INTRODUCTION

The wine industry generates a number of distinct waste streams, each of which is compositionally unique. As such, a range of different recycling options are needed. This poster presents a summary of the primary wine industry waste streams, the estimated quantity generated, average dry weight composition and potential re-use applications.

### Prunings
- Estimated at 20% of grape yield – 345,000 t
- Average composition:
  - Soluble carbohydrate 35-44%; protein 15%; anti-oxidants (trans-resveratrol/viniferin) 1%; K 0.7%, Ca 0.8%.
- $ - burning for fuel, wood composites, compost/mulch
- $$$ - anti-oxidant source

### Vineyard posts
- Stock-piled amounts unknown
- Average composition:
  - Copper chrome arsenate (CCA) treated wood most popular for trellis and strainer, with creosote distant second
  - Treatment of wood limits re-use potential
- $ - fence posts, garden beds, play equipment, mulch for gardens or pet bedding, composite wood (depends on regulations).
- $$$ - CCA extraction and use as untreated wood (disposal of extracts).

### Stalks
- Production roughly 5% of crush – 85,000 t
- 60% moisture
- Average composition:
  - Soluble carbs 30%; cellulose 20%; tannin 15%; lignin 10%; hemicellulose 10%; protein 5%; polyphenols ≤5%; tartrate 2%; K 0.9%; Ca 0.15%.
- $ - milling and use in composite wood, mulch for gardens or pet bedding, animal feed, burning for fuel
- $$$ - biochar/activated carbon, bio-sorbent for metals, bio-ethanol production from carbohydrates, source of minerals
- $$$ - anti-oxidants/health

### Lees
- Production, moisture and content highly variable
- Can contain yeast lees, wine lees, diatomaceous earth
- Estimate yeast lees at 6% of crush – 102,000 t

#### Yeast lees average composition:
- β-Glucans 10-12% dry weight; tartrate 10%; mannoprotein 6-8%; ethanol (variable).
- Other lees components:
  - Pigments (red wine lees), polyphenolics, salts.
  - $ - ethanol, tartrate, salts
  - $$$ - fermentative biotechnology (lactic acid, xylitol, citrate)
  - $$$ - mannans for health/medical uses

#### Other lees components:
- CCA extraction and use as untreated wood (disposal of extracts).
- $$$ - anti-oxidants/health

### Waste water
- Production variable, but average 2 kL/tonne
- ~6.800 ML per year nationally
- Composition and volume depend on processes and time of year
- Limited value-add potential

- Can contain:
  - Grape solids, dissolved sugar, sodium, potassium, grape juice, wine, filter media, tartrates, fining agents, caustic cleaning agents.
  - $ - sludge for composting, anaerobic digestion (biogas), irrigation

- Low value application; $ - moderate value; $$$ - high value. Estimated based on expected market value.

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The AWRI is a member of the Wine Innovation Cluster