
Apple Cider for Beginners
A presentation prepared by Tom Brandeis for the Tennessee Valley Homebrewers

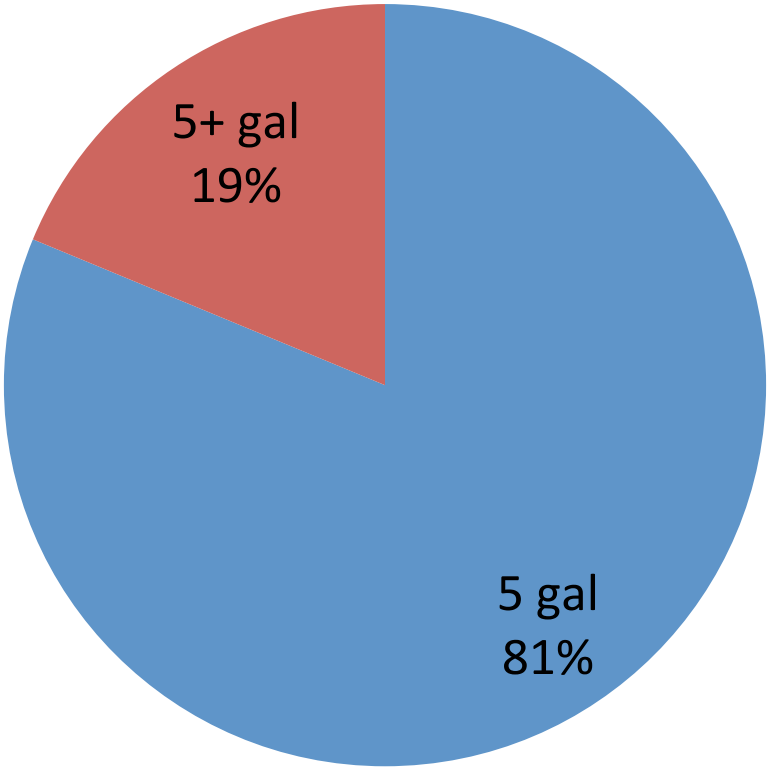
Cider making survey

- This presentation focuses on starting from apple juice and does not cover harvesting, crushing and pressing fresh fruit (sorry)
  - Local fruit sources?
  - A future activity?
- 16 respondents to the survey
- Some questions could have more than one answer

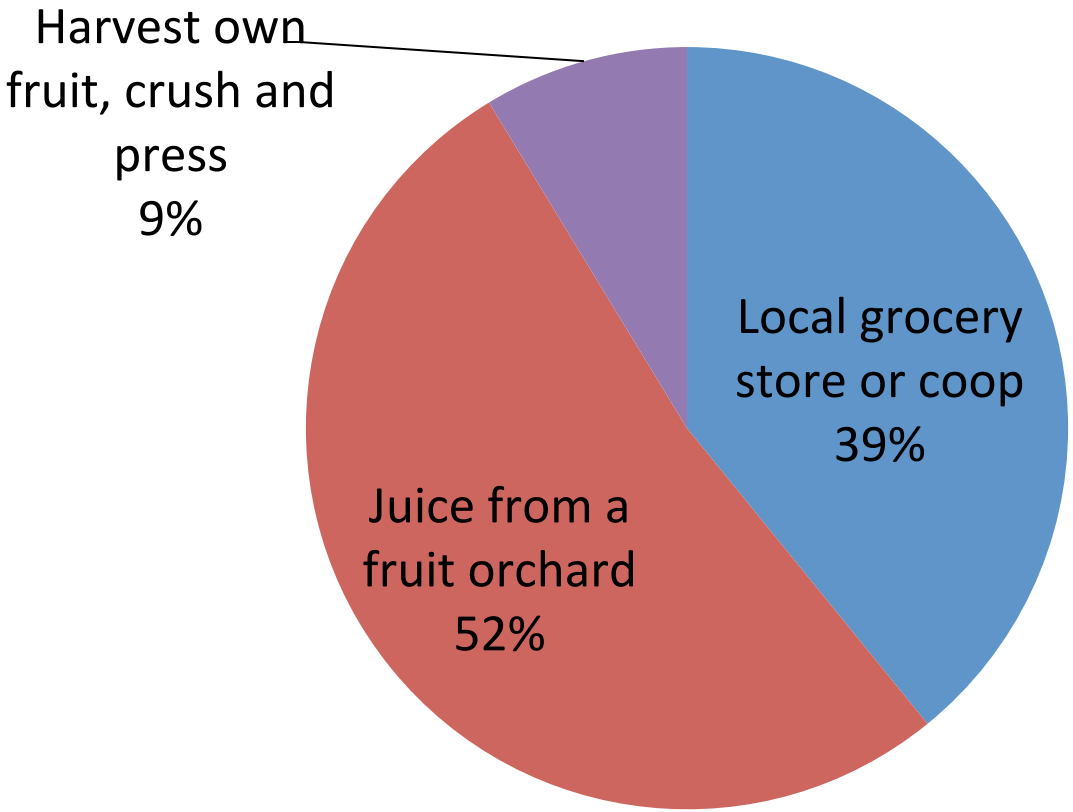
Resources for making apple cider

- Doc Woodall's Farm House Hard Cider Recipe
- Northern Brewer's "A basic overview of making hard cider from juice" at: https://www.northernbrewer.com/documentation/cider.pdf
- The Wittenham Hill Cider Pages http://www.cider.org.uk/frameset.htm
- Various web searches

How many gallons do you make in a typical batch?



Where do you get your apple juice from?



Sourcing apple juice

- Untreated or it won't ferment!
  - Most grocery store apple juice won't ferment due to preservatives
  - Must be unpasteurized juice
  - No preservatives added
  - Frozen jugs of juice work very well
- Local orchards often sell untreated juice
  - For example, Sky Top Orchard in Flat Rock, NC

Evaluating your apple juice

- Three flavor characteristics
  - Sweetness
  - Acidity
  - Tannins
- By changing these three characteristics, different types of cider can be produced
  - Measure sweetness, sugar content, with a hydrometer or refractometer
  - Measure the sharpness, the acidity, with a pH meter or acid titration
  - Evaluate tannins by taste

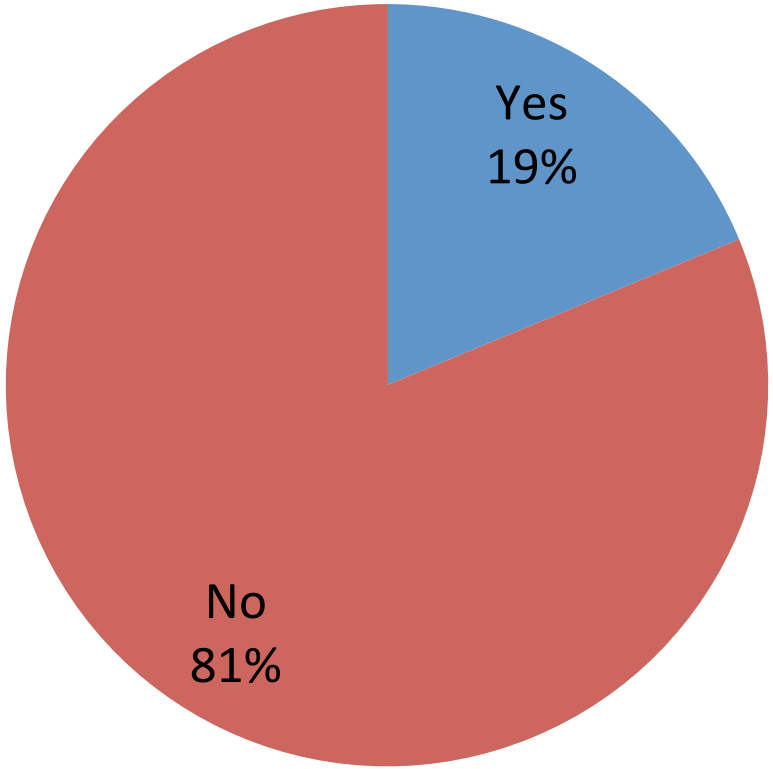
Juice sugar and original gravity (OG)

- Juice typically in the 1.045-1.060 OG range
- Should ferment to an FG of around 1.000
- Add sugar (chaptalize) if you'd like a higher ABV
  - Sugar ferments entirely, increasing alcohol content, thinning the body and amplifying acidity
  - One pound of sugar in five gallons will add approximately 1% alcohol by volume
  - Partially refined and darker sugars will affect flavor
  - Belgian candi sugars, honeys, or plain corn sugar all work well and have unique effects

Evaluating your apple juice - Acidity

- Most juice from dessert apples, especially when made from later season apples, will have a lot of sweetness but little acid
- Acid helps balance cider by adding brightness, sharpness and crispness that balances sweetness and tannin
- Highly acidic apples have a sharply sour flavor
  - Not necessarily because they have less sugar
  - Abundance of malic acid gives apples their acidity

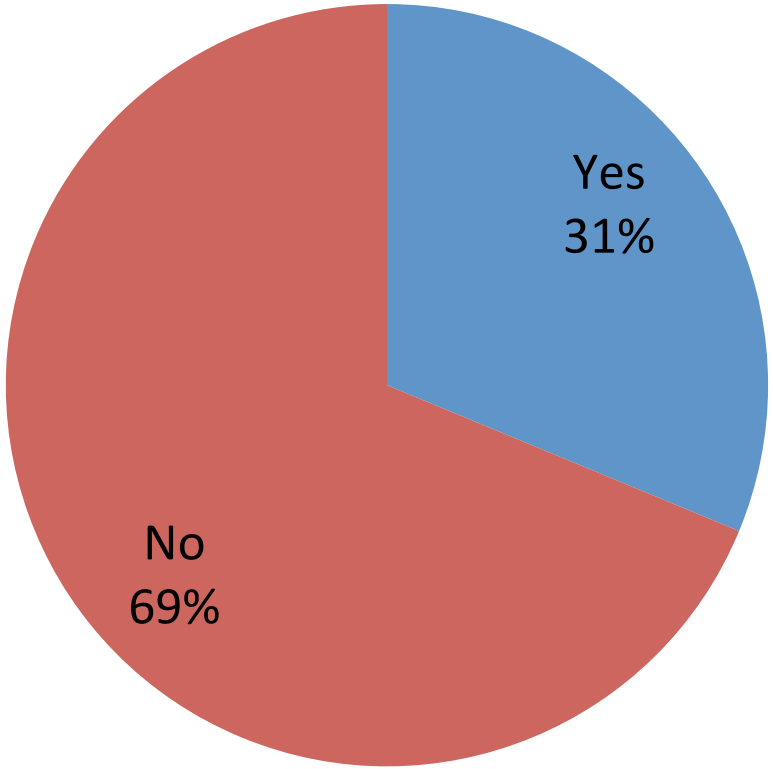
Do you measure juice pH?



Acid additions

- Small amounts of malic acid can be added to taste, up to one tablespoon in five gallons
  - Can use citric acid, too, but it will affect flavor
- To ensure more accuracy and repeatability, consider measuring the pH
- Remember, it's always possible to add a little more, so err on the side of caution

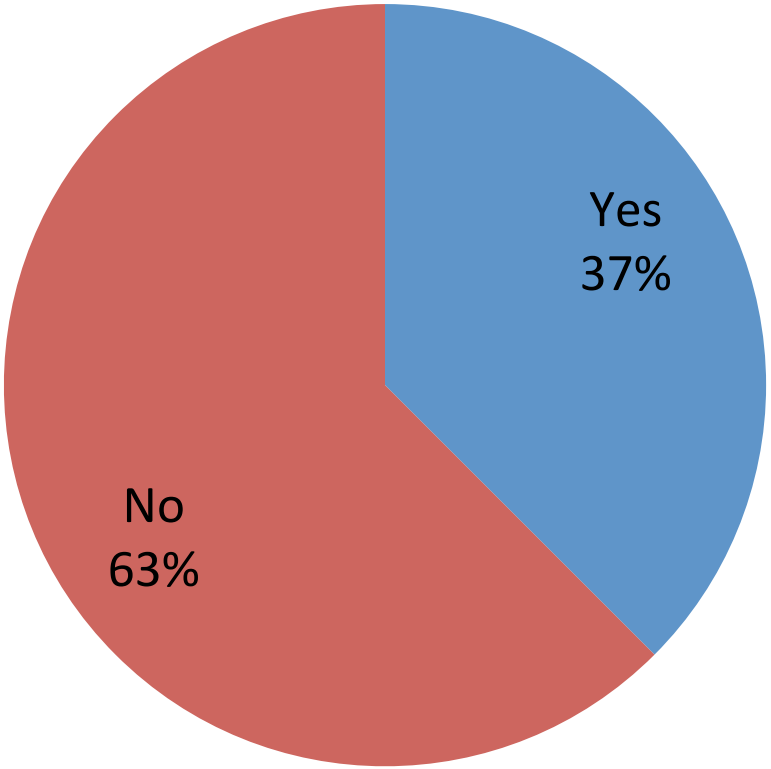
Do you ever add malic or citric acid to lower juice pH?



Evaluating your apple juice - Tannins

- Tannin - a substance present in apples, grapes, and various other fruits and plants that imparts astringency
  - Gives cider structure and complexity
- More sensation than a flavor
  - Astringency
  - Sucking on tea bags
  - Dry red wine high in tannins
- Often, tannin and acid are found simultaneously and can be easily confused
  - Red delicious apples, for example, have low acid but slightly elevated tannin, so it tends to have a puckering, drying effect when eaten

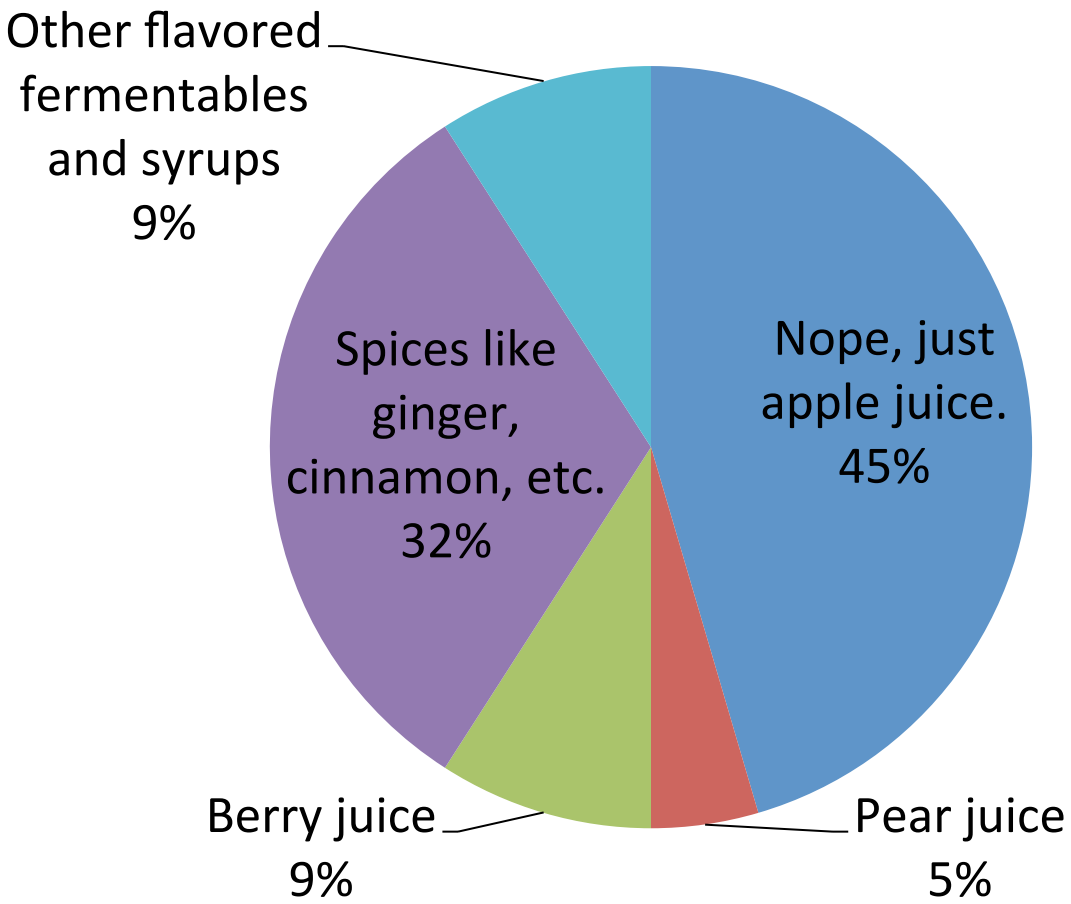
Do you ever add tannins?



Tannins additions

- Start small, as it doesn't take much to get the desired effect
  - Liquid or dry tannin can be used to equal effectiveness
  - Small amount of crab apple juice
  - Oak at some point in the process - barrel fermentation or conditioning on cubes, staves, chips, etc.
- Remember, it's always possible to add a little more, so err on the side of caution

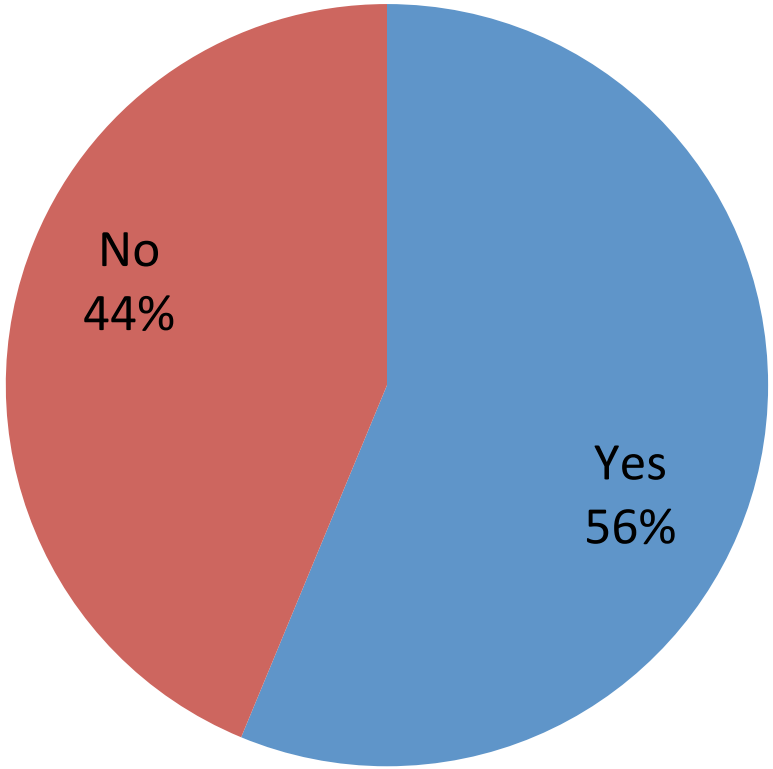
Do you add other fruits or spices?



Lots of options

- Perry – cider made from pear juice
  - Natural sweetener called sorbitol which is complex enough sugar that it is hard for yeast to ferment
  - Pear-dominant musts will finish between 1.004-1.020
  - Require more nutrient supplements - double normally used for cider
  - Blending apple and pear juice can yield excellent results
- Crabapple juice, molasses, elderberries for a rose blush, elder flower (*Sambucus nigra*)
- Honey for cizer ("apple honey wine", a mead/cider hybrid)

Do you treat your juice with potassium or sodium metabisulfite (Campden tablets)?

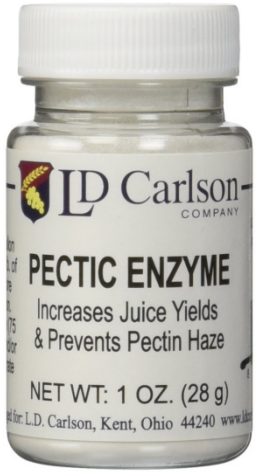


To sulfite or not to sulfite

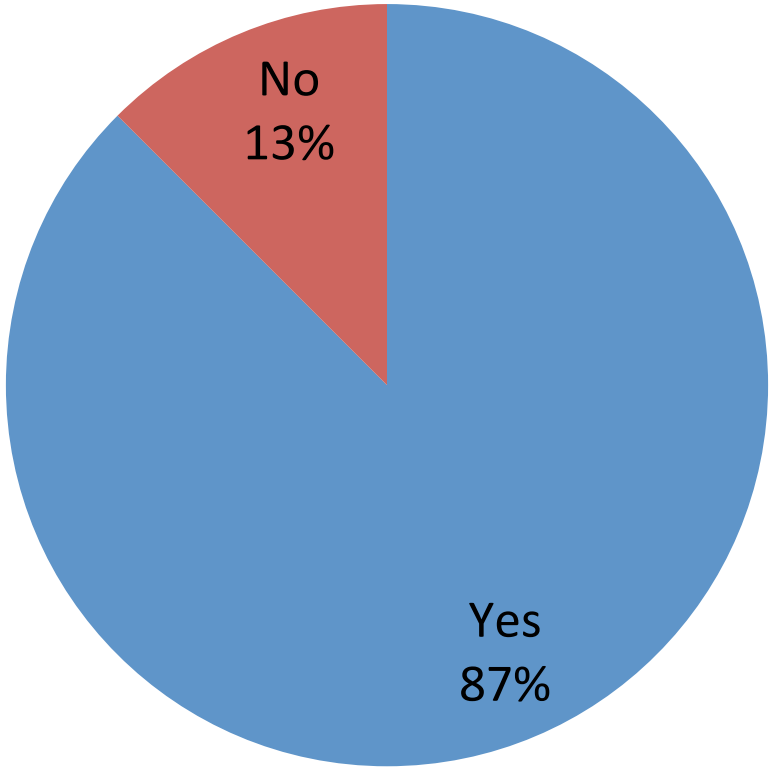
- Old School – ferment with wild yeast present on the fruits' skin. Roll the dice.
- Sodium or potassium metabisulfite - chemical that is highly effective at killing wild yeast and bacteria by releasing sulfur dioxide in the vessel
- Add a small amount of sulfite (1/4 tsp potassium metabisulfite per 5 gallons or 1 crushed Campden tablet)
  - Sulfite to approx. 50 ppm for 5 gallon batch
  - Blend with a little juice to dissolve, then add to the batch
  - Be sure to let it escape via an airlock
- Let the juice rest for 24-36 hours after adding sulfite before pitching yeast

Pectic enzyme

- Pectin - natural carbohydrate found in apples and other fruits
  - Enables jams to set and contributes to haze
- Pectolytic or pectic enzyme - enzyme that helps to precipitate pectin from juice or cider by binding to it and causing it to settle
- 12 hours after addition of sulfites, add 1/2 teaspoon of pectic enzyme per gallon to reduce haze in the finished cider
  - WLN4800 Rapidase C80
  - WLN4700 Hazyme C

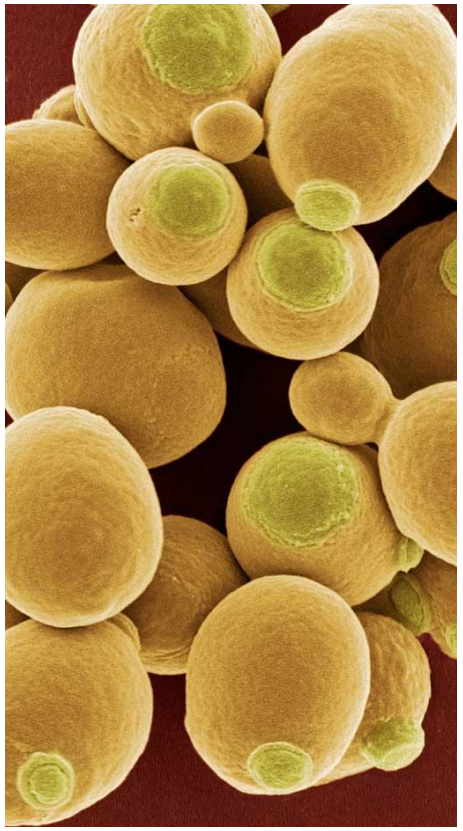


Do you add yeast nutrients to your juice?

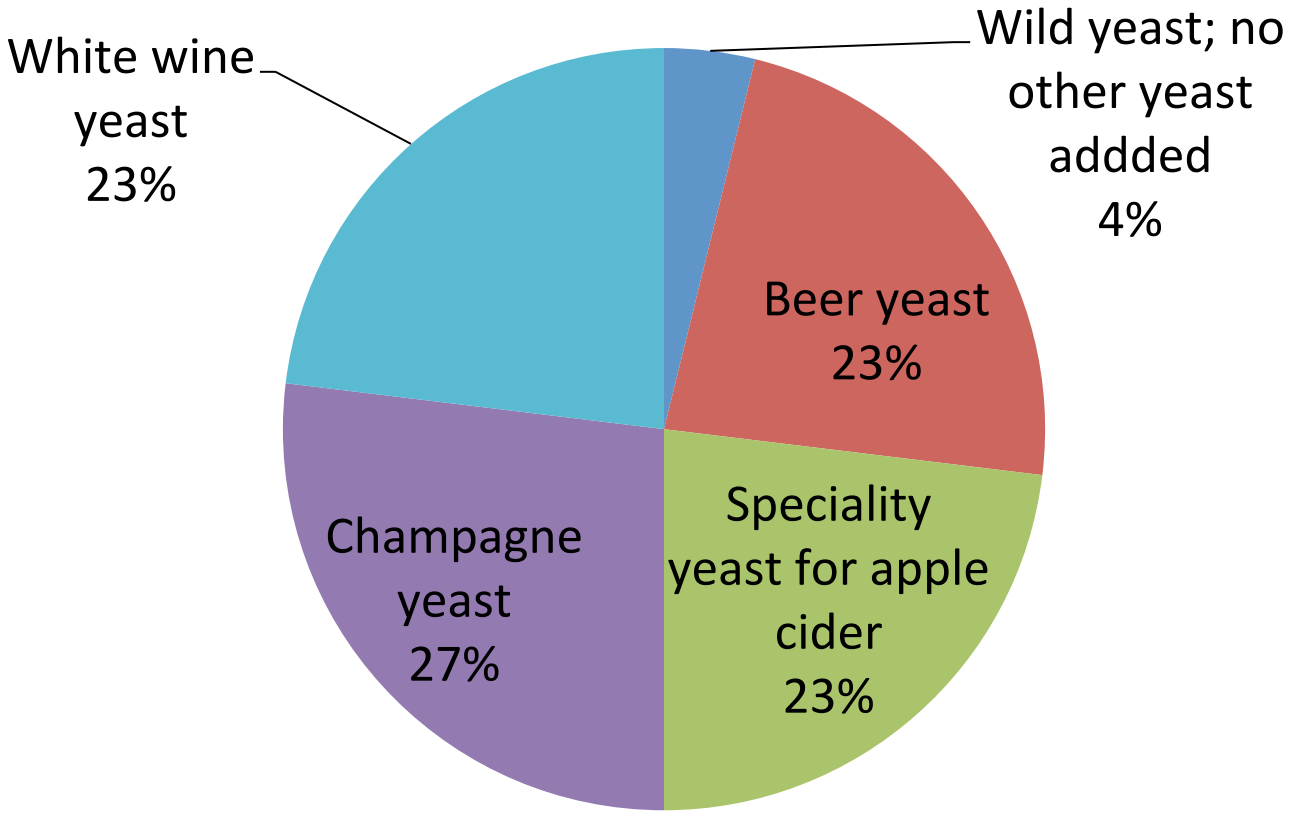


Yeast nutrients

- Apple juice is nutrient-poor for yeast
  - Yeast need nitrogen
  - Some apple growers avoid using nitrogenous fertilizers
  - As a result, their apples have very little nitrogen in their juice
- Add yeast nutrient
  - Roughly 1/4 tsp per gallon
  - Be prepared to add more if fermentation stalls



What yeast to you use?



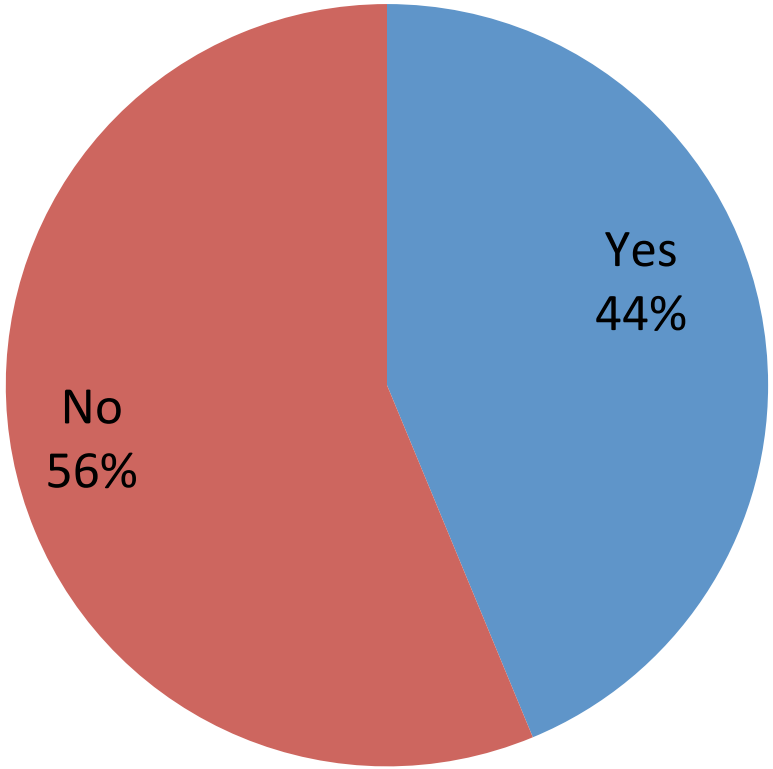
Yeasties, 1

- Liquid and dry cider-specific yeasts available
  - Wyeast 4766 Cider strain tends to be cleaner and quicker
  - White Labs 775 English Cider strain is a little slower but tends to preserve the apple character better
  - Brewer's Best Cider House Select ferments quick and clean
- Wine yeasts, such as Lalvin EC-1118 or 71B-1122, Red Star Premier Cuvee or Cote des Blancs are also popular
  - Alcohol and nutrient tolerant, work quickly and relatively cleanly, and are not temperature sensitive
  - Champagne-type yeasts are highly tolerant of the range of fermentation conditions but rarely contribute yeast character
  - White wine yeasts, fermented cool, emphasize and preserve delicate fruity aromas, akin to those found in German and Austrian white wines
  - Red wine yeasts can be pushed into higher temperature ranges, resulting in spicy and expressive ciders with notes of black pepper and anise

Yeasties, 2

- Beer yeast and characterful wine yeasts can impart specific character.
  - Wyeast 3724 Belgian Saison or 3944 Witbier will contribute spicy black pepper phenolics
  - Wyeast 4783 Rudesheimer and Wyeast 4242 Chablis will preserve the delicate character of the apples and add their own aromatic complexity
- Sweet Mead (liquid)
  - Alcohol tolerant, leaves 2-3% residual sweetness, lots of apple character

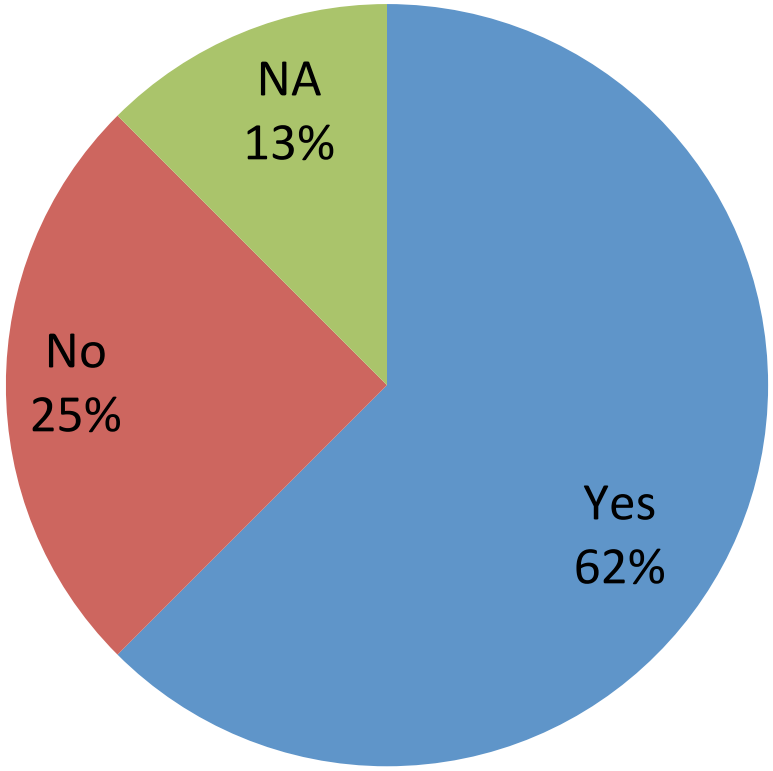
Do you make a yeast starter?



Yeast starters

- Boil 600 ml cider
- Add yeast nutrients at the end of the boil
  - ½ tsp Wyeast yeast nutrients
- Cool down
- Pitch liquid yeast or rehydrated dry yeast
- If you have a stir plate, use it, why not?
- Let ferment for at least 24 hrs

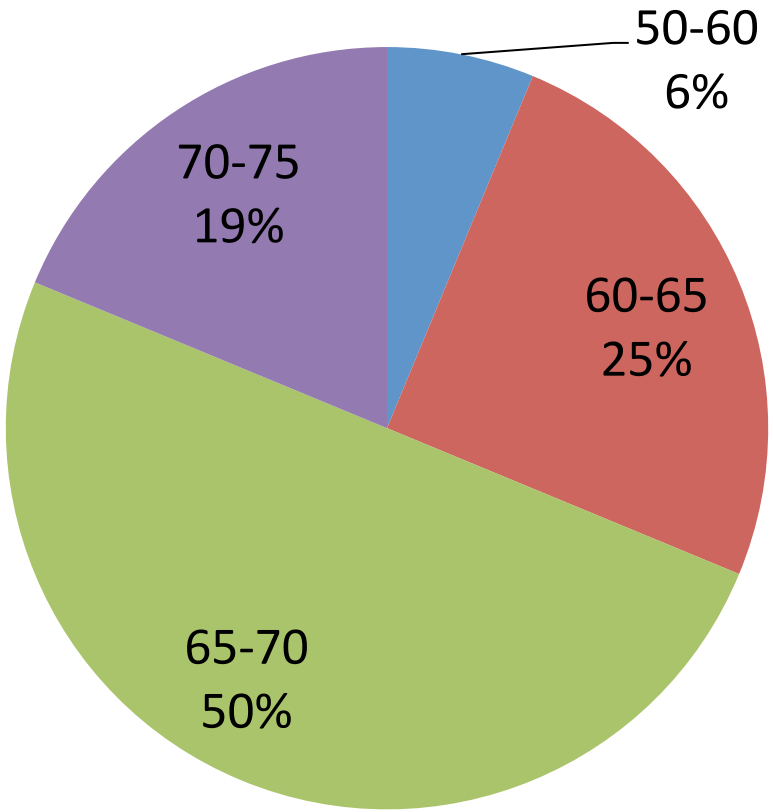
Do you oxygenate or aerate the wort pre-pitch?



Aeration and pitching

- After 24-36 hours since sulfite addition, aerate the must (or just shake)
- Pitch yeast starter into carboy
- After 48 hours since start of primary fermentation add some more yeast nutrient
  - ½ tsp of Wyeast yeast nutrients

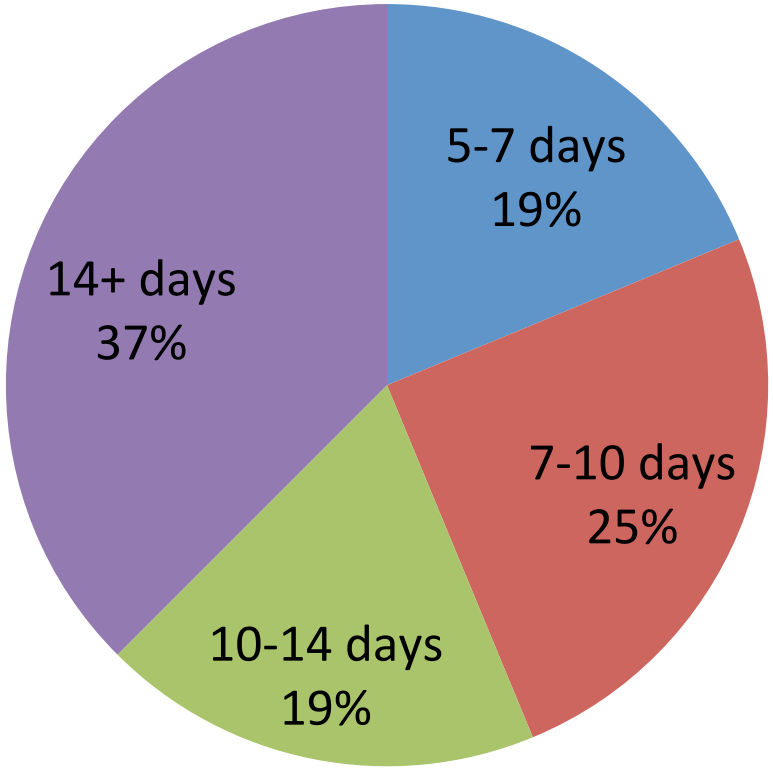
What are your fermentation temperatures, typically?



Fermentation temperature

- Usual recommendation is to ferment at around 70 degrees
  - But play with it depending on your yeast and OG
- Fermentation temperature can also have a big impact on yeast character

How long does fermentation typically take?

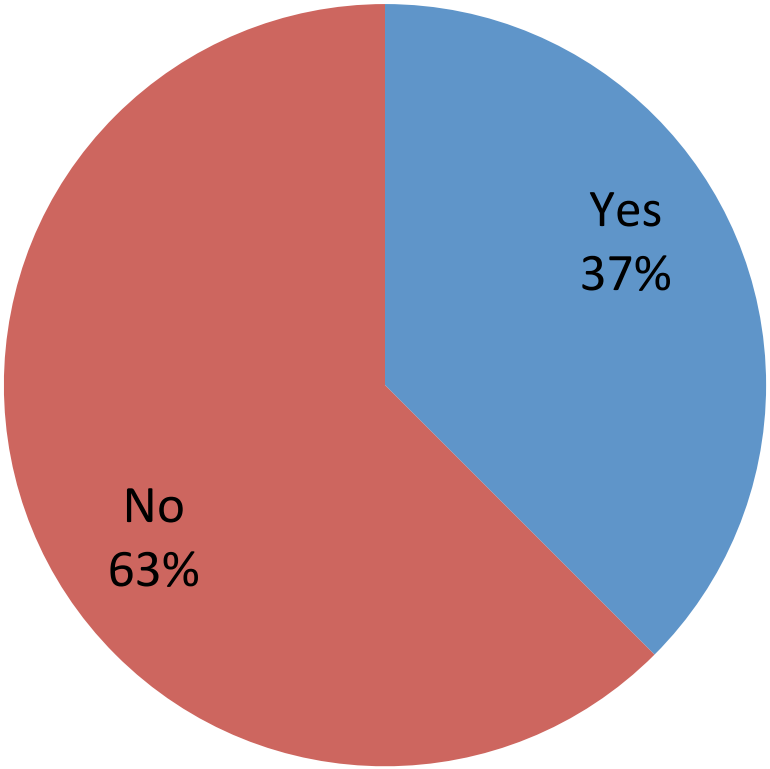


Note that 3 people use secondary fermentation for more than 1 month.

Fermentation times

- Allow the cider to ferment to dryness (0.996-1.010)
- If the fermentation seems sluggish, smells like rotten eggs or burning matches ("Satan's anus") add yeast nutrients
  - ¼ tsp at a time, up to 1 tbsp per 12 hours
  - Use caution when adding nutrient, as the trapped CO_2 in the cider can react with the added powder, causing an overflow of liquid
- When the gravity is reliably stable, allow it to sit on the yeast sediment to help clean up any off-flavors
- Secondary fermentation/Conditioning
  - Rack the cider into a sanitized carboy with no or minimal head space.
  - As the cider ages, the flavors mellow and yeast and other sediment settles out

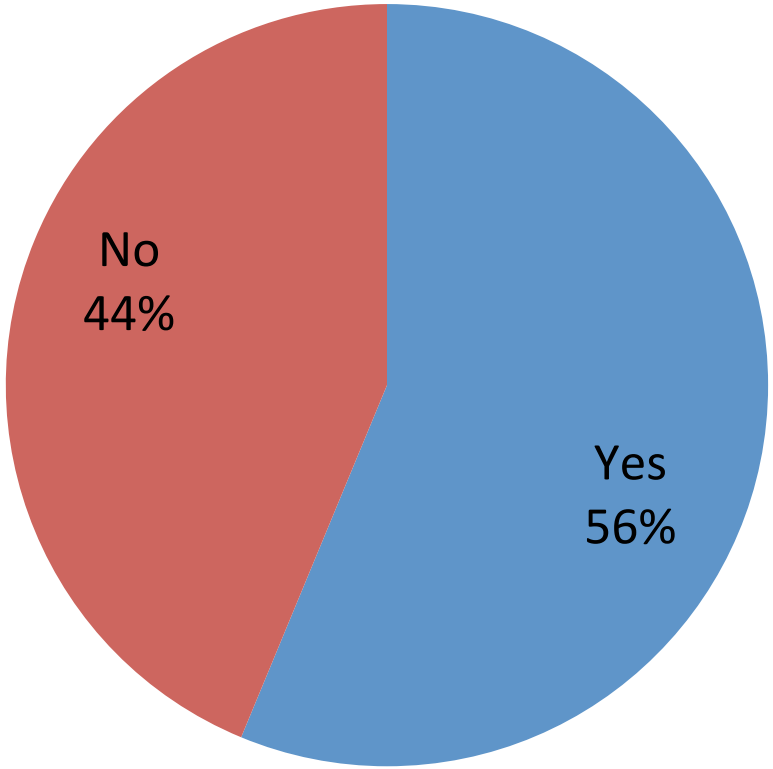
Do you add finings to your finished cider?



Fining

- Just wait for everything to settle out, cold-crash, or -
- Wine-fining agents
  - Gelatin
  - Islinglass
  - Super-Kleer
  - Sparkolloid

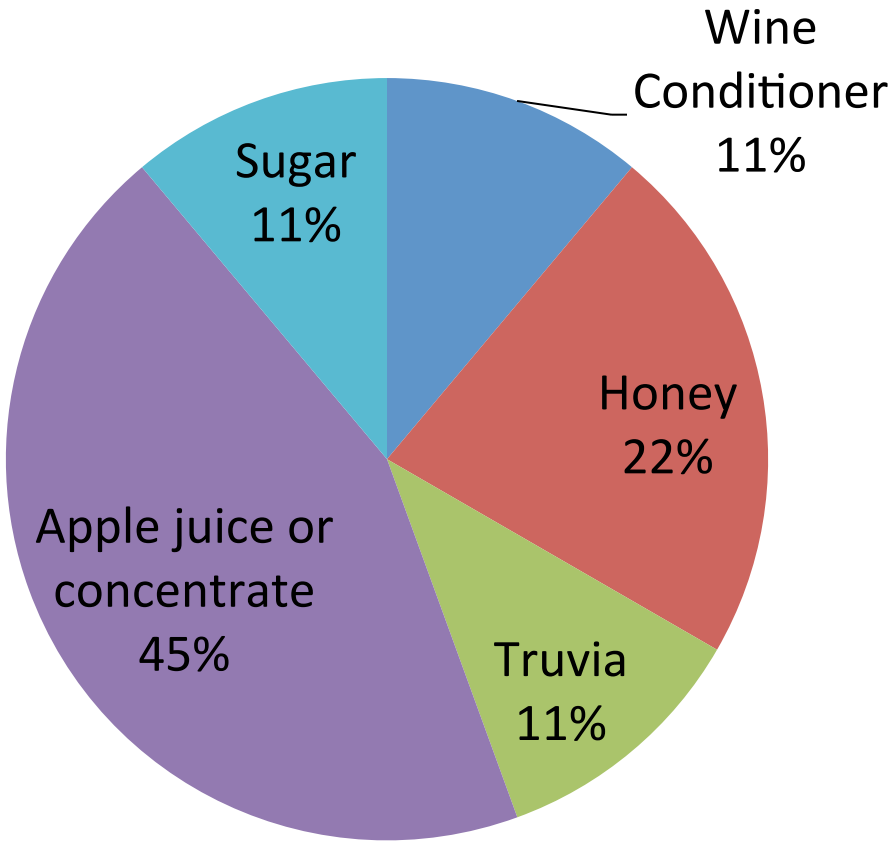
Do you back-sweeten your cider?



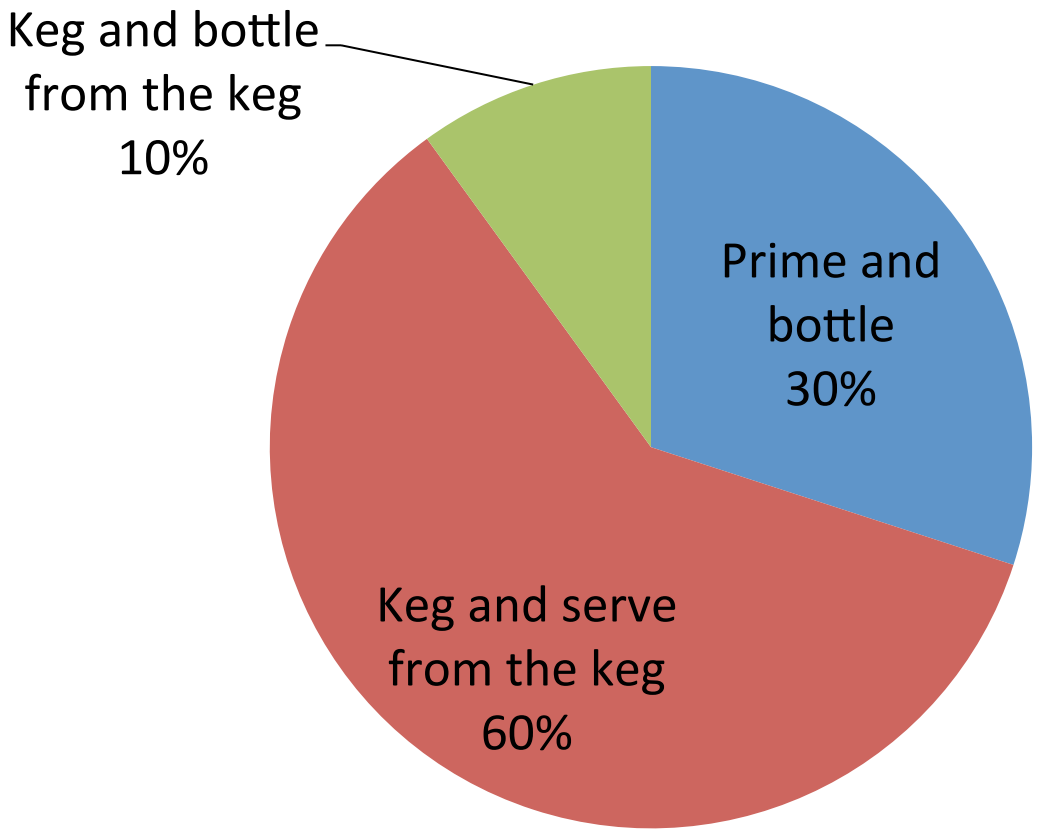
Backsweetening

- Cider fermented to finish will be very dry and champagne-like
  - Unless fermentation was less than ideal
- Add sugars to sweeten the cider
  - Unfermented, reserved juice
  - Frozen apple juice concentrate
  - Any other sugars to add flavors and character
  - Wine conditioner – a blend of liquid invert sugars (fructose and glucose) and potassium sorbate
- But, must stop renewal of fermentation
  - Unless adding unfermentable sugars like Truvia
  - Add more sulfites to kill any remaining yeast
  - Add potassium sorbate at ½ tsp/gal stops yeast cell division

Backsweetner used



How do you package your finished cider?



Bottling

- Tricky to bottle condition and backsweeten
  - Use unfermentable sugars like Truvia or lactose to backsweeten plus priming sugar
- Prime as you would bottled beer, or -
- Doc Woodall's priming recipe
  - Boil 1 cup of water with ½ cup of priming sugar and ½ cup of apple juice concentrate
  - When cool, add 1/5 packet of rehydrated dry white wine yeast (preferably Lalvin champagne)

- Add priming solution to cider in bottling bucket
- Initially store bottles at 70 degrees for at least 2 weeks then move to cellar

Basic steps – a review

1. Acquire 5 gallons of recently pressed raw cider. It should not be pasteurized nor have any preservatives added.
2. Sanitize 6 gallon carboys and add 4 and 1/3 gallons of cider to carboy.
3. Take SG reading and measure pH of the must.
4. Begin yeast starter, boil 600 ml cider, add rehydrated yeast plus yeast nutrient, let ferment for at least 24 hrs.
5. Add remaining cider (1/3 gallon) to pot and heat to boiling…add additions (if your starting SG is low you can add white sugar, brown sugar, or apple juice concentrate to boost it up) plus yeast nutrient…add in remaining cold cider (1/3 gallon) to chill off hot cider.
6. Add solution to carboy and take SG reading.
7. Sulfite to approx. 50 ppm for 5 gallon batch.
8. After 12 hours since addition of sulfites, add 1/2 teaspoon of pectic enzyme per gallon to prevent haze in the finished cider.
9. After 24-36 hours since sulfiting, aerate must then add yeast starter to carboy.
10. Ferment for 5 to 10 days at 70 degrees.
11. After 48 hours since start of primary fermentation add some more yeast nutrient.
12. After 5 to 10 days following yeast pitching, the SG should of dropped to near 1.000 or slightly above.
13. Add fining agent if desired.
14. Rack to a secondary if desired. After another 7-21 days the cider should be sufficiently clear for bottling.
15. Bottle or keg as desired.


The End
Thank you for your attention