Transformation opportunities of industry waste and potential routes to market: a snapshot

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Introduction

• The Riverland and Murraylands contribute almost $2.2 billion to South Australia’s food and wine industries.
• This project mapped and determined the most profitable value-add options for lost or under-valued food and industry waste (e.g. grape marc, waste water, vineyard posts) in line with the principles of the waste hierarchy of alternative uses for the region.
• Project phases included identifying volumes and seasonality of waste, bioprospecting of waste streams and investigations into marketable avenues.

Overall key findings

• Rejected potatoes (due to cosmetic standards), almond husks/shells and unsaleable citrus were the three largest horticulture waste streams from the study region.
• Significant wine industry waste streams were vine prunings and grape marc, with the latter already well used and aggregated, and the former typically non-valued as an under-vine mulch.
• Cross-industry aggregation hubs would further capabilities in the waste valorisation industry to better take advantage of seasonality of produce.

Bioenergy

Aggregation opportunities:
1. Anaerobic Digestion
   Recommendations:
   • Grape marc and potato waste-aggregation for anaerobic digestion.
   Considerations:
   • Moderate-to high moisture content of grape marc (40 – 60% DM) and potato waste (10-20% DM).
   • Not co-located.
   Further:
   • Need to determine heat/steam generation requirements.

2. Gasification
   Recommendations:
   • Combined gasification of almond waste and steam distilled grape marc for steam and electricity production.
   Considerations:
   • Locate at almond processing facility and supplement with freighted excess steam distilled grape marc (post-ethanol and tartaric acid removal)
   • Gas and electricity offsets for almond processor and revenue payback for grape waste facilities.
   Further:
   • Sensitivity analysis dependent on value potential of using almond waste as a livestock feed or supplement.

Nutraceuticals

Grape seed extract:
High quantities of polyphenolics and tannins
Requires significant purification to meet requirements for inclusion into nutraceutical applications
More knowledge required around the marketable nature of the product

Bulk food products:

Grape seed oil:
Good source of polyunsaturated fatty acids
Limited degradation and accessible from processed and pre-extracted grape marc/seeds
Processing infrastructure and grape seed isolation from grape marc key functional requirements to improving product availability

Animal Feed Products

Grape waste:
Current prospect: high mass – low value
Future prospect: boundary between high mass – high value with some components as low mass – high value after fractionation, including lees and tannin-based components.

Seasonality of waste streams

• From a horticultural aspect, waste generated from potatoes and carrots is typically available year-round (Figure 1).
• For the wine industry, peak waste generation times are during harvest/crush and following fermentation (Figure 2).
• Seasonality of selected waste streams can significantly affect the potential marketable value attained through processing.

Study Target Area

35,000 tonnes
21,000 tonnes
69,300 tonnes
Grape marc ~ 74,000 tonnes
Vine prunings ~ 99,600 tonnes

Potential wine industry waste transformation opportunities

Figure 1. Seasonality of horticultural products as a percentage of the total waste from the industry
Figure 2. Seasonality of wine industry products as a percentage of the total waste from the industry