Paul Vossen Specialty Crops Advisor – UCCE (Sonoma-Marin)

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Cider harvest

Brix-Sugar Content

Hand vs Machine

About 1/10th the cost

Hand Harvest Video

Machine Harvest Video - 1

Machine Harvest Video - 2

Machine Harvest Video - 3

“Sweating”

Milling and Pressing

- After picking, fruit left to sweeten or “sweat”
- Before grinding, wash fruit and remove rot

- Apple shredder to mill fruit ( )
- Bladder press to extract juice ( )

Apple Crusher

Apple Juice Press

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Sorting & Washing

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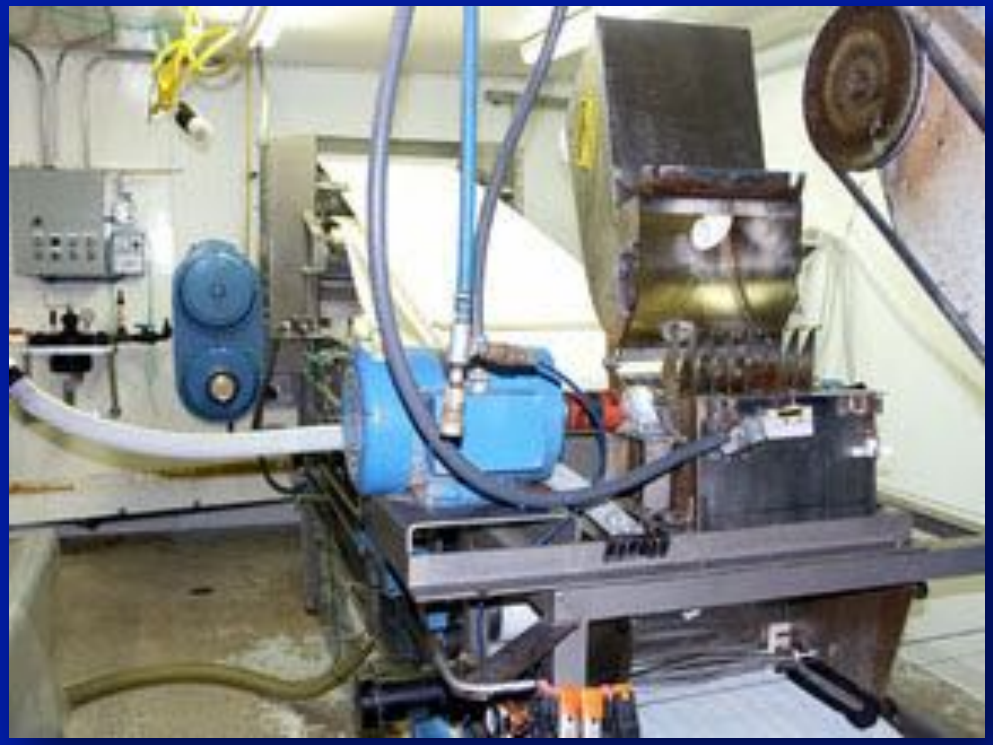
Grinding/Milling



Commercial hammer mill

Kickapoo Orchard, Inc., Gay Mills, WI

Batch type grinder mill

Suntech Mfg. Co. , Spokane, WA

Batch & Continuous Presses

Hydraulic batch press

Continuous press

Kickapoo Orchard, Inc., Gay Mills, WI

Continuous Roller Press

Pressing

- Add rice hulls and/or enzymes during pressing to increase juice extraction.

Apple Wine

Apple Wine

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Cider Juice Analysis

Summary of juice analysis for cider apple varieties grown at WSU Mount Vernon NWREC from 2003-2013 (data not collected in 2007).

		Tannin %		Malic Acid g/l		°Brix		pH	
Cultivar	Yrs Eval.	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Amere de Berthcourt	3	0.48	0.20	1.90	0.53	12.9	1.55	4.31	0.14
Breakwell Seedling	5	0.27	0.22	7.82	3.27	10.9	0.97	3.23	0.13
Brown Snout	7	0.19	0.06	3.37	0.84	13.5	1.77	3.87	0.16
Dabinett	8	0.29	0.18	2.55	1.30	14.0	1.18	4.37	0.25
Golden Russet	5	0.13	0.05	6.64	0.91	16.9	1.33	3.67	0.25
Harrison	3	0.16	0.03	7.77	2.58	15.8	0.21	3.37	0.39
Kermerrien	6	0.37	0.09	2.44	0.21	13.2	1.22	3.76	0.25
Kingston Black	7	0.17	0.11	6.45	1.04	13.4	1.39	3.45	0.19
Medaille D' Or	4	1.05	0.49	3.43	0.48	15.8	1.73	4.19	0.18

°Brix and pH

- °Brix – place 2-3 drops juice sample onto refractometer
- pH – measure 100 ml juice sample with digital pH meter

< Digital refractometer

Digital pH meter >

% Tannins

- Tannins measured using Lowenthal permanganate titration:
  - Standard procedure used at Long Ashton Research Station
  - Can compare WSU data with English data
  - How to Test Tannin Levels in Apple Juice Using Lowenthal Permanganate Titration

- Cider juice solution blue at start of titration
- Cider juice solution yellow at final point

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Malic Acid (g/l)

- Titrate with 0.2 M solution of sodium hydroxide (NaOH) to 8.1 pH
- Record volume of solution used
- Calculate malic acid using the equation:

$$\text{Malic acid } (g \cdot l^{-1}) = \text{ml NaOH} \times 0.536$$

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Yeast and Fermentation

- Wild yeast (naturally occurring) works, but results variable and unpredictable
- Commercial wine or champagne yeast most common
- At NWREC: Lallemand DV-10 (Champagne)
- Some yeast specifically for cider
- Choice depends on cider style
- Purchase or order from brewing supply sources, local or online

Commercial wine yeast common for cider making

Various Ciders

Various Ciders

Various Ciders

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Varietal Cider

Adding yeast

Fermention

Bottling

Sensory analysis

Cider & Perry Organoleptic Profile Sheet

1. Appearance	**Description**								
Clarity									
Color									
Other									
2. Aroma & Flavor Attribute	**Intensity**								
	None	**Slight**			**Mod.**				**Hi**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
3. Taste									
Sweet									
Sour									
Bitter									
Salty									
4. Mouth Feel									
Astringency									
5. Aftertaste									
Length & Characteristics									
6. Overall									
Balance and overall summary									

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Varietal Cider Descriptions

Variety	Description	Color	Aroma	Overall
Blanc Mollet	Mild to mod. bitter French bittersweet	Deep gold	Caramel, pear & Jolly Rancher with wood, biscuit & tropical fruits	Medium bodied , light flavors & aromatics. Medium length finish with bitter & mildly astringent aftertaste.
Chisel Jersey	Full English bittersweet	Golden amber	Bittersweet apple, phenolic, citrus, floral, spicy, earthy & woody	Barnyard character typical of English farmhouse cider; pronounced bitterness. Very long tannic, astringent finish.
Golden Russet	Medium sharp russet dessert apple	Straw	Estery, green apple, candy apple, honey, cidery & tropical fruits	Full-bodied, alcoholic, complex aromatics, good acid. Medium length. Excellent base for dessert apple cider blend.
Granniwinkle	Old American moderately sharp cider apple	Straw	Estery, floral, tropical fruit, confectionary, woody, green apple, cidery	Clean, crisp and fruity, light bodied, short finish . Refreshing aftertaste of melon, currant, honey and dried fruit; potential Champagne cider.

http://maritimefruit.wsu.edu

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Tax by ABV

Finished ciders and fermenting ciders at WSU Mount Vernon NWREC

- Cider is defined by its alcohol content, "alcohol by volume" (ABV)
- Apples naturally have 10-20% sugar content, produce ciders with final ABV 4-9%
- In most states, cider below 7% ABV taxed at a lower rate
- Cider with greater than 7% ABV taxed as wine

Finishing

- Adding sugar to juice prior to fermentation (Chaptalizing) to standardize the alcohol content
- Adding carbon dioxide (CO_2) under pressure (carbonation) produces bubbles and a little acidity
- The "Champagne method" of yeast fermentation can also produce carbonation

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Various Ciders

Pommeau - Ciders

Various Ciders

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