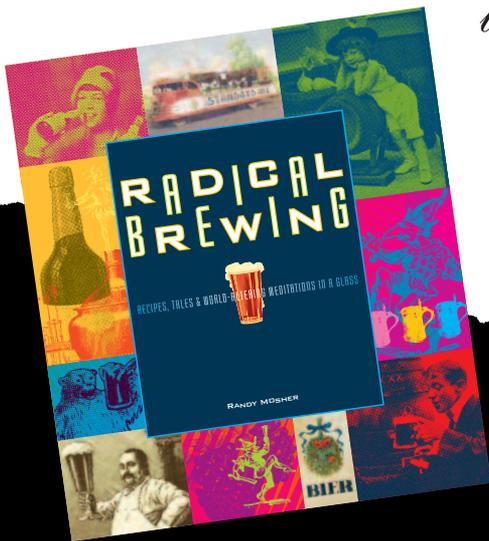


going to

EXTREM

*A sampling of ingredients, processes and recipes from
the world of Radical Brewing*



By Randy Mosher



American homebrewing, even with its adventurous repertoire of recipes and techniques, barely skims the surface of brewing as it has been practiced through the ages. In ancient Sumeria, as far back as brewing history goes, brewers were already making black beer, red beer, fresh beer, filtered beer, emmer (a type of wheat) beer, premium beer and light beer. The ancients had a whole cupboard full of herbs and spices, although which ones were used in beer is a bit fuzzy.

According to myth, the Egyptian goddess Sekhmet was diverted from a humanity-destroying rampage by a draught of mandrake-tinged beer. Mandrake is a garlic-scented root with sedative properties and a long connection to magic and witchcraft. J.S. Arnold wrote in 1911 that brewers throughout history "...neglected no herb or drug, whether harmless or poisonous, in an endeavor to lend some new property of savour to the brew."

In the search for fermentables, every conceivable form of starch has been employed. Brewing techniques also span the full range of possibilities. In the era of poor-quality malts and wooden vessels, a dizzying array of different mashing programs were used, the remnants of which can still be seen in decoction mashing. Of course when using grains such as rice or maize exclusively, a mash is completely ineffective. Other means such as saliva or a specialized fungus or yeast must be used to break starch into fermentable sugars.

In ancient times malt was sometime baked into cakes prior to mashing, and there are more recent bread-based beers as well. Kvass, the Russian small beer, is still sometimes brewed from stale rye bread. England, too, had a small beer made from stale bread—a product vexingly called "bee's wine."

Yeast and fermentation offer a huge range of possibilities. Lambic, the wild-fermented specialty beer of Belgium, was a mainstream product a few hundred years ago. Even stranger fermentations exist. In a 1916 article, Otto Overbeck described a yeast used to ferment peeterman (a cousin to Belgian witbier) which produced a gas that, if ignited, "burned with a blue flame." An African millet-based beer called *pombe* employs a yeast called *schizosaccharomyces*, which contains an enzyme enabling it to cut up starch molecules into sugars. This yeast diverged genetically from brewing yeast over a billion years ago!

Two things really put an end to wackiness in commercial brewing. First, in early nineteenth-century England, authorities finally cracked down on druggists who had been

selling all manner of noxious ingredients to brewers seeking a little more kick in their beers. This had been going on for more than a century despite laws to the contrary. Opium, *cocculus indicus* (a dangerous stimulant), *Faba amara* (*Ignatia amara*, or bitter bean, an Asian hop substitute containing strychnine) and others were used along with the more benign licorice, capsicum and coriander. But poison in beer was a serious public health problem, and so the baby went out with the bathwater as hops became the only sanctioned herb. Frederick Accum's 1820 *A Treatise on Adulterations of Food and Culinary Poisons* chronicles some of the more egregious behavior, and was a final nail in the coffin of doctored beers in England.

In Germany, the incorporation of Bavaria into the German union meant that the Reinheitsgebot went into effect throughout the country in 1877, outlawing a number of regional beer specialties that had incorporated various spices and forms of sugar.

Scientific understanding of the malting and brewing process expanded the possibilities as well as the consistency of malt, and this made some of the more arcane brewing procedures unnecessary. The global trend toward industrial production and mass marketing also favored more straightforward products and processes.

But we homebrewers have no such limitations imposed by the boys in the finance or marketing departments, and are free to pursue anything we think might make for an interesting beer. The following is a smattering of techniques, ingredients and beers I encountered during the researching of *Radical Brewing*.

Double Brewing

This is a technique used as early as Elizabethan times (and possibly earlier) for the production of strong beers. At times it was forbidden, considered wasteful of malt and men alike. The process is straightforward. A mash is made as for a normal beer, then the runoff wort, instead of being boiled, is heated to strike temperature and then used as the liquor for a second mash. This concentrates the wort in a way no single mash can, and the resulting worts were usually over 1.100 (24 °P) in gravity.

During the eighteenth and nineteenth centuries, strong ales were brewed in private

house breweries to celebrate special events. A double beer might be brewed at the birth of a son, then saved and savored when he reached his majority.

"Now Double Ale or Beer is the two first Worts, used in the place of Liquor, to Mash again on Fresh Malt, and then doth it only extract the Sweet, the Friendly, Balsamick Qualities there-from, its Hunger being partly satisfied before, whereby its Particles are rendered globical, so as to defend themselves from Corruption, for being thus being brewed it may be transported to the Indies, retaining its full Goodness..."

—William Worth, 1692

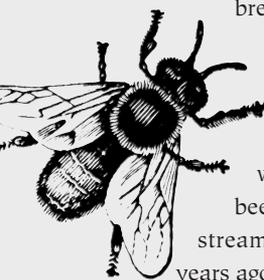
Triticale

Just when you think you've tried everything, up pops something new. A modern creation, *Triticum secale* is a cross between durum wheat and rye developed in the 1930s to combine the hardiness of rye with the yield and quality of wheat. It is widely cultivated in western Canada, where it is primarily used for animal feed. Malted triticale flakes are sold industrially by Edme, although triticale is not generally available as brewers' malt. Containing between 10 and 13 percent protein, recent studies showed that triticale is actually well suited as a brewing adjunct. Mashing/lautering experiments showed an insignificant increase in wort viscosity (compared to barley malt) at up to 30 percent triticale in a recipe, which means it won't make you crazy-outta-your-mind trying to sparge it as rye is guaranteed to do. This is a pretty high proportion of adjunct grain in a beer recipe, and should be plenty to get some real triticale flavor into the beer.

Substituting triticale for up to half of the wheat in a classic Weissbier recipe would be the obvious place to start, although a triticale bock or a triticale tripel would be two very different ways of showing off the soft spiciness of this grain. Flaked triticale is available through health food channels.

Mushroom Beer and Chanterelle Ale

The list of unusual ingredients used at one time or another in beer includes dangerous psychotropic drugs, hideously bitter



herbs like blessed thistle, toxic heavy metals like cobalt (used in the 1950s for improved head retention) and animal parts such as Rocky Mountain oysters, not to mention the actual shellfish of the same name. So, a few culinary mushrooms don't seem so odd. Another thing to keep in mind is that beer is largely the product of a fungus—yeast—so some of the tastes have certain similarities.

any other spice or seasoning. Chopped mushrooms can be tossed in during the boil, which cooks them and extracts flavor as well as the complex carbohydrate materials bearing the medicinal properties of certain species. More delicate mushrooms may be made into tea, then filtered, cooled and added in the secondary or at bottling or kegging. Species like chanterelles or truffles that

Commercial brewers have long relied on cooked sugar syrups as colorants, unless prohibited by purity laws. An early coloring material for porter was made by cooking first wort or molasses until it thickened and turned black, at which point it was *set on fire* and allowed to burn for five

**Just when you think you've tried everything,
up pops something new.**

I started all this mucking with mushrooms in beer after reading about a rustic German schnapps infused with chanterelle mushrooms.

The mushroom kingdom offers a huge variety of flavors, although in many cases you'll have to go tromping through the woods to get them. This is a fun and engaging hobby on its own, of course, and there are lots of books available if you're interested. Fortunately, supermarkets and specialty stores are stocking a fair number of different mushrooms in fresh and dried form these days, and many of them work as seasonings in beer.

In addition to food and flavor value, many mushrooms have important medicinal qualities as well. Common properties are along tonic lines, with immune and circulatory system benefits. This is another interesting area of study, and fits with the long, historical tradition of using beer as a base for delivering medically useful ingredients. Most mushrooms do have a certain earthiness—not often welcome in a beer—so the choice of which mushroom to use is very important. My own personal favorites are chanterelles. I've long been a fan of these beautiful, apricot-perfumed 'shrooms, and it turns out that they blend in quite well with pale and amber beers, if the hop aroma is held back to allow the subtlety of the chanterelles to shine through.

There are several easy ways to get mushroom flavors into your beer, along the same lines as using

don't require cooking can be finely chopped and soaked for a few days in vodka, strained through a coffee filter, then added in the same manner as a tea.

Chanterelle ale is one of my regular house beers. The chanterelles add an ethereal fruitiness, delicate and complex. I brew a lightly hopped amber ale of 1.070 to 1.080 gravity, mashed a little on the warm side to produce a sweetish brew. Once fermentation is complete, I add the strained liquid off a mixture of chopped chanterelles and vodka. Half a pound to a pound per 5 gallons is the usual dose.

Cooked Sugars

We homebrewers have been taught to spurn sugar, except perhaps for the odd Belgian beer. And as a reaction to a half-century-old tradition of diluting malt extract with corn sugar for the sake of a low-cost get-me-high, this repulsion is well-founded. However, it's time to move on and embrace sugar for what it can be—another trick in the brewer's bag, capable of lightening a beer's body and at the same time adding a layer of rich flavor sympathetic with, but different from, malt.

There are numerous partially refined sugars of ethnic origin that have great utility as well as historical precedent in beer. With names like jaggery, pilonçillo, kaong and panela, each has a different personality and is well worth seeking out. But our present topic is a more process-oriented product: cooked sugar.

or six minutes, then mixed with water and saved for use as a colorant. *Essentia bina* was a black syrup made by cooking sugar, and was used in porter production at the rate of 2 pounds per barrel. It was legally allowed only between 1811 and 1817. After that time it was superseded by the newly patented black malt.

Caramel syrups today have a lot more subtlety, and are available in a number of shades. They have commercial application as color adjusters in mainstream beers, where exacting standards are needed to match finely honed consumer expectations. They are also used in a more creative way in Belgium. The Chouffe brewery uses them to provide much of the character for their amber and dark beers. One should be aware that dark sugars lack the kind of melanoidins present in dark grains that have certain protective effects against oxidation, so beers colored exclusively with sugars may age poorly.

Colored sugars also figure heavily in the flavor and appearance of Flanders red sour beers. The Belgians love this stuff. When the old recipes mention "candi" sugar, this is usually what they were talking about, not the expensive crystallized stuff sold to homebrewers under that name. It is commonly used in sour red beers, and was an important ingredient in the blended beer called *faro*.

There are four chemical classes of caramel, and they are produced industrially for use in food, soft drinks, beer, and other uses. Each class reacts differently to pH, proteins and (continued on page 56)

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other factors. Not all of them are stable in beer. Some types may throw a haze or lose color as the beer ages. Class III caramels, which are made from invert sugar cooked together with an inorganic source of nitrogen, are the type used commercially in beer.

Unfortunately, these sugar syrups are not available in the homebrew market. The good news is that you can make caramel yourself by cooking sugar until the desired color is reached. Use a heavy saucepan or skillet for this. Mix white sugar with a small amount of water, and apply medium heat. Once a smooth syrup has been formed, do not stir, as this encourages crystallization, which you do not want. The water will slowly boil away and the sugar will start to darken. Once the color change happens, it goes fast, so be prepared to pull it off the heat quickly. You can pour it into a bowl lined with nonstick foil and let it cool, or add cold water carefully (watch for spattering) to the pan to stop the browning process and redissolve the sugar. Or you can just pour it right into your kettle of wort. In my limited experience with this type of cooked sugar in a homebrew setting, stability has not been a big problem. But, for something more in the class III category, I would suggest starting with Lyle's Golden Syrup (an invert sugar) and cooking it with a small quantity (1 percent by weight) of ammonium phosphate, commonly sold as a yeast nutrient. Caramel produced this way has more of a true caramel flavor, as opposed to the toasted marshmallow notes of straight sucrose.

Honey may also be cooked until some color develops, giving it a rich candy-like quality. This delicious material is good in darker honey beers, or to add depth to a malt and honey-based bracket.

Malt extract may also be cooked down until it darkens, with equally delicious but different results. You get a big load of Maillard reaction products, more malty and complex than cooked sugar flavors. There is historical precedence for this both in England and the Continent. Darkly cooked wort was used as a colorant in porter around 1800, after brown malt was abandoned due to its inefficiency and high cost, but before the method of roasting malt to a palatable black was worked out in 1817. A similar cooked

sugar product called Porterine was used to brew porter in nineteenth-century America.

In Germany, a brewmaster's trick sometimes employed was to preheat the brew kettle before the first wort was run in, causing caramelization—a sort of instant decoction as far as the flavor goes. This can be done in the homebrewery, but you are better off putting a pint or so of the thick first runnings in the kettle and boiling it down until it becomes thicker and begins to develop some color. Then you can flood additional wort on top of it and stop the process.

Danziger Jopenbier

Danzig is the German name for the city of Gdansk, now in Poland, but for a long time it was a part of Germany, as was the rest of Prussia. Its beers have a longstanding reputation for strength. Doctor Knaust reported in 1614 that the barley beer of Danzig, “is the queen and surpasses all other red beers. Although there are in Prussia many delicious and good beers, the Danzig beers overtops them all; and in fact, there is not found in the whole of Germany a stronger beer among the barley beers, a thing which cannot be denied, no matter what else may be claimed.” And boy, this is a strange one!

According to observers in about 1900, this was a beer brewed with conventional ingredients and processes, except for the massive gravity that was achieved by large amounts of malt, and a boil that lasted ten hours or longer. By the time the wort was turned out, the gravity was at a syrupy 45 to 55 °P! The beer was hopped at a rate of 7 to 8 gallons per kilogram (0.13 ounces per pound) of malt. Then things get really weird. Fermentation was said to have taken place in cellars completely covered with mold, which was carefully guarded against cleaning. No culture yeast was pitched, and the beer went through a five-stage process completely by spontaneous means. Brewing was allowed only between October and April, fermentation in summer having been considered too vigorous.

First, a thin white film of mold formed, then changed to bluish green, which accounted for the first two weeks. Then, bubbling gas started coming up from the wort and broke up the film, which, in turn,

further sped up the fermentation. This proceeded vigorously for ten to fourteen days, and provisions needed to be made to retain and return the overflow to the fermenter. In the third phase, the yeast kind of settled out. Then another film formed on the surface—white at first, then dark brown, then at last green, growing and thickening, folding itself up into great ridges as it floated on the surface.

An important part of this ugly fermentation seems to have been the development of certain oxidized flavors that are normally associated with port or sherry, caused by yeast that lives on the surface of the liquid. At this point it's two or three months old. Aging continues for up to a year, and at the end it is slowly forced through a cloth filter bag and placed into 13-liter crocks or jugs.

Lager, ale and sherry-type yeasts were present, as well as *Penicillium* and *Mucor* molds, *Lactobacillus*, and possibly other microorganisms. A real zoo. Alcohol was very low, at 2.3 to 7 percent; lactic acid was fairly high (about like lambic) at 2 percent, although given the incredible amount of residual sweetness, it couldn't have been too assertive.

Jopenbier was widely exported to as far away as England, where it was used as a seasoning for soups and gravies. In Germany it was a popular additive to normal beer as a flavor booster. As far as I can tell, it is no longer made anywhere today, which is a shame. It really was a unique product.

All of this extreme brewing is just the tip of the iceberg. The history of brewing is vast and diverse, full to the brim with startling—and often delicious—oddities. And of course, we American homebrewers are adding our own demented touches, making beer a delightful playground for brewer and drinker alike. Jump in!

A brewer since 1984, Randy Mosher is a nationally recognized writer and authority on brewing and beer styles. He is the author of *The Brewer's Companion*, (Alephenalia Publications, 1994), and of *Radical Brewing* (BrewersPublications, May, 2004). In addition, Mosher consults on package design and branding. 🍷

