

Brewing with Spice, Herbs, and Fruit

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... and today I'll be talking with you about:

- Brewing with fruit: fresh, frozen, puree, and extract
- Brewing with spices and herbs
- Common mistakes to avoid
- Great tweaks to enhance your beer

Why Use Spices or Fruits?

- Various fruit, spice, or herb combinations can complement your beer.
- They might also add some dimension or intrigue to your beer.
- It's a great way to introduce non-drinkers to beer.
- Certain styles require additions.

Le Methods...

“Ah, oui! Le methods...”

There are many ways to add fruit flavours to your beer. In particular we'll focus in on:

- Fresh
- Frozen
- Puree
- Extract

Fresh

Pros

- You may hand-select the best stuff - especially when it's in season.
- You can achieve greater depth of flavour.

Cons

- The fruit you want may not be in season.
- Requires more preparation.
- Increased risk of contamination.
- Possible oxygen pickup.

Fresh - Preparation

- Sanitize everything that comes in contact with the fruit.
- Consider freezing your fresh fruit.
- Real-life Situation Number 1: Mango
 - Clean, rinse, and sanitize the heck out of: cutting board, knife, peeler, blender.
 - Rinse, sanitize outside skin of mango with boiling hot water. Peel. Cut.
 - Blend that shit up - why?
 - Pasteurize - why?
 - Freeze it - why?
 - Add to the fermentor towards the tail-end of fermentation - why?

Fresh - Preparation

- Real-life Situation Number 2:
Raspberries
 - Greater surface area means greater risk of contamination (and pesticides)
 - Rinse, bring to pasteurization temperature 72C for at least 15 seconds.
 - Quickly cool (covered, ice bath) - add to beer.

or...

Rack beer on top ->



Don't Boil

1. “Heat will cause the more volatile aromas to dissipate”
2. If you insist on boiling, don't hold it there long.
3. Pasteurization (72C - 15 seconds) is (for all intents and purposes) enough to kill most bacteria.

* Again, don't hold it there long.

Note: ensure homogeneity

Campden (Sodium Metabisulfite)

- Some people use Campden to help sanitize their fruit (especially wine-makers).
- Sodium metabisulfite is particularly potent to acetobacter bacteria (think vinegar-like spoilage)
- Less effective against other forms of bacteria/yeast

(It's probably best to just pasteurize...)

Frozen

Pros

- Convenience.
- Using fruit that isn't in season.
- Keeps for a long time.
- Often high quality...

Cons

- ...not always high quality.
- Can be expensive.

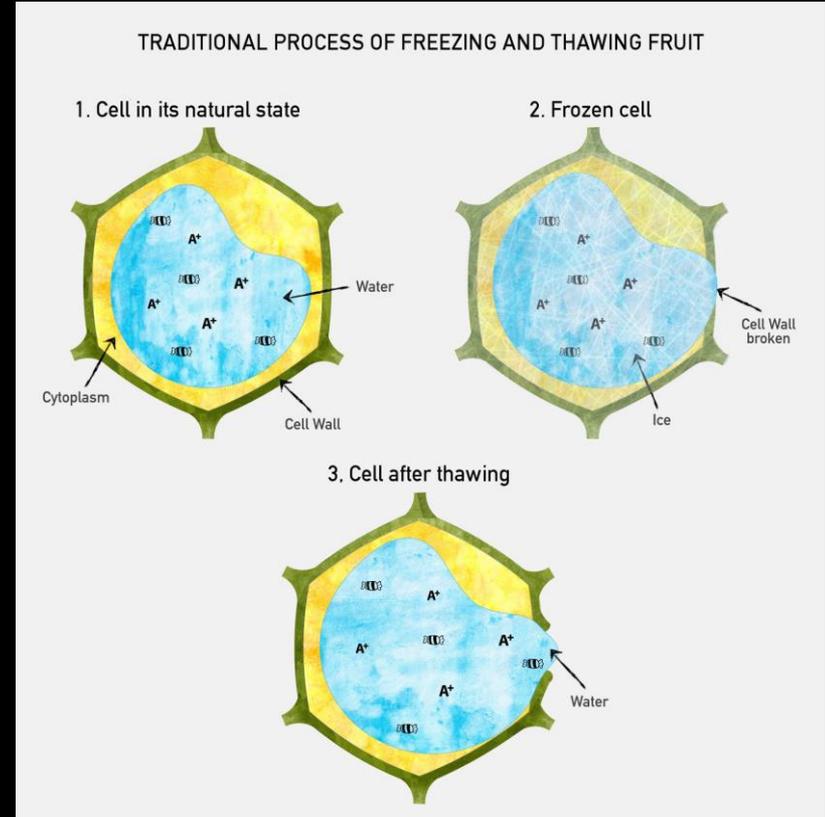
Frozen - Preparation

- Add 'er to a pot, bring 'er to a pasteurization temperature.
- Funnel fruit directly into beer
or
- Funnel fruit into a (ideally CO₂-purged) carboy and rack your beer on top.



Frozen

- Ice crystals rupture cell walls.
- But: freezing fruit does *not* kill bacteria. It merely inhibits their growth.
- Best bet is to pasteurize your frozen fruits:
 - ___C for ___ seconds.



Pasteurization Temperature vs. Time

- Effectiveness is negatively correlated with time. (i.e. the higher the temp the less time you need).
- I've anecdotally found the 72C rule to be a sweet-spot.

Pasteurization Temperature vs. Time	
Vat (Batch) Pasteurization	
Temperature	Time
63°C (145°F)*	30 minutes
HTST Pasteurization	
Temperature	Time
72°C (161°F)*	15 seconds
89°C (191°F)	1.0 second
90°C (194°F)	0.5 seconds
94°C (201°F)	0.1 seconds
96°C (204°F)	0.05 seconds
100°C (212°F)	0.01 seconds

Purees/Juices

Pros

- Sterile
- Consistent quality
- A little goes a long way
- Relatively inexpensive
- Long shelf life
- Easy

Cons

- May not be made using quality ingredients - consider the source
- Tougher to find
- Selection may be limited
- May have added sugar, preservatives (know what you're buying)

Purees/Juices - Preparation

Methods:

- Add directly to fermentor.
- No need to pasteurize/sterilize!
- That's kind of it (anybody care to chime in with tips?)

Extracts

Pros

- Minimal oxygen pickup.
- High potency.
- Long shelf-life.
- Easy.
- No added sugar (usually) - won't alter FG or ABV.
- Can be added directly to keg.

Cons

- Taste can be one-dimensional
- Easy to overdo.
- Best used in *combination with* purees and fresh additions.

When Should I Add It?

I recommend introducing fruit once fermentation has slowed to a moderate-low rate.

Why?

- Depending on your processing, you may be adding DO to your purees..
- The yeast from a semi-active fermentation will use up most of this oxygen.
- Add it too late and it may be more than the yeast needs, and it will remain in your beer.
- Add when yeast is super active and it may scrub some of the aroma from the fruit.

Amounts & Conversion

			EQUIVALENT FRESH WEIGHTS				
FRUIT	LB/GALLON	g/L	FRESH	PUREE	CONCENTRATE	DEHYDRATED	FREEZE DRIED
Apricots	0.25-2.0	30-240	1.00	0.80	0.20	0.25	0.15
Blackberries	0.5-4.0	60-480	1.00	0.90	0.15	0.30	0.10
Blueberries	0.5-3.0	60-360	1.00	0.90	0.15	0.25	0.15
Cherries (Sour)	0.25-2.0	30-240	1.00	0.85	0.30	0.25	0.10
Cherries (Sweet)	0.33-4.0	40-480	1.00	0.85	0.30	0.25	0.13
Citrus	0.25-1.0	30-120	1.00	0.85	0.15	0.25	0.10
Currants	0.33-1.5	40-180	1.00	0.95	0.15	0.25	0.10
Peaches	0.5-5.0	60-600	1.00	0.80	0.20	0.40	0.12
Plums	0.5-2.0	60-240	1.00	0.80	0.20	0.40	0.12
Raspberries	0.25-2.0	30-240	1.00	0.90	0.13	0.30	0.10
Strawberries	0.5-3.0	60-360	1.00	0.90	0.15	0.25	0.15

Taken from: May/June 2015 Issue of Zymurgy - Kevin Wright

Fruit Percentages

- Because fruits are made mostly of simple sugars (fructose, glucose, sucrose) they are highly fermentable.
- Fruit additions merely add the *perception* of sweetness to beer because our brains associate their flavour compounds with sugar.
- Fruit additions will “dry-out” as well as dilute your beer. They will lower your FG both because they are mostly made of water, and their sugars ferment into alcohol.

TABLE 1: SUGAR CONTENT AND pH OF FRUITS

Fruit	% sugar	pH
Apricot	9	3.4-3.8
Banana	17	4.5-5.2
Blueberry	11	3.1-3.3
Cherry	14	3.3-3.9
Cranberry	4	2.3-2.5
Date	60	4.1-4.9
Gooseberry	11	2.8-3.1
Lime	1	2.8
Mango	11	3.4-4.6
Peach	9	3.3-4.1
Pear	10	3.5-4.6
Pineapple	13	3.2-4.0
Plum (blue)	11	2.8-3.4
Plum (red)	11	3.6-4.3
Raspberry	7	3.2-4.0
Raspberry (frozen)	7	3.2-3.3
Strawberry	7	3.0-3.9
Strawberry (frozen)	7	3.2-3.3
Watermelon	9	5.2-5.6

Data from “The Curious Cook” by Harold McGee and U.S. FDA Web site.

SG Fruit Formula

Use the following formula to estimate your fruit's effect on Specific Gravity (SG):

$$SG = [W_{\text{fruit}} \times (P_{\text{sugar}}/100) \times 375] / V_{\text{beer}}$$

W_{fruit} = your weight of fruit in kg

P_{sugar} = your chosen fruit's sugar percentage (next slide)

375 = extract potential in gravity points per kilogram per litre

V_{beer} = volume into fermenter in litres.

(or $SG = [W_{\text{fruit}} \times (P_{\text{sugar}}/100) \times 45] / V_{\text{beer}}$ for all you imperial sillies who wish to measure in pounds & gallons)

Spices & Herbs

You'll get different flavours depending on when you add them.

- Herbs (cilantro, lemongrass... basil) are full of delicate flavour compounds and are often best added to the cold-side.
- Spices (cinnamon, anise, pepper) usually come through beautifully on both cold, and hot-side.
- Experiment. Try cold-side and hot-side combos at different rates/times.



Spices & Herbs - Cocoa Nibs



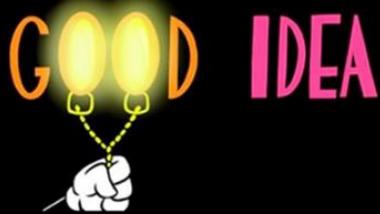
Roast them in the oven!

- Lay out a double layer of paper towels on a baking tray
 - Spread about 350g of cocoa nibs, and add another double layer of paper towels and evenly spread another 350g on top.
 - Cook/roast in a pre-heated 250F oven in the middle rack for ~40 minutes.
 - Tip: monitor nibs: you don't want to over-roast them.
 - Tip: try roasting a portion of the nibs for less time for increased depth of flavour.
 - Add to fermentor with a funnel
- or...
- Add to a large, sterilized muslin bag directly into your keg + monitor

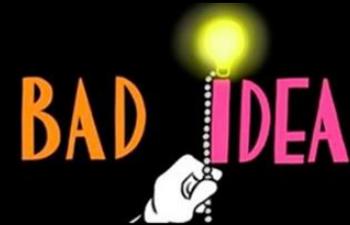
Tip: consider vanilla.

It's time for another Good Idea; Bad Idea...





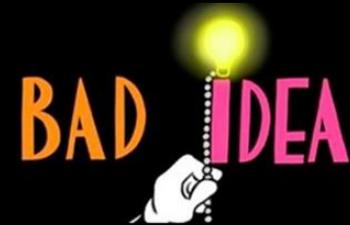
Sterilizing spices and
herbs in vodka



Not sterilizing spices and
herbs.



Adding spices and herbs directly to your keg in a sanitized nylon bag.

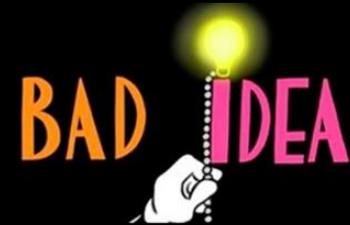


Adding spices directly to your keg.

Note: determine whether spices/herbs are floating, or sinking. Mostly they'll float.



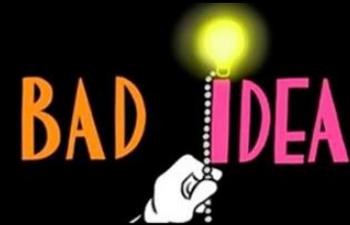
Chopping/crushing spices
and herbs up fine.



...again... essentially doing
the opposite of this.



Monitoring flavours as they develop. Finding the peak.



Coming back to the beer in a week's time to find the flavours are overpowering.

Some Takeaways

- 1) Beer is only as good as its raw ingredients. For best results, select your fruits yourself to ensure they are:
 - a) Ripe
 - b) Fresh
 - c) In season
- 2) Less is more
- 3) Adding fruit will dry out, and dilute your finished beer
- 4) The importance of cleanliness & sanitation
- 5) Consider your base style - what is your thought process? How will the flavours work together? Why are you doing what you're doing?

That's all Folks!

What's your preferred method?

What do you do differently?

What about blending?

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