

MODERN SOUR BREWING TECHNIQUES

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OVERVIEW

- What is “modern sour brewing”?
- Types of LAB
- Sources of LAB
- What can go wrong
- Tips for fast souring
- Propagating Lactobacillus
- Fast souring with Lactobacillus
- Drink some beer

What do I mean “modern”?

- Fast, controlled souring with isolated cultures, almost exclusively *Lactobacillus* sp.
- Not a new technique, but has grown exponentially in recent years
- Still a lot we don't know
- Can be used in isolation, or as part of mixed fermentation
- Not the be-all and end-all, but a useful tool

TYPES OF LAB

- Just like yeast, there are many types of LAB
 - Lactobacillus sp. - all pretty safe! Wide variety of characteristics, even within species. Most fast souring focusses on species within this genus.
 - Pediococcus, Leuconostoc, Lactococcus, Streptococcus
 - Bifidobacterium

SOURCES OF LAB

- Yeast labs – Wyeast, White Labs, Giga, Omega, East Coast, BSI
 - L. buchneri, L. brevis, L. delbrueckii, L. plantarum
 - Cheesemaking – Australian Dairy Ingredients
 - L. helveticus
 - Pharmacy – Probiotics
 - L. plantarum, L. rhamnosis, L. brevis
 - avoid enzymes (amylase, protease), yeast, Clostridium sp (butyric acid), Enterococcus faecium, Bacillus sp (bioactive amines, diacetyl)
 - Supermarket – yoghurt*, sauerkraut
 - L acidophilus, L. casei, Pediococcus sp.
- *note the use of dairy may promote butyric acid production
- Home – malt, sourdough, kefir, kombucha
 - mixed cultures with greater spoilage potential

WHAT CAN GO WRONG

- Insufficient souring
- Fermentation
- Off flavours
- Poor foam
- Production of allergens or toxins

WHAT CAN GO WRONG

Normal (good) aromas:
Bready, floury, musty, vegetal

Abnormal (bad) aromas:
Phenolic, cheese, feet, vomit, feces

TIPS FOR FAST SOURING

- Practice exceptional hygiene
- Do it fast (ensure an active starter)
- Sour prior to alcoholic fermentation
- Minimise IBUs (<5)
- Pre-acidify to inhibit foam degrading enzymes and undesirable bacteria such as Clostridium
- Sour wort, not mash
- Don't use aluminium
- Warmer temperatures may help inhibit fermentation

MORE TIPS

- Reduce oxygen to avoid the risk of off flavours, fermentation, and inhibition of positive souring bacteria
- Boiling reduces oxygen and significantly reduces thermotolerant spoilage microbes
- Scrubbing with CO₂ pre- or during souring can help reduce O₂ and create positive pressure
- Use alkaline salts to inhibit acidification and facilitate more growth or higher TA
- Boil post souring for: control, sanitation, bittering/hop flavour, if using wild/grain cultures

PROPAGATING LACTOBACILLUS

- Don't use hops
 - unless you want to promote hop tolerance
- Target 2-3% monosaccharides
 - mash cool or use simple sugar (~20g/L)
- Limit the gravity to < 1.040
- Use yeast nutrient
- Buffer starter wort with 5 – 20g/L of chalk, or 1-5g/L bicarb soda

(you can decant the starter off surplus chalk)

FAST SOURING

- Target normal ale yeast pitching rates
0.5 million cells/mL/degree plato
= 5+ million cells/mL
=100+ billion cells/19L
- **Alkalinity in beer can promote higher TA**

EXPERIMENT

To demonstrate the difference in flavour of some common souring cultures

- Same wort
- Same fermentation
- Unique souring culture

Lactic acid isn't the only thing being produced!

STARTER WORT

- Pilsner malt, mashed at 63C for 60 mins
- 50ppm Calcium, Cl:SO4 = 0.8
- 30 minute boil, with:
 - 20g/L dextrose
 - 10g/L CaCO3
 - 1g/L yeast nutrient

Propagated in PET bottles in a hot water urn

Propagation time varied to target 150 – 200 bill. cells

WORT

- Artisinale Summer Ale Wort Kit

90% Pilsner, 10% Wheat

15 min boil

no hops

no chill

OG 1.057

pH 5.30

POST SOURING

- 1 hour boil with an additional 3L water
- Whirlpool, rest, no-chill into 17L HDPE
- Diluted with 2.5L boiled, cooled water
- Pitched 22g US05 at 17C, no O2
- 18C ferm, 19C VDK rest
- OG 1.047+/-1, FG 1.013+/-1
- ABV = 4.5% – 4.8%
- Fined with gelatin on day 9
- Held at 16C 4 days, then kegged, chilled & carbonated

Beer A – *L. buchneri* (Wyeast 5335)

Wyeast recommend 32C for 5 – 7 days

Starter: 100ml pack (10 bill) into 800ml wort

Prop: 32C for 72 hours

Souring: 32C or 24 hours

Post souring pH: 3.68

Post ferment pH: 3.45

Beer B – *L. plantarum* (IBS Support)

Starter: 4 capsules (100 billion cells) into 1000ml wort

Prop: 35C for 8 hours

Souring: 35C or 24 hours

Post souring pH: 3.03

Post ferment pH: 3.07

Beer C – *L. casei* Shirota (Yakult)

Starter: 2 bottles (130ml, 13 billion cells) into
1000ml wort

Prop: 42C for 20 hours

Souring: 43C or 43 hours

Post souring pH: 2.87

Post ferment pH: 2.95

Beer D – Various (grain)

Starter: 200g pale malt (uncrushed), 800ml wort,
200ml soda water (strained after prop)

Prop: 43C for 96 hours

Souring: 43C or 19 hours

Post souring pH: 2.93

Post ferment pH: 3.03

- Underattenuated (1.017) and cloudy!

FURTHER READING / DRINKING

BOOKS

Wild Brews, Jeff Sparrow

American Sour Beers, Michael Tonsmeire

ONLINE

Sour Beer Blog – sourbeerblog.com

Education > Sour Beer Articles

The Mad Fermentationist – themadfermentationist.com

Bottle Dregs to Harvest

Commercial Microbe Description

Milk The Funk – milkthefunk.com

Wiki, forums and Facebook group

PODCASTS

The Sour Hour –
thebrewingnetwork.com/category/shows/sourhour/

Also via iTunes / podcasts

Grain & Grape – Saturday morning demonstrations

5/280 Whitehall Street, Yarraville VIC

Mash - “Wizz Fizz” series

10250 West Swan Road, Henley Brook WA

3 Ravens - “Wild Ravens” series

1 Theobald Street, Thornbury VIC

BeerMongers

Preston Fresh Hood Market, Preston VIC

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