Recovering Value from Organic Waste Materials...Winecrafting

by
Eric Leber
AprèsVin Enterprises, Inc.
FruitSmart, Inc.
Prosser, Washington
...more goodness from the grape
First, a brief historical perspective...
Associated Vintners shareholders planting their Harrison Hill vineyard.

—Photo courtesy of Associated Vintners.
Growth in Washington Winery Waste

Year
Winery Waste (tons)
0 10000 20000 30000 40000 50000 60000
Prosser grapes, gripes grow over stench

By MIKE LEE
Herald staff writer

PROSSER - Sitting atop his grape harvester and looking across the Vineyard, Phil Whitney couldn't have been happier. The stench of rotting grapes was gone, and the owner was pleased.

"The top of this pile, it was bad," said Doug Merritt, recalling the previous week's accident. "The top is kind of smelly, extremely hot."

Here in the Yakima Valley, there are a $40 million industry.

But the practice is controversial, and the Benton Clean Air Authority has raised the possibility of a new rule to regulate it closely.

Four years ago, Whitney was sued for negligent storage of grape waste, but the practice was under fire again last year after falling into a pit of recycled biowaste on one of his properties.

"That's what alerted us to the problem," said Richland, Wash. resident Terry Flores. "We started working at that point to make sure this stops."

Decomposing organic material can ignite even when it can be smelly, Dawson said.
VALUE CASCADE

WINERY WASTE (POMACE)

ETHANOL DISTILLATION
(OCTANE ENHANCER/ BIODIESEL COMPONENT)

BRANDIES/ FORTIFIED BEVERAGES

TARTARIC/TANNIC ACID RECOVERY

GRAPE SEEDS

FIBER
WINERY WASTE (SPENT YEAST)

HIGH-PROTEIN FOOD/FEED SUPPLEMENT

BAKING INGREDIENT
WINERY WASTE
(EXCESS/BAD WINE)

ETHANOL DISTILLATION
(OCTANE ENHANCER/
BIODIESEL COMPONENT)

BALSAMIC VINEGARS

BRANDIES/
FORTIFIED BEVERAGES

FRUIT/OTHER
INFUSIONS

ALTERNATIVE AGING
WOODS
In the shadow of Rattlesnake Mountain…
Winemaking begins with the grape harvest in the fall.
After the grapes are crushed and the wine is made, the grape residues (the “pomace”) are collected and then blended for uniformity.
A trommel screen provides an initial separation of the seeds from the larger grape residues.
Within a few hours after leaving the winery, the wine byproducts are ready for drying.
When most of the water is removed from the seeds, they can be more easily separated from any remaining grape skins.
A multi-step process results in a clean, dry product that is 99.9% pure seed.
Seeds flow from the hopper into the expeller press for cold-pressing. The varietal grape-seed oil drips from the barrel while the press cake is extruded from the nozzle.
Bottling the oil for market is a team effort.
A filler is used in bottling the grape-seed oils.
Adding corks, labels, and heat-shrink capsules is the finishing touch before the bottles are ready for market.
The solid part of the seeds, the “press cake”, is collected for subsequent milling.
A flour mill is used to fine grind the press cake into a highly nutritious baking flour.
Oils...
Nutritional Properties of Oils

- **Vitamin E**
- **Polyunsaturated Oil**

Nutrient Amount in Grams:
- **Olive**
- **Canola**
- **Grape-Seed**

- Olive: 3 Grams (Vitamin E: 1, Polyunsaturated Oil: 2)
- Canola: 7 Grams (Vitamin E: 1, Polyunsaturated Oil: 6)
- Grape-Seed: 15 Grams (Vitamin E: 5, Polyunsaturated Oil: 10)
Flours...
Antioxidant Content and Activity of Select Fruit-Seed Flours

POLYPHENOLS (antioxidant content)
mg/100g

ORAC (Oxygen Radical Absorbance Capacity)
Micromoles TE/g

Cranberry  Blueberry  Black Raspberry  Chardonnay

0  1000  2000  3000  4000  5000  6000
Bioenergy...
solid fuels…
Clean Energy & Environment Project

A Feasibility Study and Demonstration Project
Evaluating Biomass as a Fuel for Gasification to Produce Energy

Funding received from Washington State Community Economic Revitalization Board
Primary Participants

• Port of Benton
• FruitSmart
• Center for Strategic Alliance
• Pacific NW National Laboratory
• REL Associates

Additional Participants

• Yakima Chief (pellet mill owners/operators)
• Mid-Valley Milling (pellet mill owners/operators)
• Seattle Biodiesel (crude glycerin supply)
• WSU Chemical Engineering
misc. byproducts for fuel blending
loading feedstock into blending tank
adding glycerin from Seattle Biodiesel
fruit, wood, and glycerin being blended
feeding blend into pellet mill
pellet mill at Yakima Chief
pellets ready for gasification
gaseous fuels...
gasifier as installed at FruitSmart
2 million Btu/hr of bioenergy
combustor at air-to-air heat exchanger
inside air-to-air heat exchanger
dryer air inlet
...filtering contaminants out of water or air with the charcoal leftovers
liquid fuels…
synthesizing...

and testing biofuel blends
testing oil lubricities
testing performance-enhancing fuel additive
...eau de vitesse
Other values…
“vinomers”
converting residual fibers to paper ("graper")

...red

...or white
decorative “graper” (also edible food wrap)
pigments for ink and pens...
and water-based stain...  
cabernet franc pigment pellets
Pucker Power:
Chardonnay “coffee” and “Boomer Tea”
residual alcohol as a fuel additive (high octane) or marc brandy (aged with oak)
balsamic vinegars

$40

$28

$100

$100
searching for…

and finding

fragrances for soaps & cosmetics
some serious sniffing!
direct from Hillbilly Stills (via eBay)…
an essential oil extraction system
essential oil garden

Essential Oils

EcoVino is a grant-project sponsored by the Economic Development Association (EDA) that allow students to develop soaps, oils, and papers out of discarded grape wastes.

Useful Grape Parts:

Pulp - can be used to manufacture paper.
Seeds - are grown and extracted to produce glycerol and oils, essential ingredients used to make cosmetics and bio-diesel oils.

Notes: My project is to grow and maintain healthy plants in the field. The lemon grass and French lavender are grown for use to extract oils. The extracted oils will be used as an ingredient in various cosmetic formulation, vinegar, and edible oil.

Lavender

Background: The name Lavender is derived from the Latin word lavare meaning, “to wash oneself.” There are over 50 types of lavender plants. Lavender is a shrubby plant indigenous to the mountainous regions of the countries bordering the western half of the Mediterranean, and cultivated extensively for its aromatic flowers. Over a thousand years ago, the monks brought the lavenders to the Northern parts of Europe and began propagating it for its many beneficial uses, particularly as medicinal herb. The lavender is closely related to the rosemary, sage, thyme, and basil.

Cultivation: Lavandula - The plant flourish best on warm, well-drained loam; a fairly easy culture in almost any fertile, garden soil. It requires little maintenance.

Practical Uses: Lavender was used in earlier days as a condiment and for flavoring dishes. It has aromatic and healing properties. This herb has uses in culinary, cosmetics, medicine, and landscaping. Interest in this plant continues to grow from large-scale operations to small home gardeners.

Alternative Fertilizer

Another part of my research involves a study container to determine the most efficient way to grow lemon grass. In all, I have 28 lemon grasses that have been re-potted in either all miracle grow, grape compost, or a mixture of miracle grow and grape compost.

This study should allow us to estimate the fertilizer need of an essence producing plant. Likewise, this will help growers determine if grape wastes is an effective alternative fertilizer. If so, this will mitigate growth cost to producers.
Frank Chandler developing bioassays for UV protection and anti-bacterial action
Commercialization Challenges:

- Consumer awareness and understanding
- Market assessment
- Intellectual property management
- Technical questions
- Export market
- Production infrastructure
- Sourcing…extent of participation by wine industry
• Several hundred new, year-round, living-wage jobs;
• Healthier rural economies;
• Improved environmental quality;
• Sustainable supply of feedstocks for conversion processes;
• More diverse energy-resource options;
• Better regional and national security;
• Near zero net greenhouse gas emissions; and
• Technology exports.
THANKS FOR YOUR INTEREST!