3–4 °F (1–2 °C) per day until it reaches lagering temperature and store it cold for six to eight weeks. When racking into the secondary, could I be leaving too much bottom-feeding yeast in the primary?

Clint Probst
Mansfield, Texas

This problem is familiar to me as I have struggled through developing a method to ensure that my own lagers finish around my target final gravity. I used to judge when to transition from the primary to secondary based upon fermentation activity and then allow the beer to stay in the secondary for a set number of days at the same temperature, usually around 50 °F (10 °C). Then I would gradually cool the beer down to 32 °F (0 °C) for lagering. Based upon the information in your question, I assume you are using a similar method because you don't give details about gravity at these steps.

In my experience, I usually find that lagers finish higher than desired because fermentation was cut short by premature cooling to temperatures below 38 °F (4 °C) — at which point lager yeast typically stops fermenting. Lager fermentations behave differently than ale fermentations as they near completion. Ales usually transition from the original gravity to the final gravity in a rapid fashion — three to five days is normal for worts in the 12–14 °Plato (1.048–1.056 original gravity) neighborhood. Lagers on the other hand, will drop within 1–2 °Plato (four to eight gravity points) in the first five to seven days of fermentation and then slowly drop to the final target gravity. This period can last as long as two weeks.

The method I currently use is based upon "go, no-go" points commonly found in quality control programs used by commercial breweries. The idea is simple even though developing a program takes time and implementing that program requires diligence. I had lagers that were finishing all over the place and I could detect obvious flavor differences between batches of the "same" beer. This is not a good thing! In order to tighten the process up a bit, I established target points that had to be met during fermentation and before the next step could begin. The method I have developed to ferment most lagers has five steps:

One: Ferment at 54 °F (12 °C) until gravity is within 1.0–1.5 °Plato of the finish gravity.

Two: Spund the fermenter (a special valve that releases pressure at a defined point is made for spunding) and allow the beer to naturally carbonate.

Three: Cool the beer's temperature to 38 °F (4 °C) six days after spunding, only if the beer has reached the target finish gravity. The beer is then held at 38 °F (4 °C) for 10 days.

Four: Cool the beer to 32 °F (0 °C) and hold for at least seven days.

Five: Filter the beer and transfer to the serving tank.

This procedure is used to produce one-month lagers (this has become a typical duration for fermentation and aging in commercial breweries). When I brew stronger lagers like doppelbock, the fermentation and cold aging steps are extended. In any case, the key here is that the goal of each step must be met before proceeding to the next. Steps one and three require taking a gravity sample to verify the goal. Steps three and four complete based upon time and temperature parameters. The methodology is simple but it is not the norm for many homebrew recipes. Vague terms are frequently used in recipes because a recipe, by nature, is only a road map and describes how one brewer made a batch using certain ingredients and pieces of equipment. Some recipes lay down times like lines in the sand. For example, "ferment for seven days, rack to the secondary and hold for three weeks before bottling." While these sorts of instructions are great for describing the overall process, they should not be used as action items on a calendar unless they are qualified with goals that can be measured. My lagers have become much more consistent in finish gravity by using this simple yet effective method of monitoring.

The other extremely important thing with brewing lagers is yeast. Whenever I have flavor problems or lagging fermentations, the first thing I turn to is the yeast. Questions about age, pitching rate, adequate wort aeration and propagation steps are all important to address

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DARK ABBEY type for 9 l.
Starting specific gravity : 1.070 Alcohol content : 8 %.
One of the most well known Belgian specialties : an Abbey style beer with vinous character due to its high alcohol content. Deep amber, full flavoured with lots of malt aroma with caramel notes. Improves with long maturation times and can be kept for several years !

AMBIORIX type for 15 l.
Starting specific gravity : 1. 060 Alcohol content : 6,5 %.
Amber beer with a red copper tint. Slightly acidic palate at first but with a nice fruity aroma. Moderate hop bitterness. Comparable with the well known beer of Roeselare.

DIABOLO type for 9 l.
Starting specific gravity : 1.071 Alcohol content : 8 %.
Belgian specialty beer : Strong, golden coloured beer with a thick and long lasting head (lacy). Characteristic aroma of devil type Belgian beers, soft palate with a slightly sweet aftertaste. Improves with long maturation times and can be kept for several years !

KRIEK type for 12 l.
Starting specific gravity : 1.053 Alcohol content : 5,5 %.
Kriek is the best known of the famous Belgian fruit-beers, made by macerating cherries in beer. A slightly acidic, sweet aromatic beer with a red topper tint. Each kit contains pure cherry juice of at least 3 kg of cherries ! This beer gives you the perfect balance of fruitiness without tasting like grenadine as some commercial kriek's do.

OLD FLEMISH BROWN type for 12 l.
Starting specific gravity : 1.060 Alcohol content : 6 %.
A dark brown beer with a woody notes flavor a slight liquorice aftertaste that also compares with the Dutch Bock-beers.

CHRISTMAS type for 7 l.
Starting specific gravity : 1.065 Alcohol content : 8%.
Dark, strong and full-bodied Belgian beer, sweeter than Abbey style beers. Strong malt flavour and aroma. Improves with long maturation times and can be kept for several years !

WHEATBEER type for 9 l.
Starting specific gravity : 1.053 Alcohol content : 5%.
Very similar to the well known Belgian "Witbieren" : pale, opaline colour with low alcohol content. A real summer beer with a pleasant aroma, mild hops and a smooth malt character. Slightly acidic and thirstquenching. Based on an old recipe using barley, wheat, oat flakes and a secret herb mixture with coriander and sweet orange-peel.

GRAND CRU type for 9 l.
Starting specific gravity : 1.075 Alcohol content : 8%.
Gold opaline coloured, with strong flavour of grains and even bread. Very little hop aroma. Very mouthfull with light fruit notes and a pleasant sweetness. Also this kit contains wheat malt and a special herb mixture.

TRIPLE type for 9 l.
Starting specific gravity : 1.075 Alcohol content : 8%.
Triple is a well known, deep golden coloured, Belgian specialty. Due to its high malt contents it has a very pleasant aroma and taste, mouthfull, full bodied and even a bit herbaceous. High alcohol content.

FRAMBOOS type for 12 l.
Starting specific gravity : 1.053 Alcohol content : 5,5%.
FRAMBOISE or raspberry beer, is a Belgian specialty. Together with the BREWFERM KRIEK, this FRAMBOISE is the only fruitbeer kit available in the world. Each kit has an equivalent of 2 kilo of raspberries. This FRAMBOISE beer han a very delicate aroma and is ideal as a refreshing summer-beer or as a surprising aperitif !

PILSNER type for 15 l.
Starting specific gravity : 1.042 Alcohol content : 4,6 %.
Light, blond beer, with a moderate bitterness and dry finish, comparable with the commercial Lager or Pilsner beers. Low alcohol content.

GOLD type for 12 l.
Starting specific gravity : 1.053 Alcohol content : 5,5 %.
A real deluxe pilsner type with more malt flavor than the normal Lagers. Moderate hop bitterness. Comparable with the Scandinavian deluxe-Beers.

GALLIA type for 12 l.
Starting specific gravity : 1.055, Alcohol content : 5,5 %.
The latest addition in our range: A thirstquenching pale amber beer with a refined bitterness and a soft finish, a worthy alternative to the commercial Belgian ales.

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when dealing with lagging fermentations. I don't offer too many guarantees with my advice, but I will offer this tidbit: Lager fermentations almost always lag at the end if your brew is underpitched. Since pitching rate refers to the number of living cells added to wort, under-pitching can be a result of yeast viability or simply not adding enough cells.

I'll offer another assurance with respect to finish gravity and other beer specifications. Recipes give a laundry list of ingredients, procedures and all sorts of numerical specifications that will be met when following the recipe. The fact is, these numbers can only realistically be met if you take the time to "tweak" the recipe. Parameters such as wort fermentability can rarely be replicated by simply following a mashing profile given in a recipe. In order to really hone in on these somewhat illusive targets, minor adjustments to the mash profile, mash thickness, water salts and base malt type may be required. In other words, if you get close to a target cited in a recipe, you may have done everything well and have no problems to solve!

To bag, or not to bag

What are your thoughts or recommendations on using hop bags when brewing. I enjoy the hoppier spectrum of beers but also appreciate the pouring ease and cleaning convenience of keeping the hop pellets in bags. Do these bags diminish hop utilization?

Mike Crimmins
via email

My overall philosophy with brewing is extremely simple and goes something like this: "If the method works to produce good tasting beer with the desired aroma, stability, appearance and material yields — it's OK with me!" Let's face it, hops and malt are messy to deal with and there are many things we do as brewers to minimize the mess. Mash tuns and lauter tuns are usually designed to make clean up easy and the same is true with hopping techniques. Let's first look at some of the ways brewers deal with hops.

The majority of brewers usually do not use whole hops because they are a pain to separate from the wort and require some type of hop separator. However, many of our nation's notable brewers do use whole hops. This list includes Anheuser-Busch, Coors, Sierra Nevada and Anchor.

Most brewers use pelletized hops because they are much easier to ship, store, handle and separate than whole hop cones. Commercial brewers use whirlpool vessels to separate trub and hop solids from wort. Even brewers using whole hops spin their wort in a whirlpool to separate trub from wort. A whirlpool vessel usually has a flat bottom and is dimensioned with a height-to-diameter ratio ranging from 1:1 to 1:3. Most whirlpools fall into the short and wide category. Wort is introduced after boiling through a tangential inlet to get the wort spinning. After

filling, the liquid slowly stops spinning and the solids are deposited in the center of the vessel where they remain while the clarified wort is transferred to the wort cooler.

Finally there are brewers who skip this whole hoppy mess and extract the goodies from the hops in a separate facility. Many European brewers use hop extracts and there are many types available. Although these products lack tradition and romance, they do offer many advantages including the "less mess" factor.

Your desire to make hop handling easier is clearly a topic of importance to all brewers and there is not a single "right" method. Hop bags are certainly convenient for homebrewers because our brew kettles are much smaller than those used in commercial breweries. The amount of hops used by homebrewers is also fairly small. The most important thing to consider when using hops is that if they don't get completely hydrated and exposed to the wort or beer (like in dry hopping) the acids and oils may not transfer from the hop pellet or cone into the liquid.

This may sound unlikely, but it does indeed happen. I was once on site for a brewhouse commissioning and saw a pile of pellet hops that were dry in the center of the mass sitting in the bottom of a 250-barrel (7,750-gallon) kettle after the boil. The pellet hops had clumped together in the vacuum package and were not broken up enough before being tossed into the boiling wort. The lesson: If you choose to use a hop bag for pellet hops, make sure it's large enough to allow the hops to hydrate without being restricted by the bag. Cone hops increase in volume approximately by a factor of four when hydrated in hot water.

You may experience a slight reduction in utilization even when the hops are not restricted in the bag. This falls into the "so-what" category of things. It's well known that pellet hops have a higher utilization than whole hops (extracts have even higher utilization). This fact is recognized by brewers who use whole hops, but utilization is not always the most important factor to consider when addressing the topic of

hopping. As long as you produce a beer that meets your standard of quality and understand the pros and cons of your chosen method, you are doing just fine in my book. By the way, a slight reduction in hop utilization is not going to break the bank!

Chi-chi-chi-chill haze

I have chill haze in all of my ales and some of my six-week lagers. After kegging and carbonation, I usually let a keg sit for a couple of weeks before drinking. Some of the ales and lagers clear up toward the bottom of a keg but some have the haze until they are gone. I sparge at 163 °F (73 °C) and add Irish moss during the last 15 minutes of the boil. I keg and false carbonate. How else can I prevent chill haze?

Al Canady
Piedmont, South Carolina

I will assume your problem is chill haze and not a yeast haze commonly seen in beers fermented using a yeast strain with poor flocculation properties. Chill haze occurs when certain proteins and polyphenols (tannins) loosely bond at low temperatures and cause beer to appear hazy. Chill haze disappears when beer is warmed and reappears when chilled. Given enough cycles, a chill haze may become permanent and fail to disappear upon warming. This same thing happens in wine and iced-tea.

Battling chill haze involves removing the protein or the tannin from the beer, thereby minimizing the concentration of the problem compound. Some brewers try to remove both parts of the equation. Irish moss is effective in removing proteins, and as it turns out, somewhat selectively removes the sort of proteins that are most often implicated in hazes. (For those protein geeks out there, haze proteins are typically rich in the amino acid proline.) Irish moss must dissolve into wort and this requires time. The conventional thought is to add it during the last 15 minutes of the boil. Adding it too late can reduce its efficacy. I have seen 40–60 ppm as a recommended addition range in text books. This equates to roughly one gram (or about one teaspoon) per five gallons. As with most chemical interactions, the ability of Irish moss to bind proteins is pH dependent — but lucky for us, it works well at wort pH (5.2–5.4).

Other brewers focus on removing tannins from beer. The most common tannin fining is PVPP (polyvinylpolypyrrolidone — say that three times fast, or even once without taking a breath and you may be a wizard yourself). Like silica gels, PVPP is also a fast acting adsorbent. These compounds are typically added to beer prior to filtration to make removal easier. Some brewers allow a few hours for PVPP or silica gel (these compounds can be used together as a more economic solution) to work prior to filtration. Others inject these compounds in-line as the beer is being filtered. At home, these adsorbents can

"Help Me, Mr. Wizard"

be separated through racking; both PVPP and silica gel are granular powders that sink in beer. Textbook addition rates for PVPP range from 7.5–25 g/hL (~0.25–1 gram per gallon). PVPP is a heavy powder and you cannot really convert grams to a volumetric measurement. I would recommend following the manufacturer's advice for dosing rates.

An alternate method is cold filtration. Although not practical for brewers who do not filter, this method works great for those who prefer not to use finings. Basically, beer is chilled down to near-freezing temperatures where it is held for at least a few days if not longer (much longer at times). The cold temperature encourages haze and some of the haze actually settles out — this practice can be accomplished at home. The next step involves filtering the beer at the same cold temperature and removing the haze. In order to obtain satisfactory filtration results, it is important to select a filter that is tight enough to remove these particles. In my experience, a filter pore size of two microns or less works well for producing very bright beers. Although yeast can be removed by pore sizes up to 10 microns, haze removal requires a tighter filter. Using multiple sizes (coarse, then fine) is common in larger breweries trying to get more efficient use of filtration materials. Many pub brewers however only use one pore size for filtering.

One of these methods will hopefully work to clear up your hazy brew! (For more information on clarity and turbidity, see October 2003's *Tips from the Pros* column entitled "Managing Beer Clarity.") ■

Do you have a question for Mister Wizard? Write to him c/o Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255 or send your e-mail to wiz@byo.com. If you submit your question by e-mail, please include your full name and hometown. In every issue, the Wizard will select a few questions for publication. Unfortunately, he can't respond to questions personally. Sorry! Who is Mr. Wizard? Stay tuned!

Malt Liquor

Out of the bag and into the carboy

by Horst D. Dornbusch

Malt liquor is essentially a fairly strong and simple beer. It's no secret that malt liquor is manufactured and marketed for its alcoholic strength, not for its finer qualities. However, some homebrewers have a soft spot for this much-maligned beer style. Like a music reviewer with a Britney Spears CD hidden in his collection — it's their guilty pleasure. And with a few tweaks (that the big brewers have no commerical incentives to make), this style can be brewed to please homebrewers.

Commercial Examples

To obtain an understanding of the commercial examples of the style, I surveyed many brews on the shelves under the flag of malt liquor (though I did not try them all).

To my surprise, the malt liquor style is fairly varied in color, flavor, price and alcoholic strength. Many brands have about 6% alcohol by volume (ABV) — not much higher than "regular" beers. Others are much stronger, in the 8–9% ABV range. The malt liquors that ranked near the top on the alcohol scale were almost twice as potent as those at the low end of the scale. They were also, by and large, the cheaper brands.

malt liquor by the numbers

OG	1.064–1.080 (16–20 °P)
FG	1.010–1.012 (2.5–3 °P)
SRM	3–9
IBU	under 12
ABV	6–8%

Hops

In all but one of the American-made malt liquors I tried, hop bitterness was very low. In many, hops were not perceptible at all. The noticeable exception was Haffenreffer Private Stock, which had a floral to lemony hop bite. For the homebrewer, this means that the choice of hops ought to be non-aggressive and the dosage ought to be restrained. Try any of the noble hops — such as Hallertau, Tettnanger or East Kent Goldings — and keep the IBUs under 12. There is no need for flavor or aroma hops in malt liquor.

Six-Row Grain

The flavors imparted from grain are a key characteristic of malt liquor. With no hop, specialty grain or other strong flavors in the beer, flavor from the base malt is quite evident. In the best examples of the style, this is evidenced as a pleasing graininess. In the worst examples, it shows itself as harsh astringency.

Malt liquors are formulated with six-row winter barley and an adjunct. I recommend a fully-modified, six-row malt made from the Robust barley variety by the Briess Malting Company of Chilton, Wisconsin. This grain has a color rating of 1.7–2.0 °L. The finished beer, therefore, pours blonde to light-amber (from 3–5 °L)

For all-grain brewers, getting the characteristic grain flavor will be the biggest challenge of brewing this style. To produce this flavor, you may need to mill your grain a bit finer than you usually do. Secondly, you can sparge longer and collect a greater amount of wort per unit of grain. Finally, you can heat your sparge water to a few degrees hotter than normal. Measure the temperature of the grain bed itself (not the sparge water) and keep it as close to 170 °F (77 °C) as possible.

Corn or Rice

The adjunct in malt liquor — usually corn or rice — contributes starch

RECIPE

Rewarding Malt Liquor

(5 gallons/19 L, all-grain)

OG = 1.064 FG = 1.010
IBU = 9 SRM = 5 ABV = 6.9%

Ingredients

8.25 lbs. (3.7 kg) Briess six-row pale malt
5.4 lbs. (2.4 kg) Briess pregelatinized flaked corn or flaked rice
1.5 oz. (40 g) amylase enzymes (optional)
2.7 AAU Tettnanger (bittering) (0.66 oz./19 g of 4.1% alpha acid)
1 tsp. Irish moss
¼ tsp. yeast nutrients
Wyeast 2007 (Pilsen Lager) or White Labs WLP840 (American Lager) yeast
1 cup corn sugar (for priming)

Step by Step

Mash in the mixture of milled malted barley and (un-milled) pregelatinized corn or rice flakes at approximately 150–152 °F (66–67 °C) and let the mash rest for 60 minutes. (Option: to increase graininess, mill your grains more finely than you usually do. Try to crack each grain into 4–5 pieces. Don't grind the grains into dust, however, as you will have problems during lautering.) Stir the mash tun every 10–15 minutes to ensure that the flakes get exposed to enzymes from the 6-row malt. Start sparging with water around 180 °F (82 °C). Sparge slowly, for 60 to 90 minutes. Check the mash temperature to make sure it reaches at least 168 °F (76 °C), but no more than 172 °F (78 °C), during the last 15 to 20 minutes of the sparge. You may have to increase or decrease your sparge-water temperature. Sparge until the kettle gravity is about 1.058, then boil your wort for about 60 minutes.

continued on page 22

continued from page 21

malt liquor recipe continued

(Option: for a grainier beer, collect wort until your kettle gravity is 1.054 and then boil the wort for 90 minutes.) Add the bittering hops with 60 minutes left in the boil and the Irish moss and yeast nutrient with 15 minutes left. With a 10 percent evaporation loss per hour, the kettle gravity at the end of the boil should reach the OG target of about 1.064 (16 °Plato). Heat-exchange the brew to a fermentation temperature of 54–55 °F (12–13 °C). Wait about 30 minutes to let the trub settle out. Rack to your primary fermenter, pitch the yeast and aerate the wort. Allow two weeks for primary fermentation. Rack to secondary and lager for two weeks, between 32–35 °F (0–2 °C). Keg the beer and carbonate to 2.5 volumes of CO_2 or prime with the corn sugar and bottle. After 10-14 days of bottle conditioning, this malt liquor is ready to drink. Serve ice cold.

Note: if you follow the optional directions closely, your extract efficiency may be higher than we assume (65%). If this happens, you will get a higher gravity wort. In that case, you can liquor down (add water to) your wort prior to fermentation to hit the right gravity (with a larger volume of wort). Or, you can simply brew a stronger beer.

Rewarding Malt Liquor

(5 gallons/19 L, extract only)

OG = 1.064–1.071 FG = 1.010–1.011
SRM = 7 IBU = 8–9 ABV = 6.9–7.9%

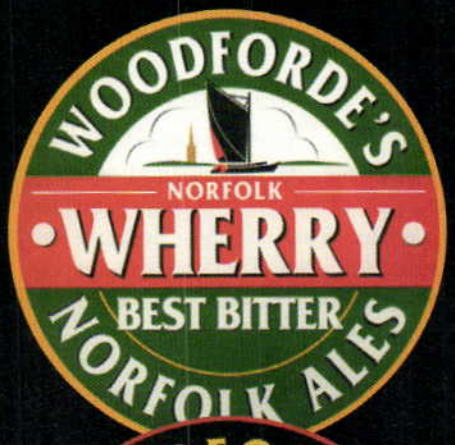
Ingredients

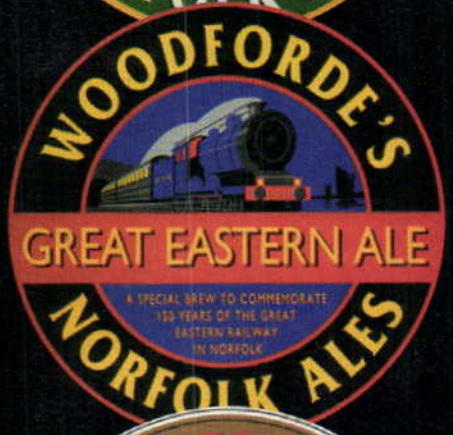
5.8 lbs. (2.6 kg) very pale unhopped liquid malt extract (such as Muntons Extra Light)
3.9 lbs. (1.8 kg) Briess brewers corn syrup or rice syrup
3 lbs. (1.4 kg) un-milled six-row malted barley (optional)
2.7 AAU Tettnanger (bittering) (0.66 oz./19 g of 4.1% alpha acid)
1 tsp. Irish moss
1 package lager yeast (Wyeast 2112 California or White Labs WLP810 San Francisco) yeast
1 cup corn sugar (for priming)

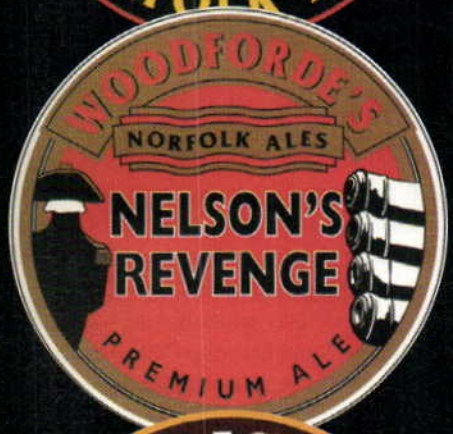
Step by Step

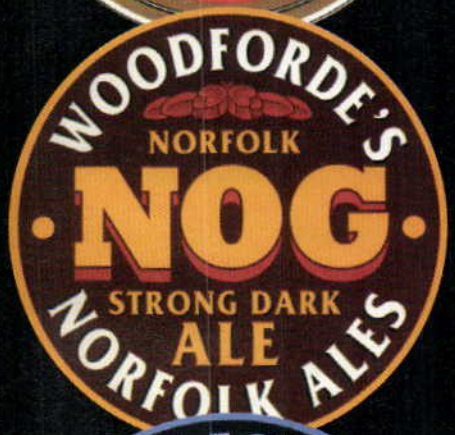
Heat 4 gallons (15 L) of brewing water to a boil and shut off the burner. Stir in the liquid malt extract and the adjunct syrup. Bring to a boil again and follow the all-grain instructions for the boil. Ferment at 65 °F (18 °C) for two weeks, then rack to secondary. Bottle after two weeks in secondary.

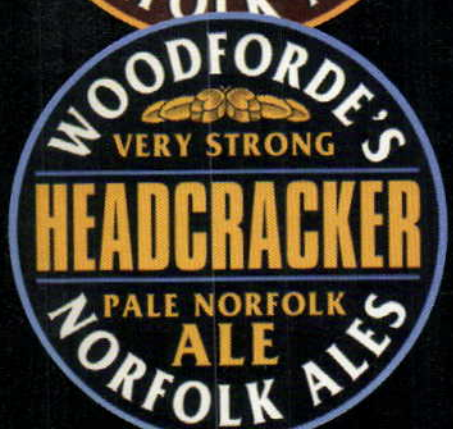
(Option: For a grainier feel to the beer, put 3 lbs. (1.4 kg) of unmilled six-row barley in a grain bag and submerge in 2 gallons (7.6 L) of water. Heat water to 172 °F (78 °C). Add water to make 4 gallons (15 L) of brewing water.)











New!
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Woodforde's is a small brewery with some very big beers.

Take **Woodforde's Wherry** for instance - a delicious bitter which won CAMRA's *"Champion New Brewery Beer of Britain"* outright in 1990/91. **Norfolk Nog** is a strong dark ale with a wonderful rich flavor which took CAMRA's coveted *"Champion Beer of Britain"* in 1992/3. If it's strength you're looking for, try **Headcracker** for size. At 7% ABV it really does pack a punch. **Nelson's Revenge** pays hommage to Norfolk's sea faring heritage and its famous son - Lord Admiral Nelson - who was victorious at the Battle of Trafalgar. **Great Eastern Ale** is a fine, light pale ale which commemorates over 150 years of steam travel in Norfolk, England.

Carefully formulated by Woodfordes Brewery and Muntons, this range of beerkits brings you a taste which is so close to the original even expert brewers cannot tell them apart.

to the mash, which is degraded by the "excess" enzymes in the six-row malt. Corn and rice lighten the beer's body and raise its alcohol content. Beers made with rice adjuncts generally finish drier than beer made with corn adjuncts and thus add more crispness to the finished beer. The malt-to-adjunct ratio varies among brands of malt liquor. Homebrewers are better off not exceeding 40% adjunct, which is the maximum ratio recommended by many malting companies.

Without going to unusual lengths, homebrewers cannot recreate the manner in which commercial malt liquor brewers use their adjuncts. Big national breweries send corn or rice grits through special mills, then perform a separate cereal mash before adding the adjunct to the main mash. Smaller regional brewers may use corn or rice syrup treated with amylase enzymes. The enzymes degrade the syrup into a liquid with a carbohydrate profile similar to wort. They then add these "wort replacement liquids" to the wort from the mash tun.

All-grain homebrewers can use pregelatinized flaked corn (also sold as flaked maize) or pregelatinized flaked rice when making a malt liquor. These brewers products have been steam-cooked to gelatinize and soften the starches. They are then rolled and dried into flakes. Therefore, they can conveniently be added to the mash as is, without the need of a cereal cooker.

If you exceed 40% adjuncts, you may need to supplement the mash with additional enzymes. Conversion of adjunct-rich mashes can be enhanced through the addition of an amylase enzyme preparation (available in 1.5-oz. packages at many homebrew stores). As a rule of thumb, use about a quarter teaspoon of amylase preparation per pound (0.45 kg) of dry grains and flakes. For extract homebrewers, there are special corn syrups and rice syrups on the market. It is not recommended to use grocery-store brand syrups for homebrewing, because such syrups often contain mold-inhibiting chemicals and other preservatives that may inhibit your yeast.

Adding a ¼-teaspoon of complete yeast nutrients per 5 gallons (19 L) during the boil may help when fermenting adjunct-rich brews.

Lager Yeast

Amercian malt liquors are lagers, though I know of a few European ones that are ales. Ferment an American-style malt liquor with any lager strain used for American Pilsners, such as Wyeast 2007 (Pilsen Lager) or White Labs WLP840 (American Lager). You can also use White Labs WLP940 (Mexican Lager) or Wyeast 2272 (North American Lager), a strain often used for Canadian-syle lagers. If you don't have the equipment to maintain lager temperatures, an alternate choice would be a California common variety, such as Wyeast 2112

(California Lager) or White Labs WLP810 (San Francisco Lager). Both of these ferment best at a relatively warm temperature of about 65 °F (18 °C). Whatever yeast you use, make a 1-gallon (3.8 L) yeast starter or pitch 1.5–2 cups of yeast solids.

Fast Fermentation and Lagering

In large breweries, malt liquor fermentations are carried out in the same or similar manner as their "normal" fermentations. American Pilsners are made from high gravity brews that are diluted after fermentation to their package strength. In most breweries, malt liquor is simply an undiluted (or lightly diluted) product from a particular "family" of beers. For example, King Cobra malt liquor is from the Natural Light family of beers. These beers may not be exactly the same, but are similar enough that they can be used for blending with each other when needed. Malt liquor is usually fermented at 54–55 °F (12–13 °C). A "free rise" to 60 °F (16 °C) at the end of fermentation gets rid of any residual diacetyl.

Although higher in gravity, malt liquor is typically not lagered any longer than the "normal" gravity products of a brewery. In most cases, the beer is out the door in 18–21 days.

Serving Suggestions

Malt liquor tastes best when it is ice cold. When served in its traditional glassware — a 40 oz. (1.2 L) bottle — it must be consumed quickly. Pour it into a smaller glass if you don't want to chug down your brew.

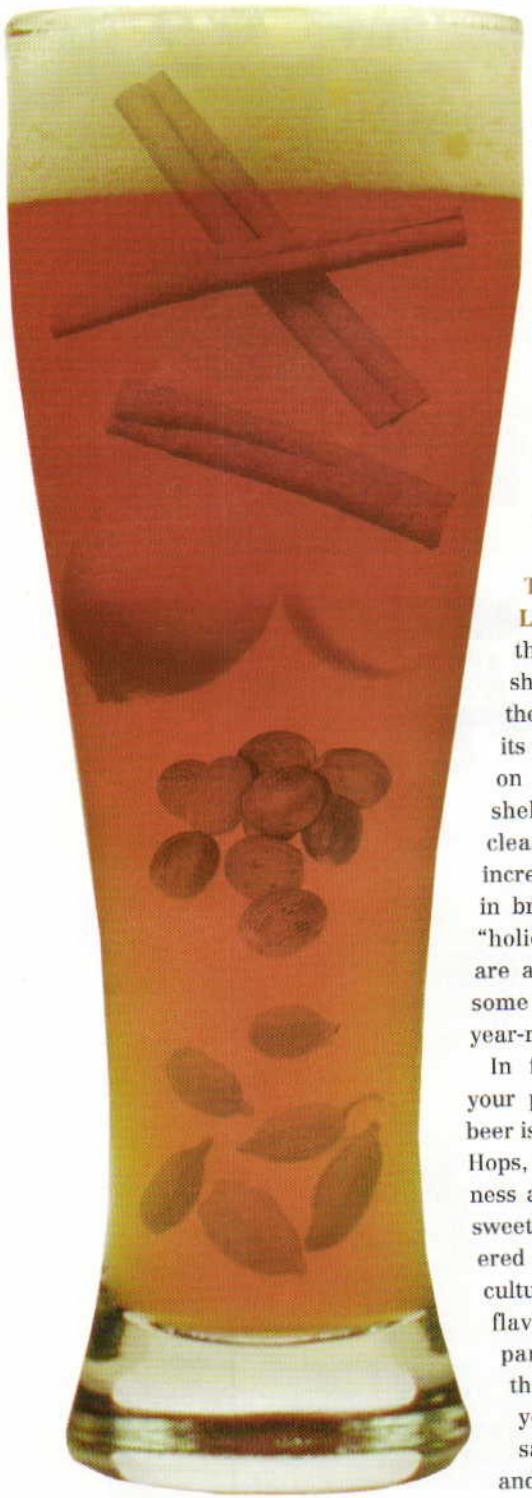
Malt Liquor Quality

The quality of the grains and the quality of the brewing process determine the quality of a malt liquor. As a quality-conscious homebrewer, you can no doubt produce a better brew than most of the name brands by simply lagering the beer longer. If so, maybe (just maybe) an acceptable version of malt liquor can enter your homebrew recipe file — maybe. ■

On page 32, "Style Profile" columnist Horst Dornbusch discusses another strong beer — eisbock.

SPICE it UP!

By **Glenn BurnSilver**



Spices Add Variety

and for beer, the spices are endless

THERE IS A POPULAR misconception that spiced beers show up only around the time eggnog makes its annual appearance on grocery store shelves. And while clearly there is an increase this time of year in brews that add some "holiday cheer," spices are actually prevalent in some of the "common" year-round beers.

In fact, depending on your point of view, every beer is spiced in some way. Hops, used to add bitterness and balance a beer's sweetness, can be considered a spice. Even yeast cultures add their own flavor and spiciness, particularly some of the specialty Belgian yeasts. But for the sake of argument — and ease of explanation — we will focus on actual spices that might be used in cooking. This includes brewing both holiday specialties and everyday favorites.

"You can use just about any edible item you want in making a beer," says John Arthur, owner of What's Brewin', a Boulder, Colorado-based homebrew shop.

That said, in the years before hop use became standard, just about anything was fair game when it came to brewing. Different plants, herbs and spices were added in an attempt to impart bitterness to beer. Ingredients such as heather, juniper berries, spruce tips and sweet gale, while unusual, are still used today in some beers. Froach is a heather beer still made in Scotland, while the Alaskan Brewing Company in Juneau, Alaska uses Sitka Spruce tips to flavor their Alaskan Winter Ale. Popular folklore says famed explorer Captain Cook made beer with spruce tips, both for the high level of vitamin C that would help ward off scurvy among his sailors and for the anti-oxidant qualities of the spruce that meant a longer shelf (or in this case, ship) life. The Belgians are perhaps the greatest users of herbs and spices in beers, adding spices — particularly popular are cardamom, bitter orange peel and coriander — to even the most "everyday" brews. The idea of adding spices to beers when the temperature dips developed with the concept of a "winter warmer," something that would help ward off the chill, but without losing all the pleasantries associated with drinking a beer.

Making the Drop

Adding herbs and spices to beers is a relatively easy process, but there are variations depending on desired flavors and strengths. As is the norm, there are a few hazards

lemon

star anise

allspice

cardamom

ginger root

nutmeg

Some common (and uncommon) BEER SPICES

Allspice - Common cooking spice used in holiday ales.

Belgian Candi Sugar - Often called beet sugar, it is considered a spice for the unique sweet characteristics imparted to abbey style brews.

Bitter Orange Peel - Also called Curacao, this ingredient, while not actually very bitter, is essential in Belgian wit beers.

Cardamom Seed - A distinctive spice from the ginger family, cardamom adds a "spicy cola" flavor to specialty Belgian and Holiday Style beers. Combines well with coriander, cumin and orange.

Chili peppers - Add both chili pepper flavor and spicy "heat" to beer.

Coriander - A "spicy spice" and key ingredient in Belgian wit and specialty beers.

Cowslip (Primrose Flowers) - Adds zip to Belgian specialty beers.

Dried Elderflowers - More common in wine, but can add a flowery sweetness to beer.

Dried Woodruff - Adds a distinctive scent of fresh-cut hay and vanilla flavor to beer.

Cinnamon Sticks - A favored addition to holiday and pumpkin beers as well as ciders.

Ginger Root - Commonly used to add a little "warmth" to holiday brews.

Heather Tips - Used in early beer making to impart bitterness. Has a pleasant aroma and teams well with honey beers. Appropriate for a Scotch ale known as Fraoch.

Indian Sarsaparilla - Best known for its use in root beer, this spice improves mouthfeel and head retention.

Juniper Berries - The popular gin flavoring can be used instead of hops.

Licorice Root - Adds a very sweet, tangy flavor. Commonly added to stouts and porters.

Mugwort - Used to impart bitterness before the practice of using hops. Adds an "earthy" flavor.

Nutmeg - More common in baking, a little of this "heavy" sweet flavor goes a long way.

Oak Essence and Oak Chips - Used more by home winemakers, oak can add a sour flavor to beers. Also used to reproduce true India Pale Ale.

Paradise Seeds - Also called "Grains of Paradise" and "Melegueta pepper," these small seeds are native to West Africa and impart a peppery zing, with hints of citrus and an "earthy" pine aroma.

Pumpkin Pie Spice - Pie in a glass! Made with cinnamon, cloves, nutmeg and other spices, it is an easy way to add holiday zest to beer.

Rose Hips - Fruit/herb used in specialty beers and rich in Vitamin C.

Sitka Spruce Tips - Native to Alaska, the young tips of this evergreen are harvested in May, vacuumed sealed and stored for use in Holiday beers. (Available only from www.gourmetalaska.com.)

Spruce Essence - A very strong concentrate with "piney" flavors that can easily overpower beers.

Star Anise - Similar to licorice in flavor and application.

Sweet Gale - A fragrant spice, also know as "Bog Myrtle" and "Badge of the Campbells," it is used in holiday beers and can also substitute for hops.

Sweet Orange Peel - Commonly used in Holiday beers and Belgian strong ales. Adds a flavor similar to Cointreau or Grand Marnier.

Vanilla Beans - Added to chocolate by the ancient Aztec Indians, the beans add a creamy flavor to stouts and holiday beers. Very effective when "dry-hopped."

Wintergreen Leaves - Uncommon, but can be added to beer & root beer.

SPICED BEER recipes

Sweet Holiday Stout

by John Arthur

(5 gallons/19 L, extract with grains)

OG = 1.072–1.080 FG = 1.020–1.025
ABV = 6.9–7.7%

Ingredients

4 lbs. (1.8 kg) stout malt extract kit
3.5 lbs. (1.6 kg) amber malt syrup
3.5 lbs. (1.6 kg) dark malt syrup
2 AAU Hallertau hops (bittering)
(0.5 oz/14 g of 4% alpha acids)
0.5 oz (14 g) Hallertau hops (flavor)
0.75 lb (0.34 kg) orange blossom honey
5 3-inch cinnamon sticks
2 tsp allspice
1 clove
6 oz. (170 g) fresh ginger root
6 medium-sized orange rinds
German Ale Yeast

Step by Step

Dissolve stout kit and malts in 2.5 gallons (9.5 L) of hot water. Bring to boil and add bittering hops. After 45 minutes, add second charge of hops. Cool, rack to fermenter, add spice mixture (see below) and ferment at 60 °F (16 °C), until primary is complete. Rack to secondary for 14 days. Bottle age one to two months. **Spice mixture:** Simmer (don't boil) spices in the honey and 0.5 gallon (1.9 L) water for 45 minutes during the wort boil. Strain out spices and blend liquid into the wort.

Christmas Ale

by Scott Christoffel

(5 gallons/19 L, extract with grains)

OG = 1.065–1.068 FG = 1.016–1.017
IBU = 39 ABV = 6.3–6.6%

Ingredients

4 lbs. (1.8 kg) amber dried extract
3 lbs. (1.4 kg) light extract syrup
1 lb. (0.45 kg) wheat dried extract
2 oz. (57 g) Dingemans Special "B"
10.5 AAU Perle Hops (bittering)
(1.5 oz./43 g of 7% alpha acids)
0.35 oz. (10 g) Perle hops (flavor)
0.35 oz. (10 g) Styrian Goldings hops
0.11 oz (3 g) star anise
0.04 oz. (1 g) seeds of paradise
0.42 oz. (12 g) bitter orange peel
0.17 oz. (5 g) sweet orange peel
0.14 oz. (4 g) cinnamon
0.11 oz (3 g) ginger root
0.75 tsp Irish moss
Wyeast 3522 (Belgian Ardennes Ale) yeast

Step by Step

Steep Special B grains at 155 °F (68 °C) in 20 oz. (590 ml) water for 30 minutes. Add malt extracts and boil for 45 minutes, adding Perle hops at beginning of boil. With 20 minutes left, add Perle flavor hops and bitter orange peel. At 10 minutes add Irish Moss. At 5 minutes, add star anise and seeds of paradise. At 0 mins. (whirlpool) add Styrian Goldings, sweet orange peel and cinnamon. Cool, rack to fermenter, top to 5 gallons and add yeast, ferment at 68°F until completion. Rack to secondary and condition at 32 °F (0 °C) for 10–14 days. During conditioning , add ginger root and cinnamon for 10 to 14 days at 32 °F (0 °C). Bottle condition 60 days.

Holiday Ale

by John Weerts and Daniel Turner

(5 gallons/19 L, partial-mash)

OG = 1.075 FG = 1.019
IBU = 34 SRM = 13
ABV = 7.3%

Ingredients

6 lbs. (2.7 kg) American two-row malt
1 lb. (0.45 kg) rye malt
0.5 lb. (0.22 kg) CaraMunich malt
0.5 lb. (0.22 kg) CaraVienna malt
5 lbs. (2.3 kg) Alexander's pale LME
9.75 AAU Northern Brewer hops
(1.25 oz/35 g of 7.8% alpha acids)
1.5 oz. (43 g) orange peel
1 oz. (28 g) lemon peel
1 oz. (28 g) cinnamon chunks
0.63 oz. (18 g) coriander powder
0.63 oz. (18 g) ginger powder
0.63 oz. (18 g) cardamom powder
Wyeast 2565 (Kölsch) or White Labs WLP029 (German Ale/Kölsch) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 150 °F (66 °C) for 90 minutes. Add first three spices with 10 minutes left in boil. Add remaining spices at knockout. Let sit 20 minutes before cooling wort. Ferment for two weeks in primary and four weeks in secondary at 60–65 °F (16–18 °C).

Peppershot Stout

by Chris Colby

(5 gallons/19 L, all-grain)

OG = 1.051 FG = 1.013
IBU = 35 SRM = 63 ABV = 5.0%

Ingredients

8 lbs. (3.6 kg) 2-row pale malt
1 lb. (0.45 kg) flaked barley
0.25 lbs. (0.11 kg) aromatic malt
0.5 lbs. (0.23 kg) crystal malt (120 °L)
0.33 lbs. (0.15 kg) chocolate malt
1 lb. (0.45 kg) roasted barley (500 °L)
9.4 AAU East Kent Goldings hops
(1.7 oz/48 g of 5.5% alpha acids)
2.5 oz. (71 g) whole black peppercorns
4.0 oz (118 mL) Bacardi 151-proof rum
Wyeast 1056 (American Ale) or White Labs WLP001 (California Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Prepare peppershot solution: Crack 2.5 oz. (71 g) of pepper and return to (glass) spice jar. Fill jar with Bacardi 151 rum and let sit for 3 days. **Brew stout:** Mash grains at 154 °F (68 °C) for 1 hour. Boil for 90 minutes, adding bittering hops for final hour of boil. Ferment at 70–72°F (21–22 °C) for 5–7 days, then rack to secondary. Bottle with corn sugar.

Add spice: In bottling bucket or keg, slowly stir in 1.33 oz. (40 mL) of peppershot solution. Do not add solids from or entire peppershot preparation. (**WARNING:** If peppershot solution gets on your hands, wash them before touching your mouth, nose, eyes or any other sensitive part of your body.)

as well, but nothing that should deter the adventurous homebrewer. The basic questions come down to when to add the spices, deciding on the best utilization method — adding during the boil or fermentation — and with which spices, to attain the maximum results and in what quantities.

When to Add Spices

Spices can be added virtually anytime during the brewing process, from the boil to secondary fermentation. Usually they are added directly into the wort (though spice bags can be used). Most spices will partially dissolve, leaving behind insoluble plant material (such as cellulose), which sinks to the bottom of the vessel. When to add depends on the strength of the spice and how much flavor the brewer wishes to infuse into the brew. Adding spices late in the boil — the last 15 minutes — usually allows for enough flavor characteristics to come through, while also providing a good aroma. Spices added early in the boil may bring out more of the flavors, possibly even too much, but there is a risk of sacrificing aroma qualities. Early spice additions are not recommended.

"Some spices may be more delicate and a longer boil would drive off aromas or extract undesirable bitter characters," explains Boston Beer Pilot Plant Manager, Grant Wood.

Arthur agrees, noting that stronger spices — such as cloves, cinnamon, nutmeg, heather and gale — may become too overpowering if boiled too long. "Some spices are going to have some real bitterness to them, so the longer you boil them, the more of that bitterness that is going to be extracted," he says. "You should go easy on the overwhelmingly powerful spices and use less. Other spices you can use as much as you want to get the infusion you want, but you'll have to play with it a bit to find what you like."

Left Hand Brewing Company Head Brewer Scott Christoffel thinks he has found a solution by adding spices several times during the boil to assure both flavor and aroma, something he does with Left Hand's Juju Ginger Ale. "I think errors can occur (with some spices) by adding them too soon as you can lose too much of the aromas," he says from his Longmont, Colorado brewing facility where he also produces XXXmas Ale using ginger, organic orange zest, cinnamon, cloves and cardamom. "Sometimes, put (the spices) in both early and late so you get a bit more of both (aspects — flavor and aroma). In the Juju, we add ginger with the three hop charges, so you can think of adding spices like hopping. (Each stage) builds different flavors and aromas. The trick of where to add depends on what you are looking for."

During Fermentation

Another option is adding spices during the fermentation stage. Many spices actually become more pronounced, such as vanilla or licorice,

Christoffel notes, because aromas are not being boiled off and the flavors will still penetrate the beer. Most brewers agree that, with the exception of the more pungent spices like cloves or anise, more spice should be added to the fermenter to increase extraction rates that would require less spice during the boil.

Not all spices, however, work as well during the conditioning stage and may actually respond very differently when boiled. "Some additions, like the orange peel, you want to boil," says Christoffel as an example. "You'll get the pithiness going, that will create a little orange flavor at the end. Or if you add it in the conditioning vessels you'll get just the clean clean aroma of it. It will be a much cleaner taste. If you put it in the conditioning tank it won't affect the palate as much."

It is important to note that if adding spices during fermentation, adding to the secondary fermenter is recommended. During a vigorous primary fermentation, spices have the potential to get caught in the airlock or venting tube and clog things up. Additionally, the carbon dioxide can a carry some of the more subtle aromatics away.

While Wood agrees spices can be used during fermentation, spices used in all Boston Beers are boiled. "Exposing the spices to heat is always a good idea," he says, noting that as an agricultural product, spices are not the only things that grow in the dirt. "Heat helps kill undesirable microorganisms that might spoil the beer."

Additionally, using spice essences and oils, while concentrated and economical may effect head retention. When possible, the use of fresh or dried herbs and spices will negate this issue.

How Much?

Therein lies the dilemma. As with any homebrewing adventure, variety is the spice of life and using spices in beers means really experimenting with them. It is important to find out what levels are going to take a spice over the top — how much is too much — and thereby avoid overpowering brews. All three brewers agree that, while it may be possible to get away with heavy

spicing occasionally, a subtle approach in the beginning will go a lot further than the overzealous addition of spice. Unlike using hops and knowing exact IBUs before adding them, there is no definitive guideline for spice additions.

Blending

Brewers who keg their beers have one option to deal with overly spicy beers — blending. If a keg of beer is too spicy, unspiced beer can be added to it to bring down the spice levels. This assumes the brewer has a suitable beer on hand for this or is willing to take the time to brew a batch of beer specifically for blending. (This need not be a full-sized batch, depending on how much volume is required to dilute the spice flavors.) Brewers who add their spices directly to the keg can plan on blending by transferring 4 gallons (15 L) of beer to the keg and withholding another gallon in a jug. The kegged beer can be progressively spiced until it's just a little overdone, then blended down to perfection.

Spice Extracts

Another option for adding spices is to make extracts of them. This also allows the brewer to gauge the strength of the spice. Spices can be boiled in water or extracted in alcohol. This (sanitary) spiced extract can then be added to the beer. To boil, put the spices in a pan with water and boil them for 15 minutes or less. Cool the sample and either use immediately or place in a sealed glass jar. To make an alcohol extract, take a small glass jar and fill it roughly three quarters of the way up with spice. Fill the jar with alcohol — vodka is a good, neutral liquid for this — and let it sit a few days.

However you prepare the spice extract, you can run a "bench" test to see how much of it is needed to flavor your beer. To do this, pour a small amount (4 oz./118 mL) of beer into a series of glasses. (You can use commercial beer for this if you don't want to waste homebrew.) With an eyedropper, add your spice extract to the glasses. Double the amount added to each subsequent glass (i.e. one drop in the first glass, two in the second, four in the third and so on). Once you find a level of spice you like, spice your beer at that rate. A drop of liquid is approximately 0.1 mL and there are 160 4-oz. (118-mL) glasses of beer in a 5-gallon (19-L) batch of beer. So, the number of drops in your 4 oz. (188 mL) sample glass times 0.1 mL per drop times 160 glasses per 5 gallons (19 L) is the volume of spice solution to add to your 5-gallon (19-L) batch of beer.

"When it comes to spices you just need to play it straight forward," advises Christoffel. "It is easier to go slowly forward than to make something that is so out of whack that you have to go backwards, which is not always possible to do." Perhaps Wood sums it up best, "When in doubt, use less." ■

Glen BurnSilver is a frequent contributor to BYO.

by **HORST DORNBUSCH**

ICE BLOCK

EISBOCK

A Potent Winter Brew

PHOTOS COURTESY OF KULMBACH.DE

THIRSTY BEER LOVERS ENJOY EISBOCK AT KULMBACHER'S ANNUAL FESTIVAL IN EINBECK, GERMANY

Eisbock, or "ice strong beer," sounds both forbidding and inviting. It has a forbidding ring, because it conjures up images of frigid temperatures, ice and snow. Yet, it comes across as inviting, too, because it also conjures up images of winter's antidote: a warming, nourishing and comforting brew — one that is rich, strong, and rewarding.

Both aspects of the eisbock are, of course, true. Icebocks rank among the world's most potent brews. They are true winter beers. As members of the Bavarian bockbier family, they have all the characteristics of a typical strong beer, only more so. They are much maltier and smoother even than the doppelbocks, and they are at least as powerful as the average strong ale, such as the barley wine, stock ale, Scotch ale, Russian imperial stout or Trappist triple. In an eisbock you can taste the alcohol, but as a rounded fiery afterglow, not as a harsh, up-front assault on the palate.

While a bockbier usually has at least 6% alcohol by volume (ABV), and doppelbock at least 7%, most eisbocks have an alcohol by volume level of 8 to 9%. Some have much more. The mystique of the eisbock is probably uniquely exemplified by the EKU 28 Kulminator Urtyp Hell, brewed in the northern Bavarian city of Kulmbach, the reputed place of origin of the eisbock. The alcohol-by-volume level of the EKU 28 reaches approximately 13%, in some years more, in some years less. To put this into perspective, the average Bavarian lager has an alcohol level of about 4.5 to 5.5% ABV.

While a high-alcohol beverage, such as a Scotch whiskey, is made by distilling beer (without hops), an eisbock is made by freezing the beer until the water turns into ice crystals. Separating the ice from the still-liquid portion of the brew has an effect similar to distilling. The more ice you remove, the greater the alcohol concentration in the beer that's left behind. The key taste difference between distillation and freezing is in the amount of flavor that remains in the finished beverage. In distillation, you leave not only water but also much of the malt aroma behind, and you drink what you take out of the brew. In

EISBOCK by the numbers

Virtual OG	1.080–1.130 (20–33 °P)
Virtual FG	1.020–1.030 (4–7.5 °P)
SRM	12-24
IBU	18-22
ABV	8-13%

freezing, on the other hand, you discard what you take out (water) and drink what is left behind, and that includes most of the malt flavors.

This is as good a place as any to mention that making eisbock in the US is probably illegal. Although there is no specific law forbidding homebrewers from freeze-concentrating their beer, distilling alcoholic beverages is definitely illegal. Commercial brewers are allowed to remove 0.5% of the volume of their beer as ice when making ice beers, but this is nowhere near enough volume to make an eisbock.

Eisbock and Ice Beer

Eisbock is different from so-called "ice beer," a fad brew that was invented by Labatt's of Canada in the 1990s. The Canadian frozen brew is filtered, which takes out not only the ice, but also a large portion of the tannins and alpha-acids. The German frozen brew is carefully strained off the ice, thus preserving and concentrating not only the alcohol, but also all the complex aromas that we associate with a great bock. The ice beer process reduces lagering times and the main goal is to more efficiently reduce the polyphenol (astringent) portion of the brew. The ice is returned to the beer in North American beers to get around distilling regulations.

The Tale of the Frozen Casks

It is not entirely clear where and when the first batch of eisbock was made, but there is one persistent legend that circulates among German brew historians. It places the origin of eisbock in the city of Kulmbach, at around 1890. The legend may not be true, but it sounds plausible. Besides, it is a good yarn!

According to that (tall?) tale, a brewery lad — after a long day of toil in front of the mash tun — was too tired in the evening to roll the casks of finished bockbier from the brewery yard back into the cellar as the brewmaster had told him to. He figured that there would be no harm in leaving them outside until morning. That night, however, turned out to be bitter cold and the beer inside the casks froze solid. By the time the brew crew returned the following morning, the staves of the casks had burst open. It appeared to all that the entire lot of wonderful bockbier had been ruined. As the brewers inspected the frozen brew more closely, they discovered that, at the very center of each cask, a small pool of murky, brownish liquid had collected. The brewers were unaware that alcohol has a much lower freezing point than water, and that it became concentrated as the beer froze in the casks from the outside in. As the water froze, the alcohol also transported with it all the essence of the bockbier's malty flavor to the center. Thus was born, allegedly, the eisbock, a beer style that is still made today according to the principles that operated on that bitter cold wintry night in Kulmbach. (Of course, modern breweries use glycol cooling on the tanks.)

Making a Bock for Eisbock

You can make an eisbock-type beer from virtually any base brew. In its homeland of Bavaria, however, it is usually made from a doppelbock (with an OG above 1.068), and sometimes from a bockbier (with an OG between 1.064 and 1.068). Its color can vary greatly, from deep golden to deep ruby. It can be a barley beer or a wheat beer. It can even be an ale. The "pre-eisbock" recipe, therefore is merely a guideline. Feel free to deviate from it if you wish. My simple recommendation for all-grain brewers: Make as strong a brew as your system allows you to. Making a bock or doppelbock is a form of high-gravity brewing. If you are an extract or partial-mash brewer, original gravity is not an issue because you can freely compose the ratio of extract and water to suit your target brew. For this reason, all-grain brewers might also want to consider "cheating" just a bit. Should you find your kettle gravity wanting, simply bump it up with malt extract.

If you chose to follow the recipe and make your eisbock as a lager, follow the German regimen for cold fermentation, which, in many parts of North America, can be done without refrigeration this time of year, provided you have a basement or garage where the temperatures remains in the range of 40–50 °F (4–10 °C). Because you are dealing with high-gravity worts, make a yeast starter. You want to ensure a vigorous start of your fermentation.

The Freezing Process

Once the bockbier or doppelbock is fully fermented and racked off its lees, consider how you will freeze it. You will probably do this in a horizontal or vertical freezer. Measure the inside dimensions of your freezer to make sure that your container fits. If necessary, freeze several small containers instead of one large one.

Avoid glass containers, such as jugs or carboys. Buckets would be advisable, both for safety and because you can get access to the beer with a sieve. If you are worried about rupturing your airlock, fill it with vodka instead of water.

The first eisbock keg of the season is ceremonially tapped, signaling the beginning of the festival.

If you live in an area where Mother Nature is cooperative, you can, of course, do as the legendary Kulmbach brewers did. Simply park your brew outside on the balcony or in the garden buried in snow if you wish, for a day or two. If you rely on nature to freeze your eisbock, however, keep in mind that your starting bockbier or doppelbock requires a long lagering period, of at least eight to 12 weeks (longer is better!). You must plan ahead, therefore, so that your brew is ready when the first severe frost is most likely to hit your area.

Set the freezer to at about 24 °F (-4 °C) and leave the brew for about 10 hours. It is OK to set the temperature even lower. However, the lower your freezer setting, the more ice crystals will form, and faster. Obviously, if you

eisbock RECIPES

ICE BLOCK Eisbock

(5 gallons/19 L, all-grain)

Foundation Doppelbock:
OG = 1.078 FG = 1.020
IBU = 20 SRM = 14 ABV = 7.4%
Eisbock:
"Virtual" OG = 1.105
"Virtual" FG = 1.027 ABV = 10%

Ingredients

6.3 lbs. (2.9 kg) Pils malt (such as Weyermann Pilsner at 1.5–2.1 °L)
9.0 lbs. (4.1 kg) Munich (such as Weyermann Type II at 8.8–11.1 °L)
1.5 lbs. (0.7 kg) Caramel malt (such as Weyermann Caramunich at 53–60.5° L)
6.0 AAU Hallertauer Magnum hops (bittering)
(0.4 oz./8.5 g of 15% alpha acid)
1.0 oz. (28 g) Hallertauer Mittelfrüh hops or equivalent (flavor/aroma)
2 packages of Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager) or White Labs WLP920 (Old Bavarian Lager)
1 package Wyeast 3347 (Eau de Vie) (for Speise/kräusening)
1/2 cup DME or corn sugar

Step by Step

Dough-in at a temperature of approximately 122° F (50° C). Let the mash rest for half an hour. Infuse mash with near-boiling water until the temperature reaches 148° F (64° C). Rest for 15 minutes. Infuse again to raise the temperature to 156° F (69° C) for another 15-minute rest. Sparge with 180 °F (80 °C) water. Make sure the mash temperature does not exceed 170 °F (77 °C). Lower the sparge water temperature, if necessary. Sparge for an hour and a half. End sparge at a kettle gravity of about 1.060 (15°P). Evaporation losses during the boil should bring this wort up to about 1.078 (19.5°P).

Boil for about two hours. Add bittering about 45 minutes into the boil). Add the flavor and aroma hops about 5 minutes before shutdown. Let wort settle. After half an hour, siphon about 1 quart (~1 liter) into a sterile, sealable container. This will be your Speise for priming. Heat-exchange as close to the fermentation temperature of 48° F (9° C) as your setup allows. Aerate the cool beer, pitch the yeast and let ferment. Do not expect the FG-value to get below 1.020 (5 °P). Rack the brew and pull its temperature down gradually by 2–3 °F (1–1.5 °C) a day to as close to as possible to approx. 28 °F (-2 °C). Lager the brew for of at least 8–12 weeks. Freeze, prime and condition as described in the main text. You will need to remove 1.3 gallons (4.9 L) of water as ice to yield a 10% ABV eisbock. You will have 3.7 gallons (14 L) of beer remaining when the ice is removed from the foundation beer.

ICE BLOCK Eisbock

(5 gallons/19 L, partial mash)

Foundation Doppelbock:
OG = 1.076–1.085 FG = 1.019–1.021
IBU = 20 SRM = 14 ABV = 7.4–8.2%
Eisbock:
"Virtual" OG = 1.105
"Virtual" FG = 1.027 ABV = 10%

Ingredients

7.0 lbs. (3.2 kg) Weyermann Bavarian Maibock liquid malt extract
3.5 lbs. (1.6 kg) Weyermann Bavarian Dunkel liquid malt extract
1.5 lbs. (0.7 kg) Caramel malt (such as Weyermann Caramunich at 53–60.5 °L)
6.0 AAU Hallertauer Magnum hops (0.4 oz./8.5 g of 15% alpha acid)
1.0 oz. Hallertauer Mittelfrüh hops or equivalent (flavor/aroma)
2 packages of Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager) or White Labs WLP920 (Old Bavarian Lager)
1 package Wyeast 3347 (Eau de Vie) (for Speise/kräusening)
1/2 cup DME or corn sugar

Step by Step

Coarsely mill the caramel malt and place in a muslin bag in about 2 gallons of cold water and raise the temperature over half an hour to 170-190 °F. Lift bag out of steeping liquid, rinse with several cups of cold water, and discard. Fill your kettle to the usual volume and boil. Turn off heat and stir in both extracts. Bring back to a boil for two hours. Add bittering hops 45 minutes into boil and flavor/aroma hops at shutdown. Follow the all-grain instructions for finishing the Doppelbock and the main text for freezing, priming, and conditioning.

ICE BLOCK Eisbock

(5 gallons/19 L, extract only)

Foundation Doppelbock:
OG = 1.069–1.078 FG = 1.019–1.020
IBU = 20 SRM = 14 ABV = 6.7–7.4%
Eisbock:
"Virtual" OG = 1.105
"Virtual" FG = 1.027 ABV = 10%

Ingredients

5.5 lbs. (2.5 kg) Weyermann Bavarian Maibock liquid malt extract
5.0 lbs. (2.3 kg) Weyermann Bavarian Dunkel liquid malt extract
4.5 AAU Hallertauer Magnum hops (0.3 oz./8.5 g of 15% alpha acid)
1.0 oz. Hallertauer Mittelfrüh hops or equivalent (flavor/aroma)
2 packages of Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager) or White Labs WLP920 (Old Bavarian Lager)
1 package Wyeast 3347 (Eau de Vie) (for Speise/kräusening)
1/2 cup DME or corn sugar

Step by Step

Mix the two malts with your hot brewing water in the kettle. Bring the wort back to a boil and add the bittering hops. Boil for one hour. Follow the all-grain instructions and the main text for the remaining instructions on finishing your eisbock.

leave your brew out during a frosty night, you have no chance of "regulating" your freezing temperature. Either way, though, there is no danger that you will crystallize alcohol, because ethyl alcohol freezes only at -179 °F (-117.3 °C).

The easiest way to separate the ice crystals from the beer is to scoop them out of the brew. For this method, freeze the brew in a container with a wide opening, such as a food-grade plastic bucket with a lid. Be sure to leave an inch or two of head space, because the brew will expand during freezing.

Sterilize an ordinary household sieve in boiling water and let it cool off. Then simply dunk it carefully into the bucket and scoop the ice crystals into the sieve's hemisphere. Be sure to lift the sieve very slowly out of the brew, because you do not want to create too many drips, which could cause aeration and thus oxidation of the finished beer. As any brewer knows, oxygen is the chief enemy of a beer's keeping quality.

Separate the ice from the liquid in as cold an environment as possible to prevent the ice from melting back into the brew. If you live in the right climate, strain your eisbock on a below-freezing day, outside . . . and wear gloves!

If you leave the brew in the freezer for too long or at too low a temperature, eventually, solid ice will develop around the inside wall of the container, and you will need to siphon, instead of scoop, the brew off the ice.

You do not have to do this all at once. If your first "ice harvest" yielded less volume reduction than you planned, simply return the brew to the freezer and, perhaps, lower the temperature by a few notches. Then try again. Repeat until you have collected enough ice in total to suggest that your eisbock is at your desired target alcohol level, which, following commercial examples, can be between 8% and 13%. Thaw the harvested ice in a measuring cup to determine what volume has been removed.

To figure out how much ice you need to remove, you start with the rough alcohol content of your starting foundation brew.

Let's assume that you started out, before fermentation, with a doppelbock wort of OG 1.078, which ended at an FG of 1.020. This brew has an alcohol content of roughly 7.4% ABV. Let's further assume that you ended up with exactly 4.5 gallons (576 fl. oz. or 17 liters) of finished beer after racking, which means that you have about 42.624 fl. oz. (576 fl. oz. x 7.4%) or 1.26 liters of alcohol dispersed in your beer. To determine the volume you need to end up with after the removal of ice crystal, assuming you are aiming for a 10% ABV eisbock, divide the amount of alcohol (42.624 fl. oz. or 1.26 liters) by the target ABV (10%, in our case). The result is 426.25 fl. oz. (3.33 U.S. gallons or 12.6 liters).

In other words, you must remove 149.75 fl. oz. (576-426.25 fl. oz.) of water (in the form if ice crystals) to make a 10% ABV eisbock of from the 4.5 gallons of 7.4% ABV foundation doppelbock. This is a volume reduction of about 26%.

Priming and Conditioning

Once you have removed all ice crystals from your eisbock, siphon the beer gently into a fresh carboy or Cornelius keg. Again, avoid aeration as much as possible.

From the description of the ice removal process, it is clear that the beer you end up with no longer contains a noticeable amount of carbonation. Whatever carbonation there is stems from the ability of liquids to retain greater amounts of carbon dioxide as their temperature drops.

The modern beer drinker, however, expects a bit more effervescence than that, even from a high-alcohol eisbock. At this stage, unfortunately, regular priming has no effect for two reasons. Any yeast left in suspension will most likely be dead, and if it weren't, it would not be able to metabolize any priming agent because of the high ambient alcohol level.

Modern commercial eisbock makers, of course, have no problem at this point because they simply percolate the proper amount of carbonation into the brew in the conditioning tank under pressure. If you own a kegging system,

set it to about 10 psi at a cellar (and drinking) temperature of roughly 50°F (10°C). Eisbock should be adequately carbonated within about 24 hours.

If you do not own a CO_2-system, you have no choice but to use a so-called speise for kräusening the brew with fresh wort and high-alcohol tolerant yeast. For this you need to preserve about 1 quart (or 1 liter) of sterile wort, taken from the kettle at the end of the boil. Keep it in a sealed container in the refrigerator until two days before you plan on separating the ice from the beer. Let the speise warm up to room temperature. Inoculate it with a package of extremely high gravity yeast such as Wyeast 3347 (Eau de Vie), and shake the container vigorously for at least a minute to aerate the starter thoroughly.

After you have separated the ice from the beer, return the beer to a mixing vessel (carboy or Cornelius keg). Let the eisbock warm up to room temperature. This is essential because you do not want to shock the kräusening yeast into dormancy. Once the speise with the alcohol-tolerant yeast has started to ferment vigorously, add it to the eisbock. Then package the eisbock either for bottle-conditioning or leave it in the sealed Cornelius keg.

Such conditioning with speise, however, represents the brewer with an insolvable dilemma: Most eisbocks are lagers, but there is no high-alcohol tolerant lager yeast available. All high-alcohol-tolerant yeast strains that I know of are ale yeasts. Unfortunately, therefore, if you do not own the requisite equipment for artificially carbonating your eisbock in a keg, your ale yeast priming constitutes a departure from authenticity. Subjectively, I do not believe that using an ale yeast for priming/conditioning is fatal, because only a relatively small portion of the overall fermentation is carried out by ale yeast. Also, an ale-type eisbock is not necessarily undesirable. In fact, one of the most sublime eisbocks I have ever had was a limited edition, dark ruby-colored, Schneider Aventinus Weizen-Eisbock. This weizen-eisbock wheat ale is made from a weizen-doppelbock with an OG of 1.074 (18.5° P) and an ABV of 8%. After this brew is frozen and separated from the ice crystals to turn it into weisen-eisbock, the alcohol level jumps by one-half to 12% ABV.

After you have added the speise, condition the eisbock in bottles or in a keg at room temperature. Conditioning may be very slow, given the eisbock's high alcohol level. It may take about four weeks or even longer. You will either have to taste the brew periodically for effervescence, or you can play it safe and allow for about six weeks of conditioning. After conditioning, bring the beer down to a cellar temperature of about 50 °F (10 °C) for storage. This is also the temperature at which you should serve it. ■

Horst Dornbusch is Brew Your Own magazine's "Style Profile" columnist.

BREWING the BIG ONES

tackling ULTRA HIGH gravity beers

by **Bill Pierce**

There's something to be said for sitting back on a long winter's night and pouring yourself a good strong beer. The complex aromas, rich flavors, full body and soothing warmth all combine to produce a satisfying experience for any real beer lover. Surely this is one of the pleasures of being a homebrewer. Such styles — including barley wines, imperial stouts, "wee heavy" Scotch ales, doppelbocks and strong Belgian ales — represent some of the boldest examples of the brewer's art and beckon the homebrewer to pull out the stops and push the envelope in terms of gravity and alcohol. To some extent we all harbor an urge to show what we have and boast that "mine's bigger than yours" — in a friendly way, of course.

However, brewing strong beers presents some challenges that need to be addressed and overcome. They raise the bar and increase the chances for failure. Producing a balanced and properly fermented beer with an OG above 1.100 and corresponding ABV of 10 percent or more requires planning, patience and skill in executing.

This article attempts to explain some of the challenges and potential pitfalls of very high gravity brewing and present some techniques and tips for brewing and fermenting that increase the odds for success. There's no reason you can't produce strong beers that are the rival of some of the biggest, and best, beers in existence.

How High Can You Fly?

As you might expect, there is a limit to how high you can go. In general, without heroic measures that are beyond all but the most committed homebrewers, the highest OG that can be expected to be fermented with any degree of success is 1.150 and the resulting 15 percent alcohol by volume, and even this is risky. This should be considered the summit of Mt. Everest in terms of ability and experience. Those who go higher do so at their own peril and with strong warnings.

The Right Stuff

Obviously, strong beers demand more ingredients than their more normal counterparts. In the simplest terms, alcohol is produced from sugar digested by the yeast, and so it requires more sugar to produce more alcohol. It also requires more yeast, which we'll deal with shortly.

More ingredients mean larger brewing vessels, especially for mashing if you are an all-grain brewer. For example, for every 20 lbs. (9 kg) of grain, you'll need about 10 gallons (38 L) of space in your mash tun. To a somewhat lesser extent, larger vessels also are needed for boiling and fermenting. High gravity beers are usually boiled longer to drive off more water and concentrate the wort. Depending on the style, compared to a normal recipe you might increase the boil time 15 minutes for every 10 specific gravity points over 1.080. Additionally, high gravity fermentations can be quite vigorous, requiring more fermenter headspace to contain the beer without foaming over as it ferments, as well as room for any fermentables that may be added later.

It is worth considering brewing smaller batches of high gravity beers, which are stronger and normally consumed in smaller quantities than lower strength beers. This also reduces the cost of ingredients and makes it easier to use your present equipment. High gravity mashes are lower in efficiency because more of the sugars are left behind; all-grain brewers should plan on a reduction of 10 percent or more in their normal brewhouse efficiencies and increase the amount of grain accordingly. Plan on using proportionally more bittering hops as well. The higher gravity boil reduces hop utilization and stronger beers need more

PHOTO BY CHARLES A. PARKER/IMAGES PLUS

Yeast Strains
(for when your yeast is straining)

In order to brew a good high gravity beer, you need a yeast strain that is alcohol tolerant and performs well in big beers. Finding these yeasts is not too hard if you just look. For example, many yeast strains have names that give them away. White Labs makes a yeast called Super High Gravity Ale (WLP099), which they claim can ferment up 25% ABV. Likewise, Wyeast makes a strain called Trappist High Gravity (3787), which they claim can reach 12% ABV. Wyeast also makes a yeast called Belgian Strong Ale yeast (1388) and White Labs Dry English Ale yeast (WLP007) used to be called High Gravity English Ale. (It is recommended for strong English beers.) With a little research into what yeast strains are recommended for what style beers, you can find other good high-gravity strains. Here are some other yeast strains that perform well in high gravity fermentations:

Strong American Ales
White Labs WLP001 (California Ale)
Wyeast 1056 (American Ale)

Strong English Ales
White Labs WLP002 (English Ale)
Wyeast 1968 (London ESB Ale)

Strong Scottish Ales
White Labs WLP028
(Edinburgh Scottish Ale)
Wyeast 1728 (Scottish Ale)

Strong Belgian Ales
White Labs WLP530
(Abbey Ale)(15%)
White Labs WLP500 (Trappist Ale)
Wyeast 1214 (Belgian Ale)
Wyeast 1762 (Belgian Abbey II)

Very High Gravity Lagers
White Labs WLP885
(Zurich Lager) (11%)

Non-beer Yeast Strains
(for finishing high-gravity beers)
White Labs WLP715
(Champagne yeast)
Wyeast 3021 (Champagne yeast)
Wyeast 3347 (Eau de Vie) (21%)

hops to balance the sweetness of the additional malt. An increase of 30–50 percent in the bittering hops is not unwarranted, depending on the beer's original gravity.

Extract brewers are at less of a disadvantage when brewing high gravity beers because they can merely increase the amount of extract needed. In fact, all-grain brewers should consider augmenting the grain with a portion of extract to boost gravity. Don't be overly concerned that the extract will change the flavor. Nor should you balk at the idea of using various sugars or honey as a means of boosting the gravity without greatly affecting body.

One method sometimes used by wine and mead makers with ultra high gravity fermentations (OG above about 1.120) and which brewers can imitate is to initially ferment a more reasonable gravity (below 1.100) to completion and then gradually augment it with additional fermentables over time. Sometimes a fresh charge of yeast is also pitched. Fermentation restarts as the yeast digests the newly added sugars with less stress than if they had been included at first. This is also a means of "sweetening" a beverage that has finished too dry and is recommended by producers of yeasts intended for such fermentations.

Possibilities for the additional fermentables include corn sugar, white table sugar, brown sugar, molasses, honey, maple syrup, sorghum syrup and boiled and cooled wort brewed from either extract or grain. Be careful, however, with some of these, especially dark brown sugars or molasses, syrups and darker honeys; they can make a considerable flavor contribution. The reputation sugar has for producing cidery flavors is greatly exaggerated; this is not a problem if it is used for up to about 20 percent of the total fermentables. Honey may be used to 35 percent or more, with some decrease in body.

Ultra high gravity wort can be prepared for these additions. For a yield of two quarts with an OG of about 1.150, dissolve 1.63 lbs. (0.74 kg) light dry malt extract (about 5 cups) or 2 lbs. (0.9 kg) liquid extract (somewhat more than 2.5 cups) in a little less than 3 quarts (2.8 L) hot water and bring to a boil for 30 minutes before chilling. To reduce the body, substitute up to 20 percent sugar for the extract. This wort can be brewed ahead of time and stored in sealed, well-sanitized containers in the refrigerator for up to about a month. It can also be canned and stored unrefrigerated; a pressure canner and proper sanitary home canning practices are strongly recommended.

Add these fermentables gradually to the beer once the initial fermentation subsides, perhaps a pound or two of sugar or honey or two quarts of wort each week. The relatively small increase in gravity does not shock the yeast and allows for more complete fermentation of the sugars. Chill or warm the additions to room temperature before adding them to the fermenter and stir them gently with a sanitized spoon or paddle. Be sure to allow for the additional fermenter space they will require.

It's All About the Yeast

The biggest single challenge of high gravity brewing lies with the yeast. The problem is two-fold: the high sugar content stresses the yeast and the high alcohol content eventually kills it. The first can be partially overcome by pitching a large population of healthy yeast and aerating the chilled wort extremely well, the second by selecting a strain that is more alcohol tolerant.

You can pitch additional packets of dry yeast, but using liquid yeast for high gravity beers requires making a starter. Instructions for a starter are included with the yeast and are also posted on the websites of the major yeast producers. Strongly consider "stepping up" the starter a second time for a truly pitchable population. This is excellent insurance against a stuck fermentation; it's all but impossible for homebrewers to overpitch. A 1.5-gallon (5.8-L) or larger starter is not too much for a 5-gallon (19-L) batch of very high gravity beer. Once the starter has finished fermenting and the yeast has settled out, you can pour off most

of the starter liquid and pitch primarily the thicker yeast sediment.

An alternative and very successful practice is to reuse the yeast from a previous fermentation. Use the desired yeast strain to ferment a batch of another more normal gravity beer (so that the yeast is not overly stressed by the high gravity). Time the brewing schedule so that the first beer will be ready to rack to secondary when you brew the high gravity beer. Rack the beer off the yeast sediment to the secondary fermenter and immediately siphon the chilled and aerated high gravity wort onto the "yeast cake" in the primary fermenter. This will result in a large population of healthy yeast and very little risk of infection if you practice good sanitation. Fermentation will begin rapidly. Homebrewers can also use yeast harvested from a secondary fermenter and "refreshed" with a bit of fresh wort.

Yeast require oxygen for healthy reproduction, and this is especially so for high gravity fermentations. In the first few hours prior to the beginning of fermentation the yeast will consume all the oxygen dissolved in the wort. Moreover, the higher gravity allows less oxygen to be dissolved. Commercial breweries introduce oxygen or filtered compressed air into the wort just after it has been chilled; many homebrewers also do so with an airstone and aquarium pump or compressed oxygen cylinder. As a less adequate measure you should at least aerate high gravity wort by pouring it back and forth seven or eight times from a height of several feet between sanitized buckets. Do this after chilling; aeration of hot wort is generally to be avoided because it can promote premature staling of the beer.

There is some evidence that continued aeration after pitching will produce a healthier, more complete fermentation. Some commercial breweries aerate high gravity wort again after 12–48 hours in order to provide additional oxygen that has been depleted by yeast that is continuing to reproduce. The benefits have to be weighed against the risk of oxidizing the beer once fermentation has begun.

ULTRA HIGH gravity recipes

St. Carolus Honey Imperial Porter

(5 gallons/ 19L, all-grain)

OG = 1.094 (Before honey added)
OG = 1.123 (After honey added)
FG = 1.020 IBU = 50
SRM = 36 ABV = 13.9%

Ingredients

10 lbs. (4.5 kg) pale malt (US 2-row)
1.0 lbs. (0.45 kg) chocolate malt (US)
1.0 lbs. (0.45 kg) crystal (60 °L)
1.0 lbs. (0.45 kg) flaked barley
1.0 lbs. (0.45 kg) Belgian biscuit malt
0.75 lbs. (0.34 kg) Belgian special B malt
3.0 lbs. (1.4 kg) light dried malt extract
4.0 lbs. (1.8 kg) light honey
21 AAU Centennial hops (60 min) (2.0 oz./57 g of 10.5% alpha acids)
7.5 AAU Willamette hops (10 min) (1.50 oz. of 5.00% alpha acids)
1 tsp Irish moss fining
Wyeast 1728 (Scottish Ale) yeast (yeast cake from batch of previous lower gravity beer)
Champagne yeast

Step by Step

Mash the grains in 4.61 gallons (17 L) of water at about 170 °F (77 °C) to yield a mash temoperature of 158 °F (70 °C). Mash for 90 minutes. Boost temperature to 168 °F (76 °C) with boiling water and hold at this temperature for another 10 minutes.

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

Primary fermentation should take approximately four to five weeks at 68 °F (20 °C).

Once complete, pitch two packets of rehydrated dry champagne yeast. Add 1 lb. (0.45 kg) honey every 4-5 days and wait for fermentation to subside before racking to secondary. Secondary Fermentation (conditioning) should take approximately 6 months at 68 °F (20 °C). For bottling, prime with 91 grams (about 3/4 cup) corn sugar for 2.5 volumes CO_2. Pitch an additional package of rehydrated dry champagne yeast.

St. Carolus Honey Imperial Porter

(5 gallons/19L, extract with grains)

OG = 1.097 (Before honey added)
OG = 1.123 (After honey added)
FG = 1.020 IBU = 55
SRM = 44 ABV = 13.9%

Ingredients

13.2 lbs. (6.0 kg) amber liquid malt extract
0.75 lbs. (0.34 kg) American chocolate malt
0.75 lbs. (0.34 kg) Belgian special B malt
3.5 lbs. (1.6 kg) light honey
21 AAU Centennial hops (60 min) (2.0 oz./57g of 10.5% alpha acids)
7.5 AAU Willamette hops (10 min) (1.50 oz./43 g of 5% alpha acids)
1.0 tsp Irish moss (boil 15 min)
Wyeast 1728 (Scottish Ale) yeast (yeast cake from previous batch lower gravity beer)

Step by Step

Steep specialty grains for 30 minutes in 1.5 gallons(5.7 L) of 150 °F (66 °C) water. Strain and add the runoff to the extract and additional water for boiling. Boil for 90 minutes, adding hops at the times indicated in the recipe. Primary fermentation should take approximately four to five weeks at 68 °F (20 °C).

Once complete, pitch two packets of rehydrated dry champagne yeast. Add 1 lb. (0.45 kg) honey every 4–5 days and wait for fermentation to subside before racking to secondary. Finish by following the directions given in the all-grain recipe.

Some of the sherry-like flavors resulting from oxidation are not considered flaws in barley wines and old ales, for example.

The Right Strain for the Job

Almost as important as pitching rates and wort aeration for high gravity brewing is yeast selection. Assuming an adequate population of yeast and good aeration, ordinary beer strains are alcohol tolerant to a limit of about 10 percent by volume, which makes them suitable for beers with an OG up to about 1.100. Look for descriptions in the catalogs that mention their suitability for high gravity fermentations.

However, for higher alcohol levels and gravities, beer yeast may not be enough. At this point you have several choices. Yeast intended for wine and cider fermentation is sometimes used instead of beer strains. Some of these, especially champagne yeast, tend to result in slightly different flavor profiles with a more dry finish. One way to preserve a more beer-like flavor profile and achieve a higher alcohol content is to initially pitch a beer strain and then add a second high alcohol yeast when fermentation subsides or when the beer is racked to secondary. Don't aerate when pitching additional yeast; this can oxidize the beer.

For very high and ultra high gravity fermentations, it may be necessary to use special yeast. Champagne yeast is tolerant to 15–16 percent ABV, and there are strains specifically developed for even higher alcohol tolerance. Two of them available to homebrewers are White Labs WLP099 (Super High Gravity Ale) and Wyeast 3347 (Eau de Vie). These are also used for very strong wines, ciders and meads. The producers of these strains recommend brewing at a lower original gravity and then augmenting it with additional fermentables later for best results. Distillers yeast is also available, but this does not have a known track record in homebrews.

The stressful fermentation, high alcohol content and long secondary conditioning times for high gravity beers can inhibit bottle carbonation. Several of these styles are not known for high carbonation levels but others, especially Belgians, can be relatively well carbonated.

It is recommended to pitch additional yeast at bottling. Often champagne yeast is used because of its relatively neutral flavor and high alcohol tolerance. Don't worry that this yeast will digest the residual sugars and result in an overly dry or overcarbonated beer. The bottling yeast is more than happy to ferment only the readily digestible priming sugar.

Patience, Grasshopper

Assuming that you pitch a large population of healthy yeast and the wort is well aerated, expect a vigorous fermentation, especially early on. But also understand that the yeast has a long, hard job ahead of it and that this requires some time. Ignore recipe instructions that specify a particular time period for fermentation. Take periodic specific gravity readings and trust these as a far better indicator of fermentation progress than appearance or time. Don't be overly concerned if it takes weeks rather than days.

It's a good idea to "rouse" the yeast once fermentation begins to slow. In a high gravity fermentation some of the yeast can flocculate, or drop out of suspension, before it has had a chance to do its job. Rousing consists of gently but thoroughly stirring the yeast sediment throughout the beer. Use the long end of a sanitized spoon or paddle that will reach to the bottom of the fermenter. This brings more yeast back into contact with the beer and promotes a more complete fermentation. It also mimics the historical practice of breweries that fermented strong beers in large wooden casks. Periodically the casks were rolled across the brewery floor to rouse the yeast; this was sometimes referred to as "taking the beer for a walk."

How low the terminal gravity will go is difficult to predict. In general, you should achieve an attenuation of at least 60 percent, that is, 60 percent of

the sugars (as expressed in the original gravity "points") should be consumed during fermentation, with an upper limit of perhaps 85 percent. Within that range, attenuation is highly dependent on the composition of the sugars in the wort, the yeast strains and the original gravity. Many but not all strong beer styles have a lot of body and residual sweetness that is the result of a high final gravity.

High alcohol beverages usually improve with age. After all, many wines and whiskies are aged for years. The situation is somewhat similar for most strong beers. When fermentation has subsided, any supplementary fermentables have been added and the beer is close to its target final gravity, rack it to a secondary fermenter and exercise some patience.

Glass or stainless is recommended for long secondary fermentations; plastic can admit air and result in oxidation over time. Plan on keeping the beer in secondary for several months or even up to a year or more. This will help to mellow the strong alcoholic bite sometimes referred to as "rocket fuel" as well as to develop the rich, complex flavors typical of strong beers. If you are curious, take an occasional sample to judge this for yourself. The high alcohol content and high gravity make these beers largely immune to autolysis, but you should check the airlock periodically to ensure that it doesn't dry out and admit air.

Another long period of aging after bottling is also beneficial. Store the bottles in a place out of the sun and not subject to wide temperature swings. If you can, resist the considerable urge to consume the beer while it is still young. The "shelf life" of such strong beers is measured in years rather than months or weeks.

There will be subtle aroma and flavor changes over time; many of these are considered desirable and the mark of a properly aged and conditioned beer.

Mission Accomplished

Strong beers are a lot like regular beers — only more so. The challenges are greater, but so is the satisfaction with the end product. Pay attention to the process, especially to yeast management and aeration, and have patience; eventually you will be rewarded accordingly. The additional investment in ingredients and time pay off in a truly memorable beer of grand proportions.

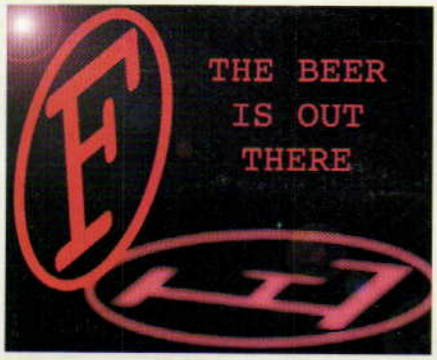
Some commercial strong beers, especially those that are brewed seasonally, have a "vintage date" indicating the year they were brewed. Aficionados sometimes hold "vertical tastings" to compare the differences among the various vintages and how they change over time. If you like traditions there is no reason you couldn't do the same with your own strong beer recipe.■

Bill Pierce studied brewing at the Siebel Institute of Technology.

8 BIG novelty BEERS OF THE DIXIE CUP

by Bev D. Blackwood II

The Dixie Cup in Houston, Texas has long been noted as one of homebrewing's most eccentric homebrew competitions. Organized by the Foam Rangers homebrew club, there's always something offbeat and unusual. One cherished Dixie Cup tradition is honoring homebrewing pioneer and author Fred Eckhardt each year with a different theme to commemorate the event. Another tradition that has been flourishing is the annual novelty beer category, which is almost inevitably a high-gravity beer with an unusual ingredient. Frequently, the style is tied to the event theme, but not always. One year the style was malt liquor and the entries were submitted in 40 oz. bottles, wrapped in brown paper bags. The sight of BJCP master judges passing around a bottle of homebrewed malt liquor out by the hotel dumpsters has become a classic memory. The Dixie Cup novelty category forces homebrewers to think "out of the carboy" and thrives on account of their boundless creativity.



Dixie Cup 1999 — The Fred Files

Homebrewers who attended the 1999 Dixie Cup — The Fred Files — know that "The beer is out there." The category description for the 1999 novelty category was also out there: Big and Stupid. The style guideline described the style as: "Dedicated to those big and stupid beers that only a homebrewer could hope to love. Use your imagination, but it must be drinkable." The brewer had to specify the reasons why the beer should be considered stupid. As we found out, "stupid" is a relative term.

Panther Pee

By Donald Sadja

(5 gallons/19 L, extract with grains)

O.G. 1.105 F.G. 1.035

IBU = 90+ SRM = 44 ABV = 9.0%

Don Sadja relates how he came up with his stupid idea. "I thought: Why not use a great imperial stout recipe as a base and do something stupid like add raspberry flavoring to it." Apparently not so stupid, as it produced a very drinkable beer!

Ingredients

12.0 lbs. (5.4 kg) dark malt extract
0.5 lb. (0.22 kg) roasted barley
0.25 lb. (0.11 kg) flaked barley
0.25 lb. (0.11 kg) black patent malt
0.75 lb. (0.34 kg) Special B malt
1.0 lb. (0.45 kg) oatmeal
36 AAU Nugget hops (75 minutes)
(3 oz./85 g of 12% alpha acids)
1 oz. (28 g) Fuggles hops (15 minutes)
1 oz. (28 g) Cascade hops (15 minutes)
Wyeast 1728 Scottish Ale yeast
(1/2 gallon starter for primary fermentation)
1/2 cup brown sugar (for priming)
4 oz. (188 mL) apple juice (for priming)
4 oz. (188 mL) raspberry flavoring
1/2 package White Labs WLP013 (London Ale) yeast (conditioning)

Step by Step

Steep grains at 155 °F (68 °C) for 30 minutes. Add the dark malt extract and water to make 5.5 gallons (21 L). Boil for 75 minutes, adding hops at the times indicated in the ingredient list. At bottling, add 1/2 cup brown sugar, 4 oz. apple juice, 1/2 pkg. London Ale yeast and a 4 oz. bottle of raspberry flavoring. Condition for nine months at 68 °F (20 °C), then enjoy.

24 Carrot I.P.A.

by Bev Blackwood

(5 gallons/19 L, all-grain)

O.G. 1.074 F.G. 1.020

IBU = 60 SRM = 22 ABV = 7.0%

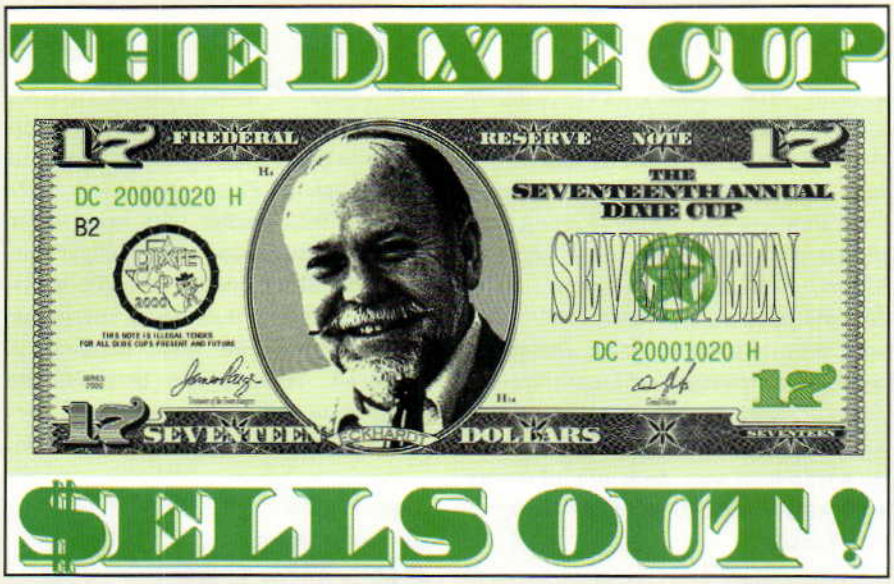
While Don's beer may not seem very stupid, the third place beer — my own 24 Carrot IPA — was exactly that. An India Pale Ale brewed with a truly stupid ingredient, 24 pureed organic carrots. The beer retained the vegetal character of the carrots and seemed a little more orange than usual. However, the defining moment came during judging when Randy Mosher, noted on his judging sheet that the beer was "dry carroted" and defined the mouthfeel as "crunchy." In truth, the carrot stick included in the contest bottle picked up a lot of the hop character of the I.P.A. and proved to be quite tasty, as was the beer!

Ingredients

12.25 lbs. (5.6 kg) Maris Otter malt
1.75 lbs. (0.8 kg) medium British crystal malt
1.25 lbs. (0.57) Belgian Caravienne malt
3.5 lbs. (1.6 kg) organic carrots
15 AAU First Gold hops (first wort hops)
(2.0 oz./57 g at 7.5% alpha acids)
15 AAU Challenger hops (10 mins)
(1.5 oz./43 g at 7.5% alpha acids)
1.0 oz Cascades hops (0 minutes)
1.0 oz. Cascades (dry hop)
White Labs WLP013 (London Ale) yeast

Step by Step

Single infusion mash grains for 1 hour at 158 °F (70 °C). Boil wort for 60 minutes. Add peeled and pureed organic carrots (appoximately 24 of them, depending on the size) to primary fermenter.



Dixie Cup 2000 — The Dixie Cup Sells Out

In 2000, the Dixie Cup "sold out" accepting sponsorships, posting banners and slapping Fred's face on the17 dollar bill. It also brought the now common "Imperial Beer" category to the Dixie Cup. Inspired by John Maier of Rogue Ale's I²PA and Imperial Pilsner, as well as Full Sail's Imperial Porter, we encouraged our brewers to "kick it up a notch." The guideline stated: "Imperial Beers are not for the weak-willed. These beers go to 11. Any recognized BJCP beer style may be brewed, but it must meet the Czar's standards. Specifically, the beer must exceed the maximum original gravity specified by the BJCP style guidelines by no less than 20 gravity points."

Imperial Beers were judged based on how well the increased gravity was handled while still conforming to the style guidelines of the base beer. Interestingly, there's a new competition that has taken this concept and run with it. It's the "X-Beer" competition, but it goes both ways, 20 points high and 20 points low on guideline.

Imperial Stormtrooper IPA

by Jimmy Paige
(5 gallons/19 L, all-grain)
O.G. 1.090 F.G. 1.024
IBU = 82 SRM = 20 ABV = 8.5%

Foam Ranger Jimmy Paige took first place that year with an Imperial IPA which he claims was more "like an American barleywine at the time it was judged." Age when judged at 2000 Dixie Cup was approximately 7 months old. Jimmy claims he named the beer Imperial Stormtrooper because "that was the only thing I could think of with the word 'Imperial' in it."

Ingredients

7.0 lbs. (3.2 kg) English Maris Otter two-row pale malt
7.0 lbs. (3.2 kg) Schreier domestic pale two-row malt
2.0 lbs. (0.91 kg) home-roasted amber malt (using Randy Mosher's recipe for roasting)
(The brewer can substitute Victory malt or Belgian aromatic malt for this ingredient.)
1.5 lbs. (0.68 kg) light Munich malt
0.5 lb. (0.23 kg) domestic wheat malt
0.25 lb. (0.11 kg) Special B malt
0.25 lb. (0.11 kg) Carastan malt
0.25 lb. (0.11 kg) CaraPils malt
7.2 AAU Chinook hops
(first wort hopping)
(0.6 oz./17 g of 12% alpha acids)
6 AAU Nugget hops
(first wort hopping)
(0.5 oz./14 g of 12% alpha acids)
10.4 AAU Columbus hops (30 minutes)
(0.8 oz./23 g of 13% alpha acids)
4.5 AAU Centennial hops (20 minutes)
(0.5 oz./14 g of 9% alpha acids)
3.0 AAU Nugget hops (20 minutes)
(0.25 oz./7 g of 12% alpha acids)
10 AAU East Kent Goldings hops
(15 minutes)
(2.0 oz./57 g of 5% alpha acids)
0.68 AAU English Fuggle hops
(15 minutes)
(0.15 oz./4.3 g of 4.5% alpha acids)
0.25 oz. Nugget hops (10 minutes)
1.0 oz. Centennial hops
(dry hop at 7 days)
1.0 oz. Centennial hops
(dry hop at 17 days)
Wyeast 1968 (London ESB Ale) yeast

Step by Step

Single infusion mash for 60 minutes at 153 °F (67 °C) with 6.0 gallons (23 L) of water treated with 1/2 teaspoon each gypsum and calcium chloride. Bottled at 31 days and primed with 2.0 oz. (56 g) dried malt extract

Texas Imperial Brown

by David Cato
(5 gallons/19 L, all-grain)
O.G. 1.080 F.G. 1.021
IBU = 90+ SRM = 37 ABV = 7.6%

American Brown ale was once referred to as Texas Brown ale, since the Dixie Cup was the first competition to recognize the style. In honor of that, David Cato brewed his Texas Imperial Brown Ale, which is more or less a brown I.P.A. It's a richly flavored beer and very hoppy, appropriately enough with Amarillo hops. It took 2nd place in the Imperial Beer category.

Ingredients

13.5 lbs. (6.1 kg) Maris Otter
1.0 lb. (0.45 kg) aromatic malt
1.0 lb. (0.45 kg) biscuit malt
0.5 lb. (0.23 kg) British medium crystal malt
0.5 lb. (0.23 kg) chocolate malt
34 AAU Amarillo hops (60 minutes)
(4.0 oz./113 g of 8.5% alpha acids)
17 AAU Amarillo hops (30 minute)
(2.0 oz./57 g of 8.5% alpha acids)
2.5 oz. (71 g) Amarillo hop (10 mins)
2.0 oz. (57 g) Amarillo hops (0 mins)
3.0 oz. (85 g) Cascade hops
(dry hop for 3 weeks)
Wyeast 1272 (American Ale II) yeast

Step by Step

David recirculated at 154 °F (68 °C) for 1 hour with his RIMS system. David wasn't overly happy with his brew day. "My efficiency sucked that day, but I did get close to 1 IBU per gravity point, which should count for something." So should a second place finish at the Dixie Cup!

Dixie Cup 2001 — La Copa Dixie

La Copa Dixie, the 2001 Mexican themed Dixie Cup, featured a classic style (Herb, Spice & Vegetable) "tweaked" for the usual high gravity requirements. Add chili peppers and alcohol and you have: La Cerveza que Quema Dos Veces (AKA: The beer that burns twice) Starting with enough alcohol to warm any palate, beers entered in this category required an original gravity of not less than 1.070. Add to that a healthy dose of chili peppers, enough to make the eyes water, (but still remain in balance) and you have the fabled Beer That Burns Twice. If it burned three times, we didn't want to be around for it! It should be noted that the beers were judged on the basis of overall balance and "burn." Drinkability was encouraged, but not mandatory!

Chili Head Fred

by the Austin ZEALOTS
(5 gallons/19 L, all-grain)
O.G. 1.099 F.G. 1.025
IBU = 78 SRM = 14 ABV = 9.6%

Marc Martin headed a group of Austin ZEALOTS who were out to make a name for themselves at the Dixie Cup. Marc, the Primary Fermenter, Corey Martin the Secondary Fermenter, and another key member, Keith Bradley, decided they should honor the ever present Fred Eckhart by brewing a clone of that famous namesake barley wine made by Hair-of-The-Dog brewing, "Fred." After a lengthy (12 hour) brew day and six months of aging, two quarts were tapped from the keg and sliced Jalepeno, Serrano and Habanero peppers were steeped in the cold brew. Spoonfuls were tasted at 8–12 hour intervals until just the right level of heat was present to mingle with the malt and hops. Balance with a lingering heat was the goal and it was obviously achieved, since it took home first place!

Ingredients

14.6 lbs. (6.6 kg) Moravian two-row pale malt
2.1 lbs. (0.9 kg) Belgian aromatic malt
1.7 lbs. (0.77 kg) flaked rye
1.25 lbs. (0.57 kg) Belgian candi sugar
3.8 AAU Progress hops (120 mins) (0.63 oz./18 g of 6% alpha acids)
4.7 AAU First Gold hops (120 mins) (0.63 oz./18 g of 7.5% alpha acids)
4.7 AAU Brewers Gold hops (120 mins) (0.63 oz./18 g of 7.5% alpha acids)
2.5 AAU Liberty hops (120 mins) (0.63 oz./18 g of 4% alpha acids)
2.8 AAU Fuggles hops (30 mins) (0.63 oz./18 g of 4.5% alpha acids)
5.3 AAU Amarillo hops (30 mins) (0.63 oz./18 g of 8.5% alpha acids)
5.0 AAU Northern Brewer hops (30 mins) (0.63 oz./18 g of 8% alpha acids)
0.63 oz. (18 g) Mount Hood hops (10 mins)
0.63 oz. (18 g) Saaz hops (10 mins)
0.63 oz. (18 g) Styrian Goldings hops (10 mins)
0.63 oz. (18 g) Chinook hops (10 mins)
Wyeast 1728 (Scottish Ale) yeast (1000 mL starter)

Step by Step

Single infusion mash for 1 hour at 156 °F (69 °C). Boil for 150 minutes. Fermentation at 68 °F (20 °C) for 10 days. Rack to secondary and condition for seven days at 65 °F (18 °C). Perform a diacetyl rest for 2 days at 75 °F (24 °C). After six months of conditioning, use 2 qts. (1.9 L) of beer for the pepper infusion. De-seed and slice the following: 1 large Jalepeno, 2 small Serranos and 2 medium Habaneros. (Use 10 times as many peppers for full 5-gallon (19-L) batch.) Place peppers in a 2-quart (1.9-L) pitcher with beer, cover with foil and place in refrigerator. Taste a tablespoonful at eight hours and then every 4–6 hours thereafter until the desired level of heat is achieved. Transfer the beer off the peppers to a 2-L soda bottle and carbonate with 15 pounds carbon dioxide.

Wee Hottie

by Kuyler Doyle
(5 gallons/19 L, all-grain)
O.G. 1.073 F.G. 1.025
IBU = 20 SRM = 25 ABV = 6.2%

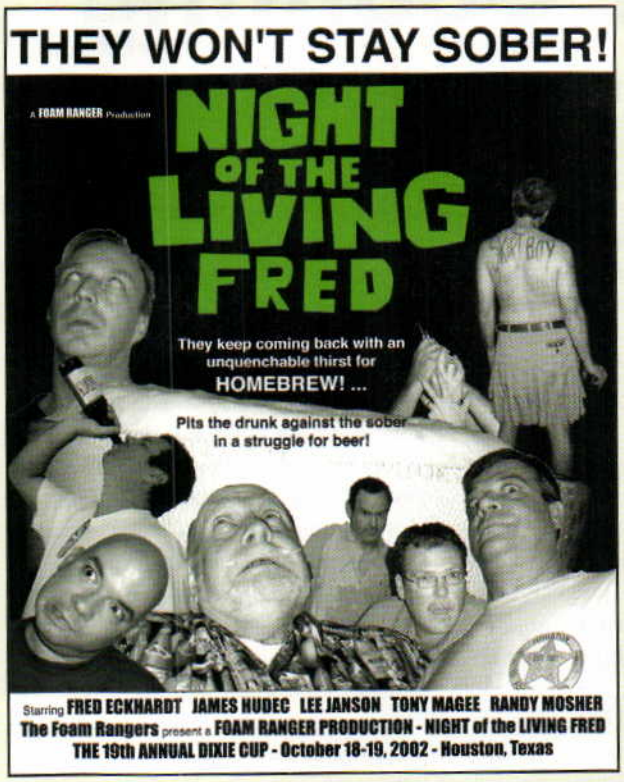
Kuyler Doyle's "Wee Hottie" took second place behind the ZEALOTS entry. Kuyler's choice was dictated by the style's primary ingredient. "I thought the malty sweet character of a Scotch ale would pair well with spicy heat from chiles," states Kuyler. "Since Scotch ales are allowed to have a smoky flavor, I went with that as the link. I added some rauch malt to the blend and used smoky chipotle peppers for the heat and flavor." Like the ZEALOTS, Kuyler did a spinoff of a 5-gallon (19-L) batch. The recipe below has the peppers scaled up for full a 5-gallon (19-L) batch.

Ingredients

11.5 lbs. (5.2 kg) Maris Otter malt
1.0 lb. (0.45 kg) smoked rauch malt
1.0 lb. (0.45 kg) British CaraPils malt
0.5 lb. (0.23 kg) Belgian aromatic
0.5 lb. (0.23 kg) Belgian CaraVienne
0.25 lb. (0.11 kg) British medium crystal malt
0.25 lb. (0.11 kg) British chocolate malt
5.5 AAU U.K. Target hops (75 mins) (0.5 oz./14 g of 11% alpha acids)
1.1 AAU U.K. Fuggles hops (15 mins) (0.25 oz./14 g of 4.5% alpha acids)
0.25 oz. U.K. Fuggles hops (0 mins)
Wyeast 1728 (Scottish Ale) yeast

Step by Step

Single infusion mash at 158 °F (70 °C) for 90 minutes. Add to the secondary: 40 chipotle peppers and 40 serrano peppers, seeded and sliced.



Dixie Cup 2002 — Night of the Living Fred

2002's Dixie Cup was "The Night of the Living Fred," an all around Halloween treat for everyone concerned. Naturally, the only thing needed was an appropriate novelty beer. Enter the Monster Mash! The beer required an original gravity of at least 1.070 (a monster wouldn't want it any other way). The next step was to add your favorite Halloween candy to the beer. The main requirement was that the candy had to be a recognizable part of the flavor component and had to complement the beer.

Whopper Stout

by Kuyler Doyle
(5 gallons/19 L, all-grain)
O.G. 1.063 (without added malted milk)
F.G. 1.022
IBU = 55 SRM = 62 ABV = 5.3%

Foam Ranger Kuyler Doyle was successful again with his "Whopper Stout." Inspired by that year's "Fred Tasting" pairing of stouts and chocolate, Kuyler "Figured that malted milk and chocolate from Whoppers in a beer would be a good thing." However, he was confronted with the issue of the cheap, oily chocolate used in the actual candy. "I substituted Carnation's malted milk for the Whopper flavor," states Kuyler. "I used a blend of regular and chocolate flavor malted milk."

According to Kuyler, much of the malted milk settles on the bottom, but the flavor comes out in the finished product. Doyle credits part of the win to his pairing the beer with Whoppers during judging. (Entrants were encouraged to include samples with the entry.) The malted milk additions are an estimate, since the beer submitted was a "spin-off" of a larger batch.

Ingredients

8.75 lbs. (4.0 kg) pale malt
1.5 lbs. (0.68 kg) dark Munich malt
0.75 lb. (0.34 kg) British medium crystal malt
0.75 lb. (0.34 kg) British dark crystal malt
0.75 lb. (0.34 kg) chocolate malt
0.5 lb. (0.23 kg) Belgian aromatic malt
0.25 lb. (0.11 kg) British black patent malt
5.0 AAU Willamette hops (first wort hops) (1.0 oz./28 g of 5% alpha acids)
10 AAU Cascades hops (first wort hops) (2.0 oz./57 g of 5% alpha acids)
White Labs WLP001 (California Ale) yeast

Step by Step

Mash at 156 °F (69 °C) for 75 minutes with 0.5 teaspoons of gypsum added to mash water. Add a combination of Carnation malted milk flavor (regular and chocolate) to the secondary fermenter until the desired flavor balance is achieved.

Red Hot Blond

by Steve Hacker
(5 gallons/19 L, all-grain)
O.G. 1.088 F.G. 1.020
IBU = 15 SRM = 8 ABV = 8.8%

The second place winner took a completely opposite tack, with a blonde ale enlivened by a healthy addition of Red Hots, the bright red cinnamon candy. Again, the actual entry was a spinoff of a 5-gallon batch, so the amounts have been extrapolated.

Ingredients

16.25 lbs. (7.4 kg) Weyermann German Pilsner two-row malt
0.25 lb. (0.11 kg) Dingemans Belgian aromatic malt
0.25 lb. (0.11 kg) DeWolf Belgian biscuit malt
0.25 lb. (0.11 kg) Weyermann German Vienna malt.
0.5 lb. (0.23 kg) clear Belgian candi sugar (60 min)
5.0 AAU Styrian Goldings hops (60 mins) (1.0 oz./28 g of 5% alpha acids)
2.5 AAU Styrian Goldings hops (15 mins) (0.5 oz./14 g of 5% alpha acids)
Wyeast 1214 (Belgian Abbey) yeast

Step by Step

Mash at 145 °F (63 °C) for 90 minutes. Decoct approximately 2 gallons to 180 °F (82 °C) for first temperature increase. Twenty minutes later decoct 2 gallons of mash to 200 °F (93 °C) to step mash up to 155 °F (68 °C). 1 tsp. gypsum added to reverse osmosis water. 60 minute boil. Dissolve approximately 45 ounces of Red Hots in 40 ounces of water at 165 °F (74 °C). Add to wort and ferment.

Present and Future

By the time you read this, the 2003 Dixie Cup will be over. We received over 1,000 entries for this competition. In 2004, the Dixie Cup will celebrate its 21st birthday in 2004. Yes, we're finally legal! What will the novelty style be? Who knows? You can be assured it will be strong and it will be unique! ■

Bev D. Blackwood II is a member of the Foam Rangers homebrew club.

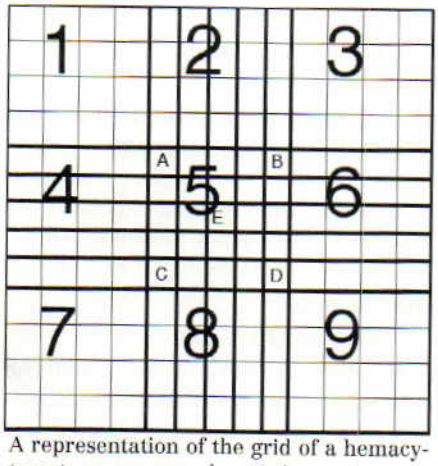
Yeast Counting

And assessing yeast health

Story by Chris Colby

There are many variables in homebrewing that are easy to calculate, but hard to actually measure. For example, if you record the original gravity of your wort and the final specific gravity of your beer, you can calculate the potential alcohol level in your beer. Actually measuring it, however, requires a device called a pycnometer and a highly sensitive scale.

Getting an accurate estimate of the amount of yeast in a sample, and the percentage of that yeast that is viable, also requires some special equipment. However, counting yeast is (arguably) one of the easiest and most useful of advanced homebrewing techniques. With an accurate cell count, you can know what your actual pitching rate is and fine-tune it, if needed. Once you round up the necessary equipment, the procedure is straightforward. The following methods will help you quickly estimate how much yeast you have and what shape the yeast are in.



A representation of the grid of a hemacytometer as seen under a microscope.

Equipment

To count yeast, you will need a microscope, a hemacytometer and some methylene blue stain. In order to be useful for yeast counting, a microscope should have at least a 100X objective (lens). A substage light source with a dimmer is also a big plus.

A hemacytometer — or "blood cell counter" — is a specialized microscope slide. Since yeast cells are roughly the same size as blood cells, hemacytomers also work well for counting yeast. The hemacytometer has a silvered band running across its center. The silvered section has two tiny grids etched on it. Using a special coverslip, made of quartz, a known volume of liquid is trapped above each square on the grid. Once you count the number of cells in this small volume, you can multiply this density by your total volume to estimate the total number of yeast cells in your sample.

Methylene blue is a type of stain that yeast cells will eliminate if they are healthy. Thus, in a sample of yeast cells, unstained cells are healthy — or at least healthy enough to continue processing the stain inside them. Stained cells are dead or dying.

New microscopes can be purchased from scientific supply companies, but most are expensive. If you live near a university or other school, you may be able to buy an older student model from a biology department or medical school. Hemacytometers and methylene blue can be found at scientific supply companies as well.

Viewing yeast

Before you use your hemacytometer, you should get comfortable with viewing yeast with your microscope. As when viewing any object, begin by placing the sample on a microscope slide and viewing it with the lowest power objective, usually 4X or 10X. To do this, take a drop of your yeast sample, put it on a slide and place the slide on the microscope stage. If you want, you can cover the sample with a cover slip. For best results, use a fairly dilute sample of yeast, not a drop of concentrated yeast sludge. A slightly cloudy sample from a mostly-fermented yeast starter or batch of beer is a good place to start.

Focus the scope using the coarse focusing ring, which is almost always the outer of the two focusing rings. Once you've focused, switch to the next highest-powered objective until you reach 100X. Each time you switch objectives, focus the microscope — now using the fine focus knob.

The biggest key to comfortably viewing yeast is to adjust the amount of light shining through your sample. Yeast are nearly transparent and, if you are viewing them with bright lighting, they will be completely washed out. On most scopes, there are two ways to adjust the lighting levels, the light source and the substage diaphragm. For best results, turn the light source to its brightest setting, then adjust the amount of light downward by slowly closing the diaphragm until the yeast are clearly visible. If your field of view is still too bright with the diaphragm closed all the way down, turn down the light source.

Once you get used to viewing yeast, try staining them. Place a drop of a dilute yeast sample on a slide and cover it with a cover slip. Now place a drop of methylene blue on the slide next to the cover slip. Stain will migrate under the cover slip by diffusion. Once this happens, blot up the remaining stain with a tissue and view the yeast as before.

The hemacytometer

To count a sample of yeast, place the coverslip over the hemacytometer. There are grooves on each side of the hemacytometer that will be partially covered by the coverslip. Using a Pasteur pipette or an eyedropper, place a drop of the sample in both of the grooves. Liquid will move by capillary action from the grooves to beneath the coverslip. Once the hemacytometer is loaded, put it on the microscope stage.

On low power, search the silvered part of the hemacytometer for a grid that looks like the graphic above.

There are two such grids on the slide. You won't see the numbers and letters on the actual grid — I've simplified the diagram a bit for our purposes. The heavy lines will actually be three closely spaced fine lines and the smallest squares — such as those labeled A through E — will be subdivided into 16 smaller squares.

Each of the nine squares has sides that measure 1mm. The coverslip sits 0.1 mm above these grids, so each grid encloses 0.1 mm^3. In essence, you count the number of yeast cells in a small volume and extrapolate to a larger volume. There are many ways to do this; I'll explain two.

Counting cells

If you want to get a fairly accurate count, and don't mind some drudgery, you can count all the cells in 5 of the nine grids in each of the two different clusters of nine grids. In other words, count all the cells in grids 1, 3, 5, 7 and 9 on both sides of the hemacytometer. If you want a quicker but less accurate estimation, count all the cells in the squares labeled A, B, C, D and E on both sides of the hemacytometer.

As you count, you will likely run into one question — what to do with cells that straddle the lines outside each square. Usually, cells on the line are counted on the bottom and right hand of the square, whereas cells on the top and left lines are not counted.

Calculations

Once you have your cell counts, you can easily calculate the density of your sample. This is just the total number of cells counted divided by the total volume of sample in the grids you counted. If you counted 10 "big" squares — squares 1, 3, 5, 7, and 9 on both sides of the hemacytometer — the total volume is 1.0 mm^3 (or 1 mL). So, if you counted, say, 168 cells total, you'd have a density of 168 cells/mL. If you counted 10 small squares, the total volume is 0.04 mm^3 (or 0.04 mL) — $\frac{1}{25}$ the volume of the big squares. If you counted 168 cells total in the small squares, you'd have a density of 168 cells per 0.04 mL. Multiply both numbers by 25 and you get 4,200 cells/mL. Once you've calculated the density of yeast cells, you can easily convert to actual number of cells. Let's say you have a 1 liter starter with a density of 5,500 cells/mL. Since there are 1000 mL in a liter, you'd have 5,500,000 (5.5 million) cells.

Dilution

Cell counts in fermenting worts can be in the millions of cells per milliliter. Even if you wanted to, you couldn't count a sample at this density using a hemacytometer. The cells would overlap themselves (perhaps several deep) and the grids counting would be impossible. So, when counting dense samples, you need to dilute your sample until you reach a density that is suitable for counting. Researchers who use this technique frequently shoot for cell counts around 200–500 in each "big" grid square.

When diluting, it's easiest to make 10-fold dilutions until you reach a countable density of cells. To do this, take 1 volume of your sample and add

it to 9 volumes of water. (A volume can be any amount you are comfortable with — a drop, a milliliter, an ounce, etc.) After you count your cells in the dilute sample and calculate their density, simply multiply by the dilution factor (10, 100, 1000, etc.) to calculate the density of the original sample.

Cell health

To obtain a measure of your yeast's health, count a number of cells and divide the amount of unhealthy or dead cells you encountered by the total number of cells. Unhealthy cells are those that are stained blue and the total count includes both stained and unstained cells. For pitching yeast, you ideally want less than 5% of the cells to be unhealthy. In order to get a reasonably accurate estimate of yeast health, you should count at least 200 cells. For the best results, pick a defined area and count all the cells within it. This will prevent you from picking and choosing the cells you count and potentially skewing your results. Do this procedure on a normal microscope slide, not your hemacytometer. When you add the stain, its volume will dilute your sample and throw off your estimation of density.

Application

By far the most useful application of cell counting is to measure your pitching rate. Most commercial ale breweries pitch at a rate around 1 million cells per mL per °Plato. (For example, for a 12 °Plato wort (SG 1.048), you'd want 12 million cells per mL.)

To assess your pitching rate, take your yeast starter and swirl it vigorously until all the yeast is in suspension and the starter looks uniformly cloudy. Take a sample of this and dilute it in 10-fold increments until you reach a countable density. (Be sure to swirl the sample each time before diluting.) Count your cells and calculate your density as above. Then, multiply the density of the sample by the volume of your yeast starter (in mL). This will give you your total number of cells in the starter. Take the total number of cells and divide by the volume of your batch of beer (in mL) — this is your total density of cells. Finally, subtract away the fraction of cells that are dead and this is your pitching rate.

For example, let's say you measured 56 million cells per mL in your starter sample and your starter was 2 L (or 2,000 mL) in volume. This would give you 112 billion cells in your starter. In a 5-gallon (19 L) batch, you'd have 5.8 million cells/mL. If 2% of your cells were dead, your pitching rate would be 5.68 million cells/mL.

Counting cells isn't the most thrilling activity in the world. However, an estimate of your pitching rate can lead to a solid fermentation and most importantly — great beer! ■

Chris Colby, editor of BYO and former biologist points out "if you think this is tedious, try counting fruit flies."

Intro to Caskology

Listen up class: It's time to talk about real ale

HoMeBrew ScIencE

by Steve Parkes

PHOTO BY TODD HAMMOND

Cask conditioned beers can be prepared and served from kegs of all dimensions.

In this article I will be writing about a subject dear to my English heart — cask conditioned beer. It will be useful to start with a definition of what I am talking about when discussing "authentic" cask conditioned beer (AKA real ale). The Oxford English Dictionary defines real ale as "a name for draft (or bottled) beer brewed from traditional ingredients, matured by secondary fermentation in the container from which it is dispensed and served without the use of extraneous carbon dioxide." This definition, however, need not be taken literally in order to produce a great ale. Real ales can be produced using modern ingredients, racked into a second container for serving and certainly can be dispensed using a protective layer of carbon dioxide. Cask conditioning allows a beer to be presented in a form that emphasizes its subtle nuances. A well-balanced beer will shine in this environment, allowing the palate to separate, enjoy and appreciate its balance.

Fermentation

Fermentation is carried out in the same way that it would be for most ales. A top cropping ale yeast will ferment the beer at temperatures ranging from 65–75 °F (18–24 °C). The fermenter will usually be open but could have a lid. The primary fermentation will take three to four days until the terminal gravity is reached.

As the gravity reaches 1.014–1.010, the thick and golden colored main crop of yeast will rise to the surface and will only remain there for a few hours — it must be collected at this time before falling back in. The beer will throw a final head of thick yeast about two inches thick that will form a crust protecting the beer underneath while the fermentation continues to the terminal gravity.

Maturation of beer

The beer must be prepared for cask conditioning to ensure consistency. It is important to ensure that an even yeast count be achieved before racking — it is difficult enough to control the fermentation occurring in the cask as it is, so care should be taken to ensure consistency in the parameters that can actually be controlled. Some brewers will filter beer then add a measured count of yeast back to the brew; others will fine the beer and do the same. The correct yeast count at racking should be between 1 and 3 x 10^6 cells/mL (based on the yeast strain) and the yeast should remain viable and healthy. There should be between 1 and 2 °Plato (1.004–1.008 SG) present in the beer for secondary fermentation. If fermentable extract needs to be added in the form of primings, then it is normally added just prior to racking. The beer should be transferred to a racking back (an open tank where newly fermented beer is held for a short period before maturing) prior to racking in order to ensure an even distribution of yeast and fermentable material throughout the beer. Brewers have a variety of options when it comes to sources of

TERMINOLOGY

alginate: auxiliary fining agent to aid in clarification of the beer in the cask

beer engine: hand operated suction pump designed to pull the beer from the cask and dispense it into the glass

cask: container for cask conditioned beer

cask breather: device that allows CO_2 to flow into the cask as beer is removed

firkin: a 9 imperial gallon, or 10.8 U.S. gallon cask.

isinglass: solution of collagen protein extracted from the swim bladder of the sturgeon (it aids the sedimentation of yeast on the bottom of the cask)

keystone: bung that seals the cask at the end through which the tap is hammered

priming: addition of fermentable sugar to the beer in the cask to feed the secondary fermentation

racking: filling the cask

reracking: filling a cask with cleared, or settled beer from another cask

shive: bung that seals the cask, at the side opening, through which the cask is vented

spile: wooden or bamboo peg used to vent the cask.

still age: rack for setting up casks for settling and serving

tap: the valve that is driven through the keystone for beer dispense, or connected to the keg to allow beer to be dispensed

tut: the plug in the middle of the shive through which the spile is driven

extract for secondary fermentation. These options are: sucrose, dextrose, wort, krausening and maltose syrup.

Anatomy of a cask

Traditionally casks were made from wood but now stainless steel is most common. Casks come in a variety of sizes with traditional names like: pin (4.1 imp. gal/5.4 U.S. gal), firkin (9 imp. gal/10.8 U.S. gal), kilderkin (18 imp. gal/21.6 U.S. gal), barrel (36 imp. gal/43.4 U.S. gal) and hogshead (54 imp. gal/64.8 U.S. gal).

Casks are the traditional round-bellied barrel shape with a hole for filling and venting located halfway down the side. On the flat end there is a hole for the tap. The casks are stored and served from their sides with the vent hole facing up and the tap hole facing down. The wooden or plastic bung for the tap hole is called the keystone. The yeast settles into the belly of the cask and clear beer can be drawn through the tap (above the yeast).

Keg alternatives

Sankey Keg

This is a single entry keg with a spear that removes beer from a small well in the bottom of the keg.

Hoff Stevens

This keg is similar to Sankey kegs in that it has a spear. The major difference is that the spear is made of plastic, is much thinner and runs down the inside of the keg wall but not into a well. Most of the yeast remains with the beer until the keg is empty.

Golden Gate

These kegs are different in that they have no spear. There is a vent in the top and a fitting for a tap in the bottom. If the keg is placed tilting away from the tap, it will be above the sedimented yeast and draw clear beer.

Cornelius Keg

These kegs, favored by homebrewers for serving vessels and sometimes fermenters, are typically 5-gallon stainless steel canisters with ball locks. These are the same kegs used by soda companies.

Finings

Finings are added to speed up the rate that the yeast will settle on the bottom of the cask. They will not work on a beer that is still fermenting, so care must be taken to ensure that the secondary fermentation has ceased before finings are added.

Isinglass

Isinglass is extracted from the swim bladder of the sturgeon and some tropical or sub tropical fish. The colorless, viscous liquid is rich in collagen, with a net positive electrical charge. The structure is like that of a large net that, when mixed with beer, attracts and binds the negatively charged yeast cells, some proteins, lipids and some of the antifoaming agents.

Auxiliary finings

Sometimes the beer will not drop sufficiently with isinglass alone and an additional fining agent can be used. This auxiliary fining agent may be derived from alginate, seaweed or silicates. Auxiliary agents are negatively charged and aid the removal of positively charged colloidal particles from beer. Many English brewers add them on a routine basis to beer just as it goes into the cask. They cannot be added at the same time as isinglass because the opposite charges will cancel each other out. Measure the rate of usage in the same way that the rate of isinglass was determined. Most brewers use them at a ratio of 3:1 in respect to isinglass.

Dry hopping

Some brewers will add whole hops to the beer in the cask to impart some hop aroma. The conditions in the cask favor the extraction of some of the essential oil components of the hop but not the alpha acids — hence imparting additional bitterness through dry hopping is not expected. 1/4–1 oz. of hops, often in the form of hop plugs, are added per cask as it is filled. Pellets should not be used because they cannot be properly separated from the beer when it is to be dispensed. Although many people profess to love hops, they are not particularly welcome when floating in your glass.

Finings will not cause hops to settle, but they tend to sink to the bottom of the cask naturally or sometimes float on the surface of the beer. The line connecting the cask to the beer engine should therefore have a strainer installed in it.

Whole hops present a problem when using kegs because they can cause problems with dispense through the spear and interfere with the tapping apparatus. Rogue Ales in Oregon places whole hops in a small bag inside the keg then staples the bag to the inside of the bung that is hammered into the side of the keg.

Still aging

Storage temperature is even more important with cask beer than with keg beer, as the flavor and the fining action can quickly deteriorate at elevated temperatures. Storing the beer at too low a temperature may cause it to become over-carbonated.

The beer should not be moved too many times or it will not clear. The cask should be still aged horizontally, not tilted forward or backwards to ensure that the yeast settles into the belly of the cask, not around the keystone. It can always be tilted slightly forward later to allow the cask to be emptied more efficiently. The still age may be shaped to hold a cask or may have a flat surface, which calls for the cask to be supported on wooden wedges called "scotches" or "chocks." There are usually three: two placed at the front to prevent rolling and one at the rear to adjust the tilt angle. The cask should rest on the chocks and not on the surface of the still age.

Venting

First, a solid wooden peg or hard spile is hammered gently through the tut in the middle of the shive. There will be a sudden escape of gas from inside the cask as pressure escapes. This peg is immediately replaced with a soft spile usually made from porous bamboo. (The soft spile is usually too short or soft to be hammered through the tut.) The beer will then "fob," or work through the porous peg, drawing excess CO_2 from the beer and settling down to equilibrium conditions for the given pressure and temperature.

Temperature control

The ideal serving temperature is "cellar temperature" or around 55 °F (13 °C). Traditional evaporative cooling methods may work if the beer can be served quickly. A hessian sack is laid over the cask and kept wet. Water evaporating from the sack cools the cask underneath. Another device is a saddle shaped cooling coil that sits on top of the cask and is covered by a decorated plastic cover. Cooling solution can be pumped around the coils using a regular beer cooler that is readily available in the U.S.

Tapping

Once the beer has finished working and has been given at least 24 hours to clarify, then it is ready to be tapped. It is possible to hammer in the tap without disturbing the settled yeast and finings, but this takes a little practice and skill. In theory, tapping can wait until just before the beer is served, but it can sometimes disturb the sediment — it is therefore advisable to tap a few hours before the cask is needed. The brass, stainless steel, or plastic tap should be cracked open slightly, held against the keystone, then hammered into the cask with one sharp hit from a rubber or wooden mallet. The first half glass poured from the cask will be cloudy, but the beer will soon be crystal bright. The line to the pump can then be threaded onto the tap, using a leather washer and a strainer to trap hop leaves and large particles.

Dispense

As beer is removed from the cask or the keg, something must flow into the container to replace it — traditionally this was just plain air and the resulting problems are obvious. The beer quickly lost what carbonation it had and was prone to infection from micro-organisms in the air. It is possible to filter the air entering the cask, but that does not help with carbonation. Replacing plain old air with CO_2 is a practice that maintains carbonation and eliminates the detrimental effects. The problem is allowing enough CO_2 to enter the cask or keg without creating pressure in the container. The "cask breather" was developed to allow CO_2 into the cask in order to replace the beer that had been removed and simultaneously allow excess CO_2 to be vented.

Gravity

The easiest way to serve cask conditioned beer is to hammer a tap through the keystone and pour the beer directly into the glass from the tap. The cask needs to be set up behind the bar and the bartender needs to be trained in proper pouring techniques. Under normal conditions, the beer will tend to pour without excess head using this method.

Beer engine

It is more likely that the beer will be stored away from the bar and delivered to the glass via a beer engine or hand pump. The beer engine is mounted on or through the bar and is a simple piston pump that pulls a measured amount of beer from the cask and delivers it to the glass with a single pull. Usually they are sized to deliver 10 oz. (296 mL) of beer per pull. They are fitted with a non-return valve to prevent beer from flowing back into the cask. There is nothing, however, that stops the beer from flowing through the pump if the cask develops enough of a pressure to push it. The line should be as short as possible and insulated.

Because cask conditioned beers contain a significant amount of live yeast, the lines must be thoroughly cleaned on a regular basis. They should not be left overnight with beer in them (running water through the lines every night certainly adds to the work involved in keeping cask beer). Modern beer engines dispense the beer through a "swan neck" spout, often with a sparkler attachment. In some parts of England, customers demand a tight creamy head on their beer and the sparkler is designed to force the small amount of condition in the beer into the head. Other beers benefit from being poured with a small head and some require no head at all. In the United States cask beer is often associated with the tight creamy head, so a sparkler is advisable.

Flavor differences

There is no doubt that the softer carbonation and warmer serving temperature affect the flavor of cask conditioned beer. Both carbonation and low temperatures can interfere with the perception of flavor and aroma. The additional time spent with the yeast results in a greater complexity of flavors.

Furthermore, fining rather than filtration means that less flavor is "filtered out" by the brewer. As discussed, dry hopping produces flavors and aromas that change as the beer ages. The higher fermentation temperatures will tend to result in more estery beers. Open fermentation along with the increased presence of oxygen throughout the process results in more oxidized flavor components. ■

Steve Parkes is the owner and lead instructor of the American Brewers Guild and head brewer at Otter Creek Brewing in Middlebury, Vermont.

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Baron's Premium Beer Kits

Brew King has released an innovation in prepared beer wort. A unique proprietary mashing system gives this wort incredibly high attenuation potential that leads to crisper, drier beers. The kits come in a bag-in-box container with two gallons of concentrated pre-hopped wort, fining agents, yeast and a packet of dry-hops (for certain styles). Water is the only ingredient homebrewers need to add — and boiling is not needed. Designed for 6-gallon batches, the 14 kit styles range from American lite to brown ale. All styles meet AHA specifications. For the advanced brewer who wants to modify their beer, full specs and recipe recommendations are available from retailers, including data on hopping, grains and liquid yeast. These kits are currently available at many homebrew stores. Visit www.brewking.com for a retailer near you.

New products by Hobby Beverage Equipment

Hobby Beverage Equipment has released two new products. The first is a line of MiniQuick Connect "quick" disconnects that have no moving parts. An O-ring seals the push and turn connection. The set contains eight female fittings, five male, one ½ to ⅜-inch reducer, and 12 feet of thick wall ½-inch nylon reinforced tubing.

The second product is a new version of the company's Affordable Conical fermenter. Hobby Beverage Equipment upgraded its existing conical fermenter to improve upon its design. The new fermenter does away with the racking port bulkhead fitting and the cut threads around the apex. New individually molded threads are welded into the thicker tank wall. This style is the same as the company's 8, 15, 25 and 40-gallon fermenters. They are also offering a sturdier 6.5-gallon tank. Contact Hobby Beverage Equipment at 909-676-2337 or email john@minibrew.com for details.

Muntons purchases Scotmalt Trading Ltd.

Muntons has purchased the Edinburgh based Scotmalt Trading Ltd. (Scotmalt). Scotmalt is a manufacturer of malt extract and their product range will complement the existing trade of Muntons malted ingredients. This purchase follows the successful acquisition of the Novartis malt extract business in 2001.

The Scotmalt purchase was completed on October 17, 2003 and encompasses all the trading activities of the business. Muntons has maltings in Suffolk, Yorkshire and Scotland. For more information, visit the Muntons Website at www.muntons.com.

The Complete Joy of Homebrewing: Third Edition

HarperCollins Publishers and Charlie Papazian have released the third edition of "The Complete Joy of Home Brewing." Papazian's laid-back style and easy-to-follow instruction have inspired millions to try their hand at home brewing. Over 1-million copies of the first two editions have been sold, making "The Complete Joy of Home Brewing" the most popular book about beer ever published. It is considered the seminal text for the beginning homebrewer. In addition to being the founder and president of The Association of Brewers, Papazian is an internationally known lecturer and beer festival organizer. For more information, ask your local homebrew shop or find the book on HarperCollins' online catalogue at www.harpercollins.com/catalog.

Craigerator kegerators

Craig Jones has started an artistic venture in converting old refrigerators into one of a kind pieces of functioning art. What better kind of functioning art could there be than one that dispenses beer? He began to make what he calls "Craigerators — custom kegerators by Craig" and has put them on sale. The very first "Craigerator" is called the "Bone Box." It's a 1958 Hotpoint refrigerator with complete nut and bolt restoration. The entire fridge was taken apart, cleaned, stripped, sandblasted, powder coated, refurbished and painted. The insulation was replaced with high density foam. The electrical components were completely replaced. Pieces were custom fabricated and to finish the project, a high quality, custom paint job was applied. Over 100 hours went into the Bone

Box's transformation, and it can now be bought for $2,200. A white pearl paint was used to illustrate "ghost" skulls and bones that appear when light hits them. The Refrigerator handle is constructed of a human femur bone and, according to Craig, "this is legal!" Craigerator #2 came out at the end of June. The "Devil May Care," is a 1953 GE fridge with another hellishly fun design concept. A dual tap system makes having two flavors more fun than one. This fridge sports a candy apple flame paint job, a custom devils tail, pitchfork taps, a see through freezer door with red neon and chrome flame handles. Fabric devil's tail magnets can be repositioned at will. The price tag: $5,200. More concepts are in development, ranging from a custom car fridge to an alien theme called, "Science Experiment #7." For a more detailed look and purchase information, visit www.craigerator.com.

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Wedding Wheat

The one that almost got away

by Thomas Miller

Nine years ago, I proposed to my wife-to-be. Our wedding day was set. In my heart-of-hearts, I wanted the moment of our marital union to be unforgettable. There would be guests and gifts, cake and crying. Standard wedding day stuff — but there had to be that little twist to mark the day as ours.

So I dug deep and brewed a special batch of beer. Several batches of German Wheat beer, in fact. My homebrewing mind figured the blood, sweat and tears expended on those many gallons of handcrafted brew would demonstrate an eternal commitment to my blushing bride.

I can recount with fond memories the outstanding qualities of this beer — the traditional clove and banana characteristics achieved through the use of two yeast strains, the wonderful turbidity out of the bottle, the thick, clinging head. Guests from across the country clamored for their next bottle. What did not find its way down someone's gullet was spirited away to all points of the compass: Montana, Wisconsin, Florida, and Ohio became the final resting places of those few straggling bottles.

Skipping forward to the present, my mother, divorced since 1980, married a wonderful man during the summer of 2003. Their day contained some of the youthful vigor of my wedding day, minus the homebrew. The bar was stocked with bottles from one of Cleveland's finest microbreweries, so I found myself with plenty to enjoy.

Weeks pass and they have purchased a new home. My wife and I (now laden with three young children) received this Saturday morning phone call:

"Hi Tom. It's mom."

"Good Morning."

"What are you doing?"

"Sharpening a chainsaw so I can cut up that huge tree on the side of the house."

"Oh, really? That sounds fun."

"I should have skipped the beers last night," I confessed. "What's up with Bob and you?"

"We're moving into our new house today," she answered.

"Moving? And you didn't call for our help?"

"I didn't think you would want to drive all the way to Cleveland."

"You are moving out of the house I grew up in! We'll be there this afternoon," I announced.

With that we loaded up the kids and made the three-hour drive, moved my mother out of my childhood home and piled their combined belongings into a beautiful new home. As I'm carrying one box down the truck ramp, into the garage — the basement my destination — I make a remark about it being "the most important box of all." Boxes filled with booze always elicit that kind of comment from me.

But then I noticed something. Tucked into the box, nestled between bottles of fine gin and cheap whisky, was the last remaining, unmolested bottle of my Wedding Wheat.

By the time I set the box down, my hands were slick with sweat. The bottle was warm. The liquid inside was crystal clear. "To the fridge!" I yelled. But amidst the kinetic frenzy of moving things around, I forgot to drink that beer. Instead, I transported it back home to New York. The car ride was unkind to the brew's aesthetic value — when we got home I noticed some floaters that raised many unsavory questions. Since then, I have not been able to bring myself to drink it.

To overcome my taste-test trepidation, I volunteered this article. Heck, there's nothing like a writing assignment to push me into action. My task was to drink the 100-month old homebrew and report back.

But as I write this, the brew remains untouched. It looks brilliantly beautiful in the fridge, yet I fear what lurks beneath. Maybe that's why I have not allowed myself the luxury of writer's block. If I stop typing, I might have to actually pop open the bottle.

But that is part of the agreement, part of the job. Just a sniff and a tiny sip will do. Here goes nothing . . . I could let my computer do the hard work here. It's hard to think of all the synonyms for "disgusting," but this is what Microsoft Word's Thesaurus generates: revolting, repulsive, sickening, ghastly, sordid, horrible, nauseating, repellent.

Any of these would aptly describe the beverage I just tasted. The wonderful German Wheat Beer flavors I remembered have vanished. This so-called "beer" now reminds me more of doe-in-estrus urine than anything else.

Thankfully, my marriage has aged better than the beer made to commemorate it. The next time something I make ends up in a basement for eight-plus years, I pray it will be a bottle of wine. ■

"Tucked into the box . . . was the last remaining, unmolested bottle of my Wedding Wheat."

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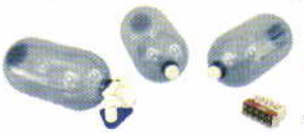

Normally $59.95
n Sale! $54.95
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Stainless: WL101...$42.50

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