



# vineland

RESEARCH & INNOVATION CENTRE



# Infusing consumer research into your product development pipeline

**Amy Bowen, PhD**



# Who we are

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*Improving the economic viability, sustainability and competitiveness of horticulture in Canada*

- Results-oriented Canadian organization dedicated to horticulture science and innovation
- Deliver products, solutions and services through an integrated and collaborative cross-country network
- Independent, not-for-profit launched in 2007



# Vineland Research and Innovation Centre

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- Collaborative, multi-disciplinary research and contract services
- Vineland's 218-acre campus showcases 35 buildings including research laboratories, farms and greenhouses





# Vineland Program Focus

## Research and Innovation Support to Canada's Horticultural Sector



### Horticultural Technology Solutions

- Vision systems
- AI & Machine learning
- Robotics
- Technology validation
- Systems integration



### Biological Crop Protection

- Integrated pest management
- Entomology
- Plant pathology
- Biostimulants evaluation



### Consumer, Sensory & Market Insights

- Consumer & sensory science
- Market research
- Value chain mapping
- Sustainability analysis



### Plant Responses & Environment

- Plant production science
- Soil restoration & health
- Abiotic stress
- Soil & substrate lab services



### Plant Variety Development

- Plant breeding
- Variety performance evaluations
- Genomics
- Bioinformatics
- Biochemistry



# Consumer, Sensory & Market Insights

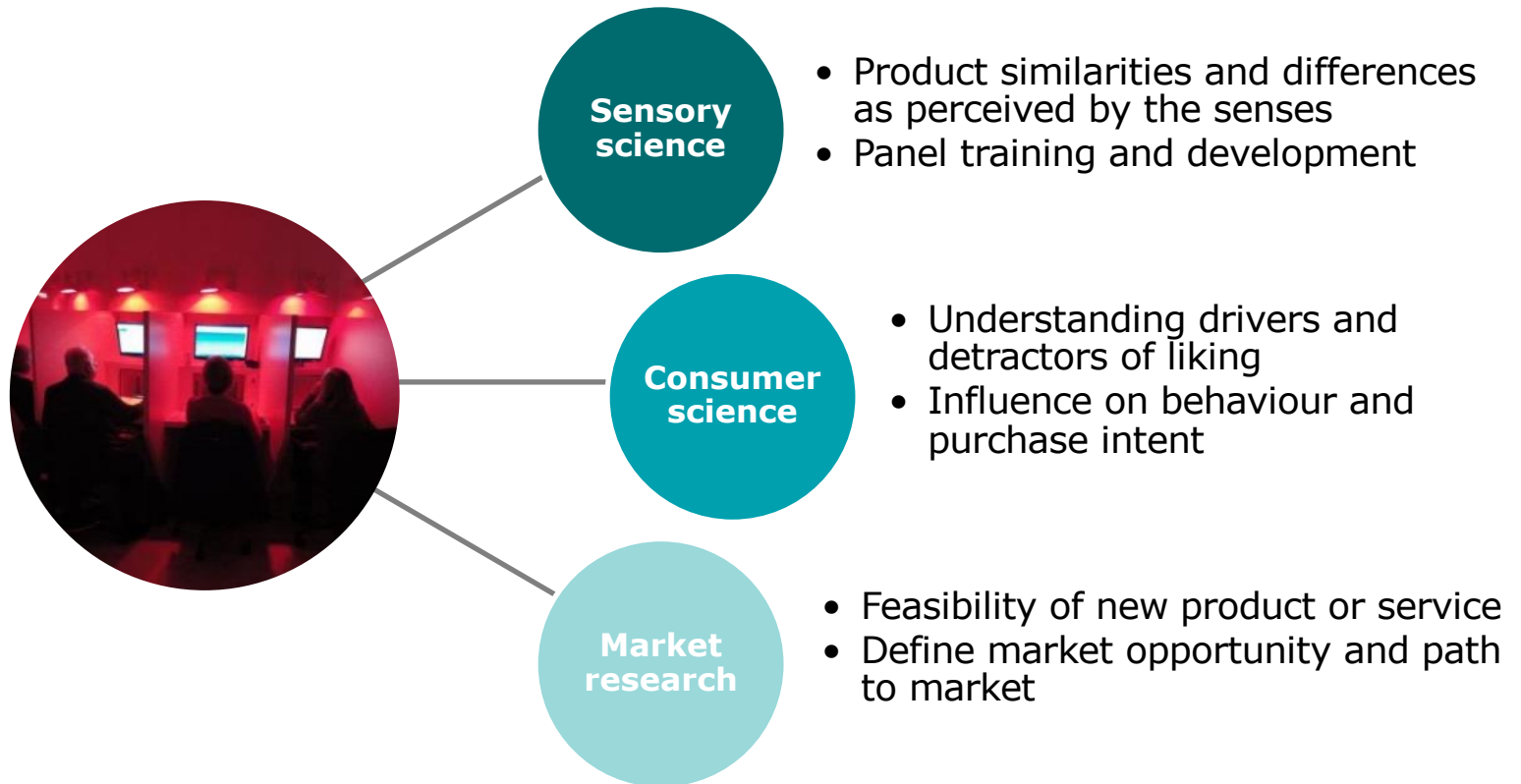
## Developing sensory and consumer-driven strategies

- Support product development and innovation in horticulture through sensory and consumer research coupled with market and business intelligence to understand the consumer, define new product opportunities and market positioning



# What we do

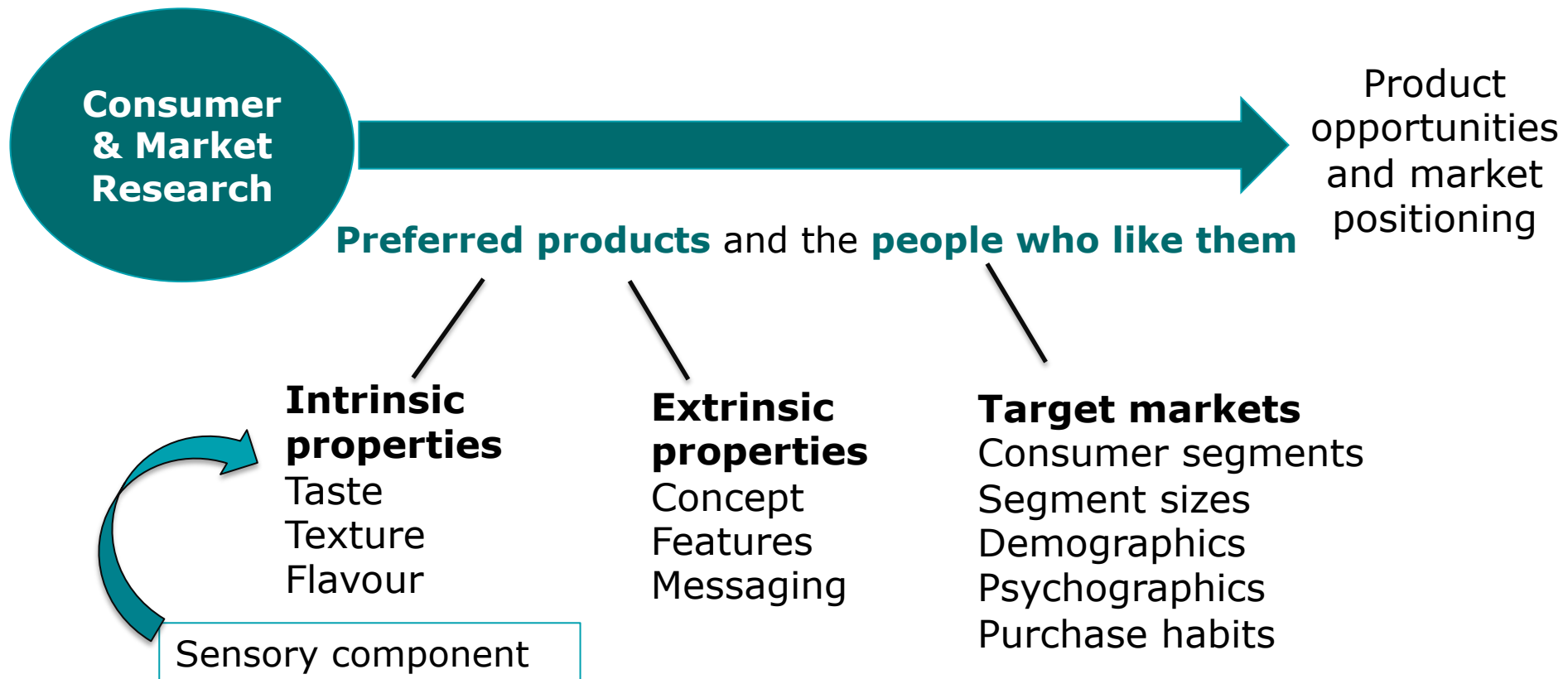
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- Background expertise in biology, food science, psychology, business, marketing and statistical analysis

# Our approach

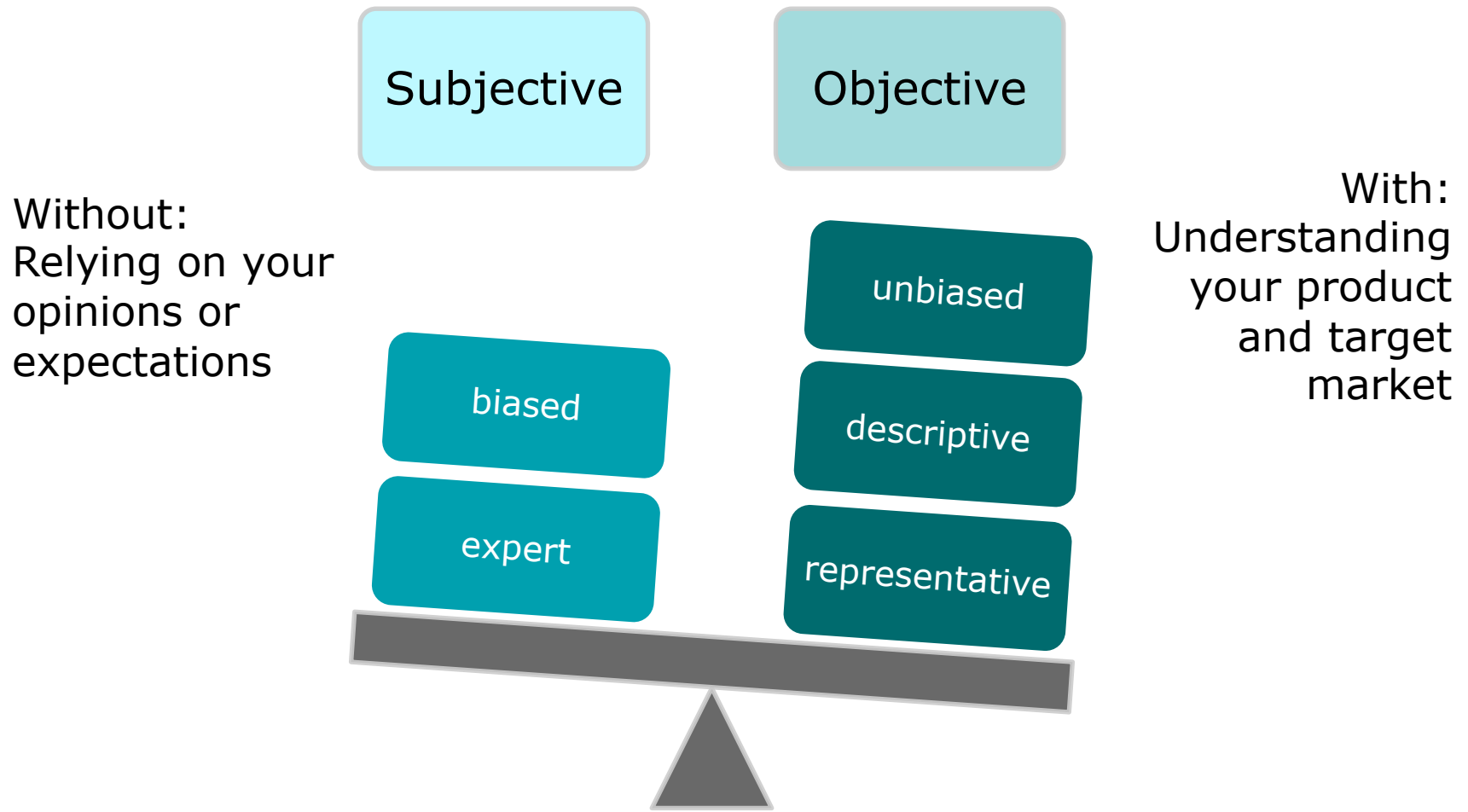
- Customized, data-driven approach-based on our extensive knowledge of horticultural products, value chains and consumer markets





# Value for consumer research

We don't always know what we don't know



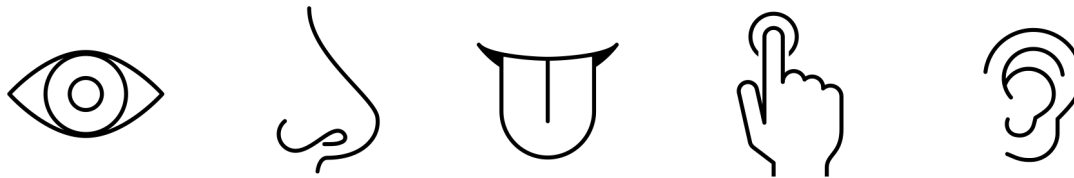
Consumer research is expensive but it's more expensive not to do it!

# Sensory science

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*A scientific discipline used to evoke, measure, analyze and interpret reactions to stimuli perceived through the senses (ASTM, 2000)*

- Set of techniques to measure human sensory response to consumer products using people as instruments



- Objective measurements to remove bias for product evaluation:
  - Trained, expert and untrained panels
  - Provide information on the similarities and differences of product attributes both detailed and holistic

# At Vineland

## Sensory and consumer evaluation laboratory

### Trained Sensory Panel



- 20 part-time employees screened and trained to evaluate edible and non-edible products for sensory attributes:
  - appearance
  - aroma & flavour
  - Taste
  - texture & mouthfeel

### The laboratory

- 10 individual booths with electronic data collection software
- Ability to adjust lighting to mask visual cues
- Sample preparation and serving area



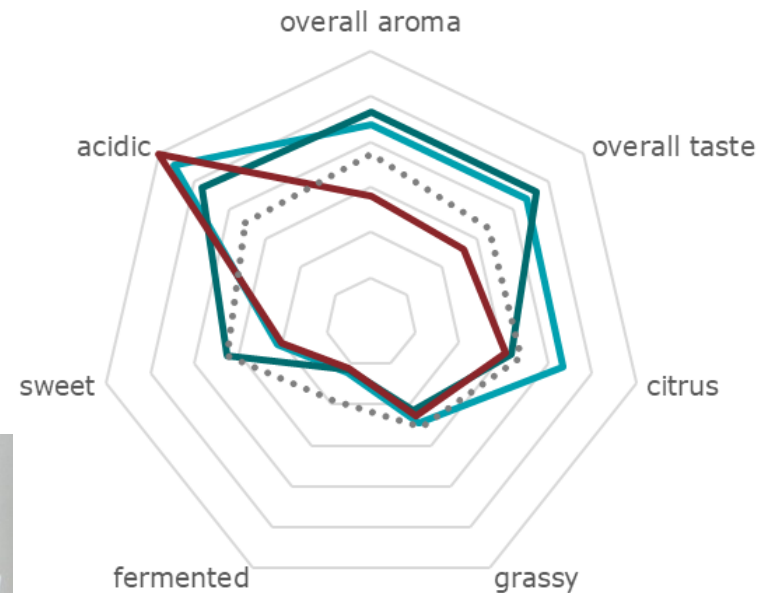
# Flavour profile

## Strawberry: field vs. greenhouse grown

Approach:

- Develop product attribute descriptors
- Create references
- Evaluate attribute intensities
- Identify product similarities and differences

- field-grown (Ontario) - 1
- field-grown (Ontario) - 2
- greenhouse-grown (Ontario)
- ..... imported (US)





# Consumer acceptance

## Preference is individual

- How do product attribute differences impact liking, preference or willingness to purchase?
- Focused on understanding the relationship between product intrinsic and extrinsic attributes
- How this impacts consumer choice?



Innate

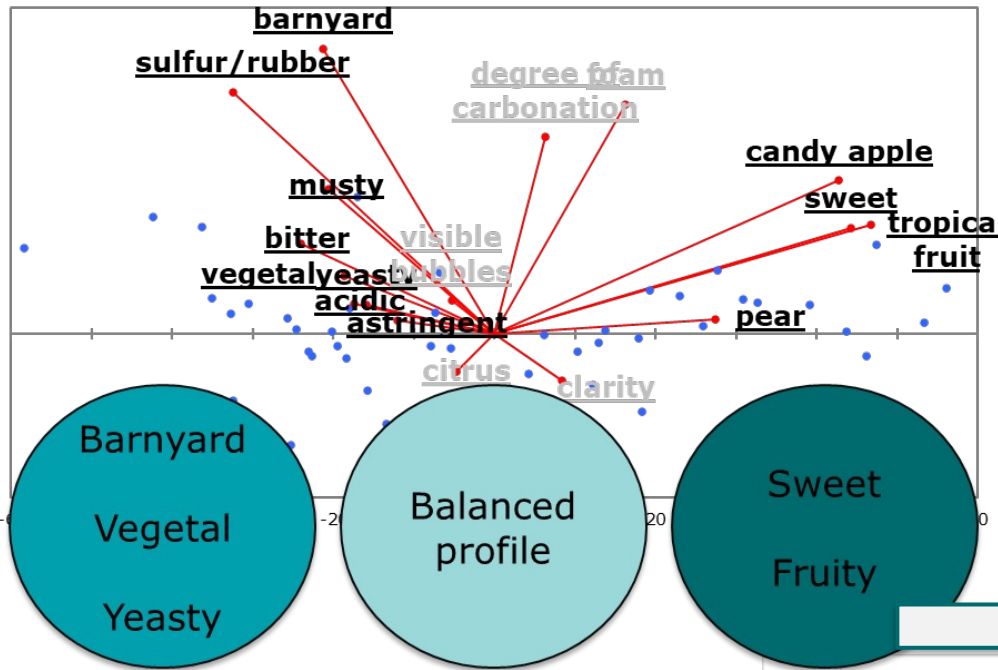


Cultural



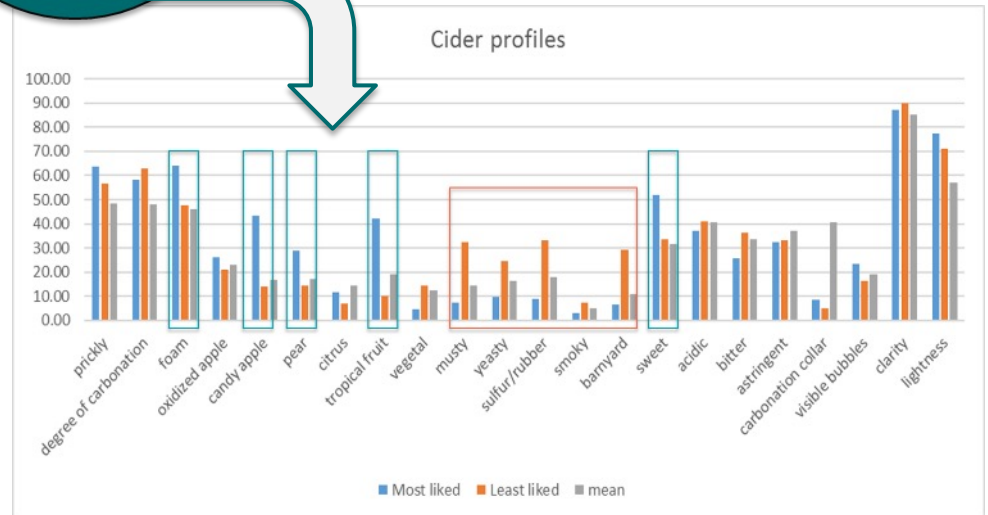
Environmental

# Hard cider profiles



## Sensory profile and consumer acceptance

- Descriptive analysis was used to create sensory profiles of 48 commercial ciders by a 12-member sensory panel
- 15 ciders representing sensory diversity were evaluated in a CLT with 228 consumers from the GTA
- Drivers of liking were defined along with demographic differences



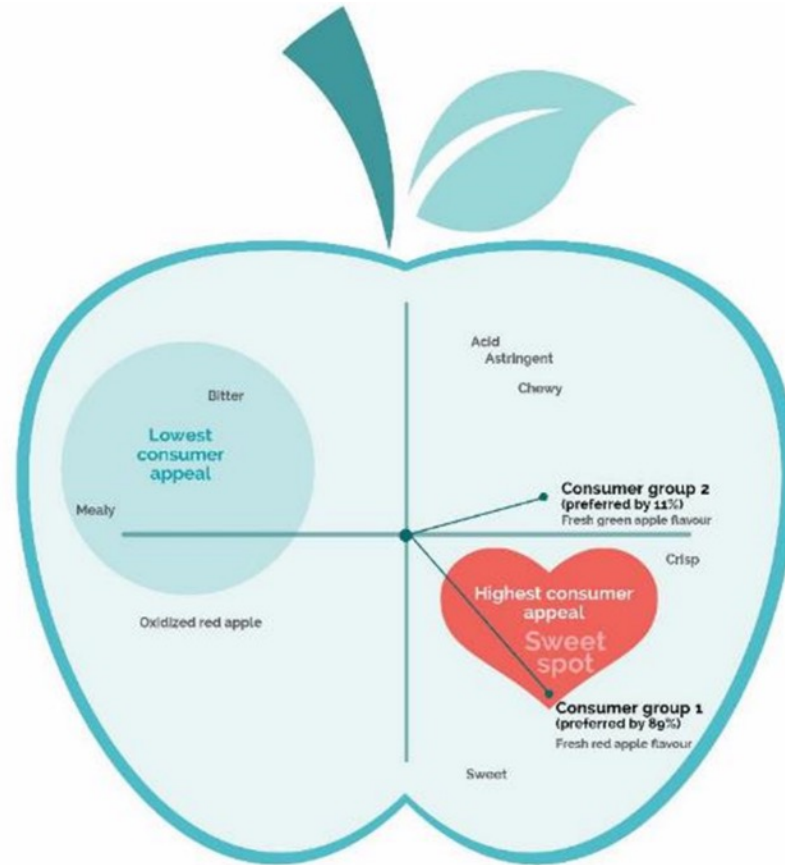
# Consumer acceptance of apples

## Apple preference map

### Part 1

Vineland's trained panel creates sensory profiles:

- ID key attributes that differentiate the varieties
- Evaluation of intensity of each sensory attribute



### Part 2

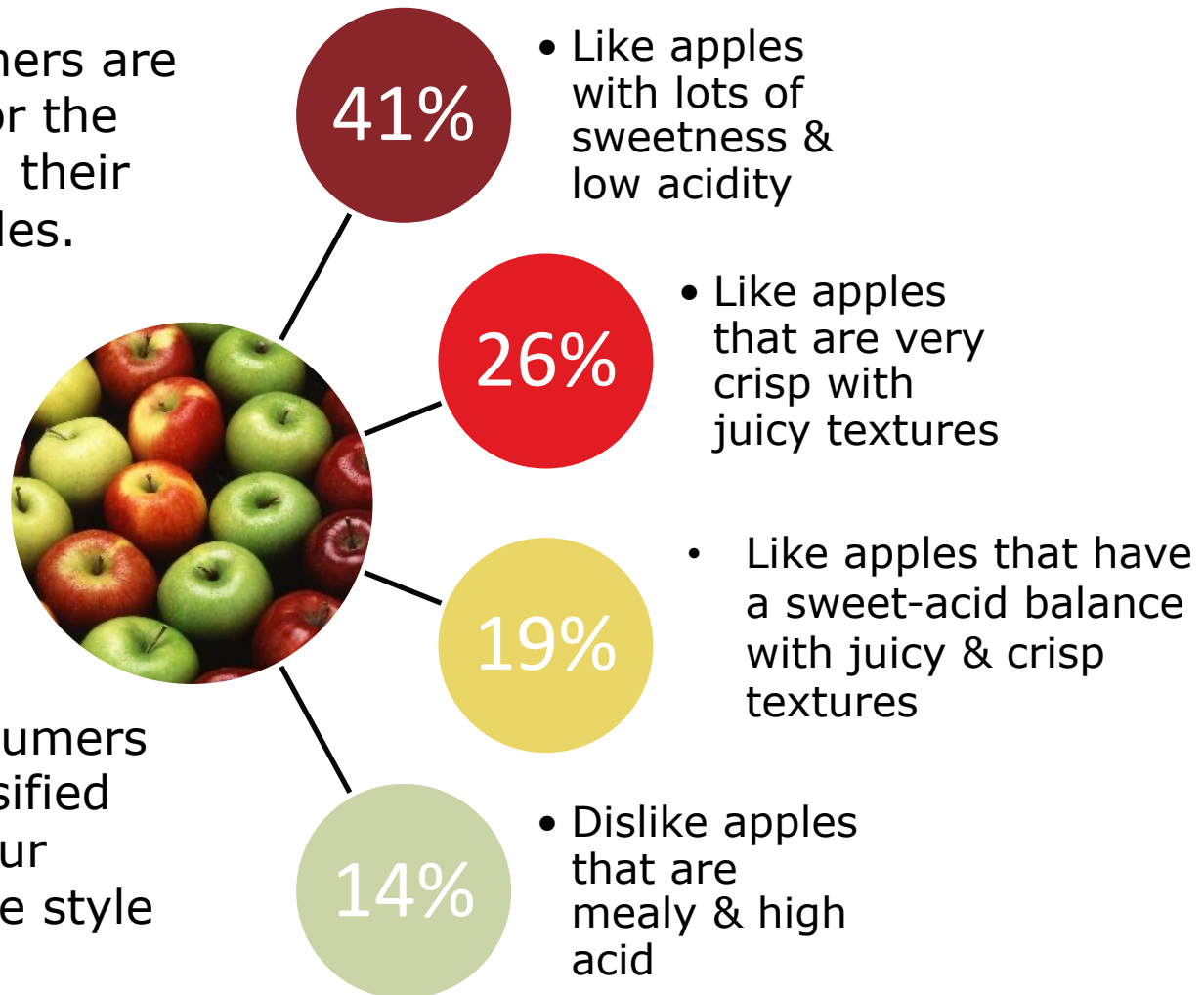
Consumer inform the most and least liked varieties:

- How much do you like this product?
- Demographics, attitudes and beliefs to define market segments

# Choice matters

## Which consumer groups would you target?

Apple consumers are not looking for the same thing in their favourite apples.



Instead, consumers could be classified into one of four different apple style groups.





# Consumer interest

## Wine styles

1) Improve the quality performance of Ontario's dominant white Vidal

2) Investigate potential for an up-and-coming red Marquette

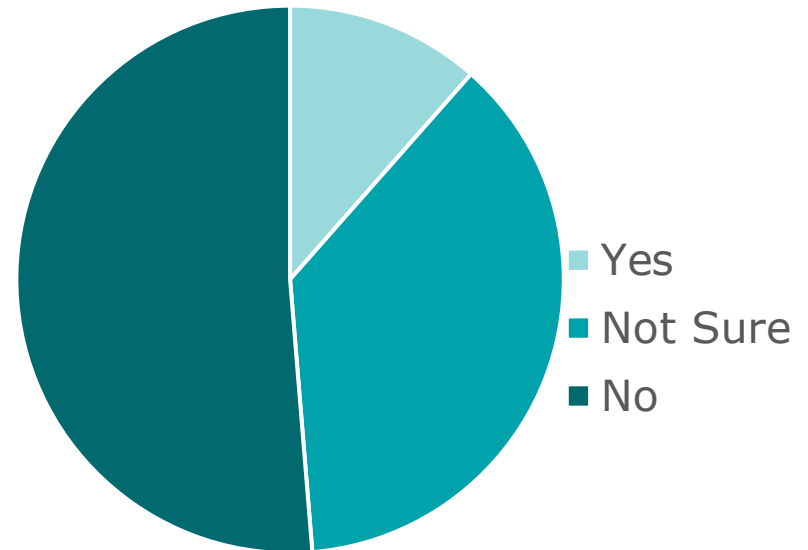


# Marquette attitudes and beliefs

## Results

### Q: Have you ever purchased or drunk wine made from Marquette grapes?

- Approximately half (51%) participants had never purchased or drunk wine made from Marquette grapes
- 37% were 'not sure', suggesting the number that have not purchased or drunk Marquette is likely higher





# Interest in Marquette wine

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## The Marquette story

Participants were given a Marquette brand story and asked follow-up questions:

“Ontario’s wine industry is exploring new red wine grape varieties such as Marquette, which received VQA designation in 2019. The interest stems from a desire to produce quality red wines throughout all of Ontario’s production regions.

Marquette is an ideal new variety for Ontario due to its ability to survive our winters, its high natural pest and disease resistance requires fewer inputs (such as pesticide sprays) throughout the production season.

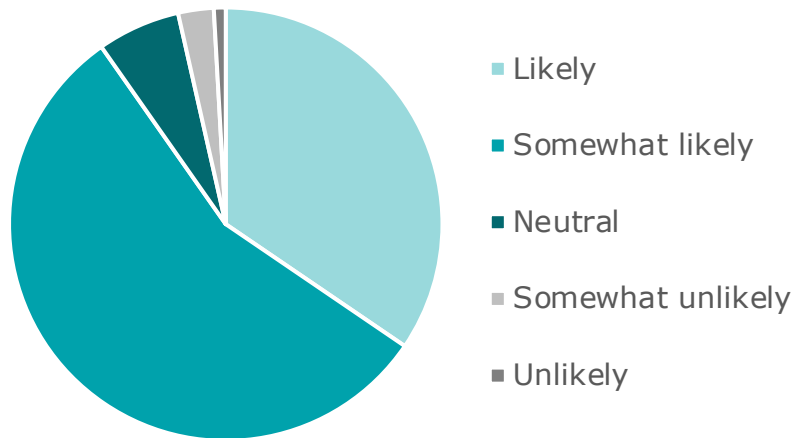
Marquette produces high quality medium bodied wines with flavours of cherries, dark berries and spice. This results in a high-quality sustainable wine at an affordable cost.”

# Interest in Marquette wines

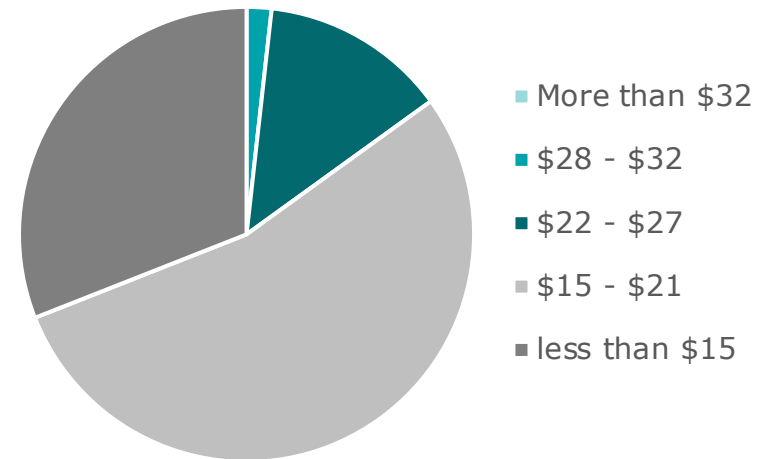
## Results

- Participants were given a Marquette brand story and asked follow-up questions:

Q: Based on the descriptions above [story], how likely would you be to try a Marquette wine made in Ontario?



Q: How much would you pay for such a red wine? [based on story]



- Regardless of liking group, most consumers were likely or somewhat likely to try a Marquette wine made in Ontario (90%) and would pay (54%) \$15-\$21



# Market opportunities



- Environmental scanning and SWOT analysis
- Market research
- Competitive analysis
- Customer insights
- Product trends



- Industry trends, stakeholder preferences
- Value chain analysis
- Scoping new business opportunities
- Feasibility studies
- Economic cost-benefit analysis
- Carbon footprint reduction
- Focus groups, interviews, survey design, data collection and analysis



- Sensory and consumer studies
- Business and technology roadmaps
- Trend analysis and forecasting
- Research impact evaluations
- Brand insights development

# Waste upcycling

## Tackling fruit and vegetable waste upcycling challenges

- We scope opportunities for horticultural products, including:
  - Identifying a range of new value-added product opportunities in edible (food ingredients) and non-edible (agricultural applications)
  - Cost-benefit analyses of alternative opportunities
  - By-product profiling (sensory, analytical)
  - Assessing suitability for target value-added applications
  - Technology development for converting to value-add



# Waste valorization into food

Research at Vineland



## Sector overview

Sources of waste & opportunities

## Ingredients

Developing the value proposition & testing functionality for upcycled ingredients

## Connector

Connecting food companies with a supply of fruit & vegetable by-products

## Opportunity scoping

Helping by-product generators identify options for re-purposing their waste



# Waste valorization into non-food

Research at Vineland



## Compost & Vermicompost

Evaluating quality & properties as growing medium



## Growing media

New products from re-purposed materials



## Soil amendment

Horticultural waste products re-purposed



## Biodigestate

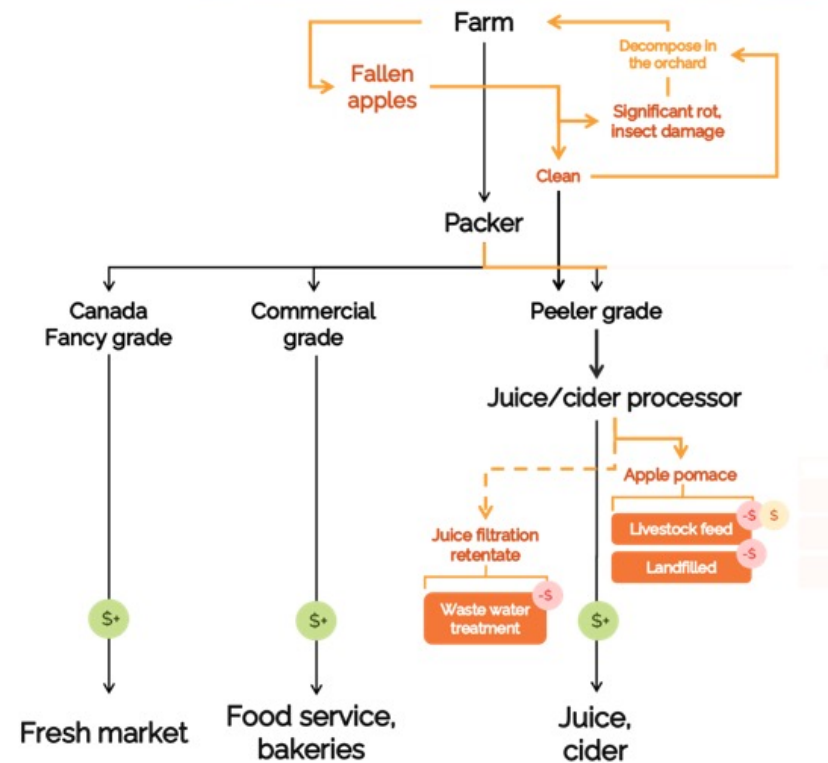
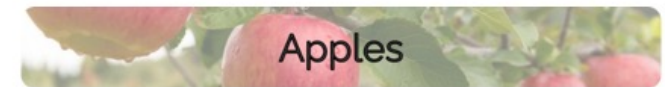
New uses for liquid and solid material



# By-product streams

- In 2022, Vineland released a report detailing the by-product streams available from the top 7 Canadian fruits and vegetables:

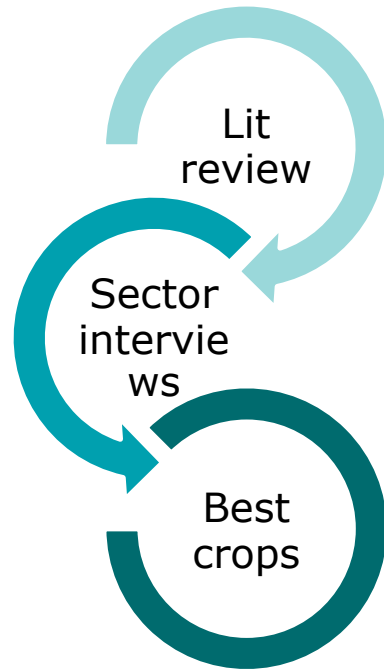
- Interviewed >40 growers, processors and distributors across Canada
- Crops:
  - apples, potatoes, field tomatoes, onions, carrots, greenhouse tomatoes and cucumbers



[https://www.vinelandresearch.com/wp-content/uploads/2022/05/Vineland\\_By-product-streams-from-Canadian-Horticulture\\_May-2022.pdf](https://www.vinelandresearch.com/wp-content/uploads/2022/05/Vineland_By-product-streams-from-Canadian-Horticulture_May-2022.pdf)

# Province Brands

## Upcycling agricultural waste to create novel sugar products



- Developed technology to convert dried hemp stalks into upcycled sugar concentrates:
  - Looking to expand their product line by applying the technology to other crop waste streams
- Assistance from Vineland to identify other locally available crop waste streams that would be suitable for their process

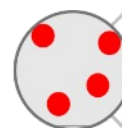
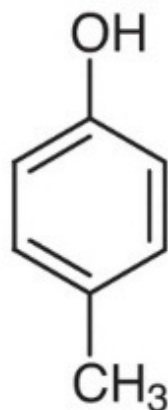


Most promising	Other potential candidates
Spelt hulls	Greenhouse pepper/eggplant vines
Sunflower stalks	Corn stover
	Phragmites
	Wood shavings

# Bayview Flowers

## Odour mitigation strategies for liquid biodigestate

- Commercializing an organic home use plant fertilizer
- Problem: it smells
- Solution:
  1. Determine the baseline chemistry of the organic fertilizer
  2. Define potential mitigation strategies for odor and off-gassing/loss of nitrogen content



1. Adsorbent



2. Masking



3. Other treatments

# Market roadmaps

## Understanding the landscape

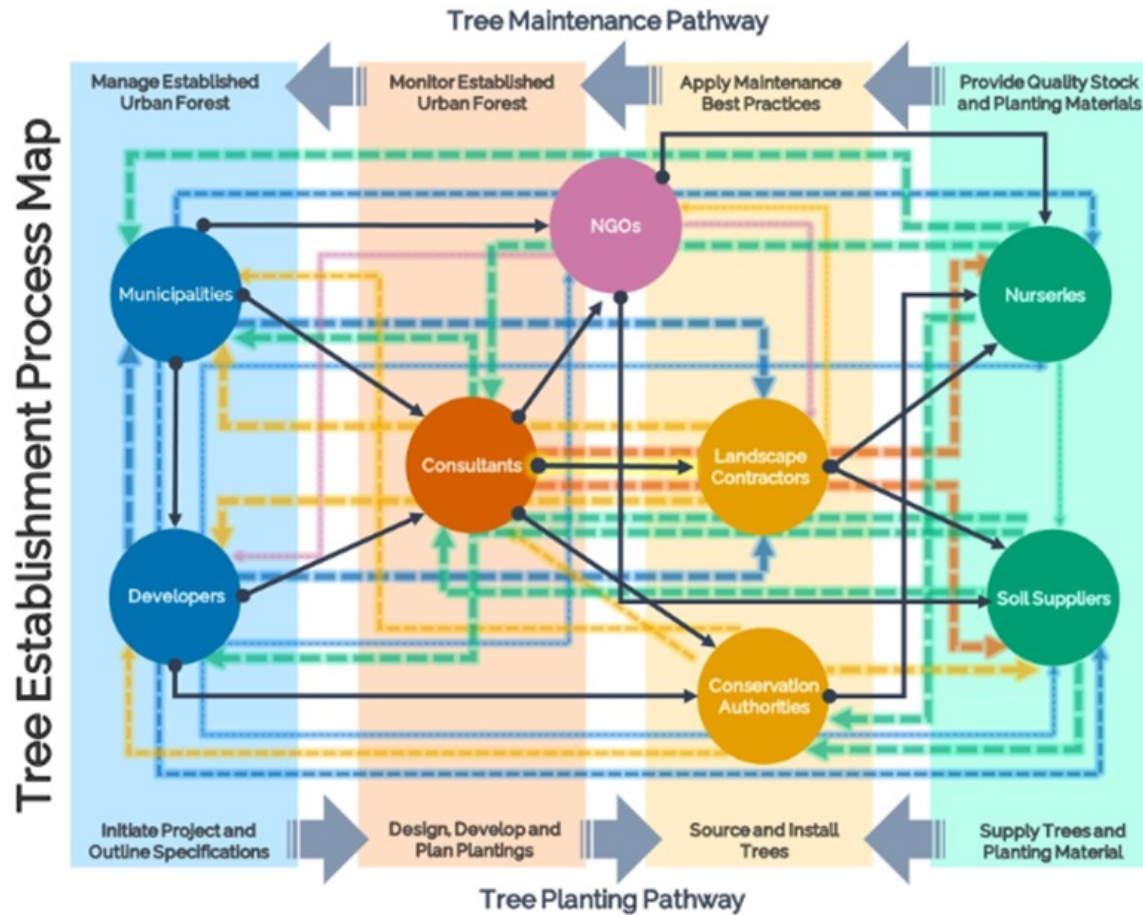
### Roadmap



- Interdisciplinary approach with expertise across the value chain to provide market intelligence related to horticulture technology, production and relationships



# Ontario urban tree value chain



## Legend

### Lines of Communication

- Established
- Established, additional communication required
- Needed, Integral to Tree Establishment
- Needed, Beneficial to Tree Establishment
- Needed, Of Interest to Tree Establishment

- Developers & Municipalities
- Consultants (Engineers, Landscape Architects, Arborists)
- Conservation Authorities & Landscape Contractors
- Non-Governmental Organizations
- Tree Nurseries & Soil Suppliers

# Sustainability

## Mitigation and adaptation



Environment  
impact  
assessment



Life cycle  
assessment



Greenhouse  
Gas Emissions



Cost of  
production

# Value of consumer research

## Summary



● Understand your product characteristics:  
- objective assessment

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- Define its value proposition
  - Determine consumer interest
  - Understand ecosystem

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- Best path to market
  - Confidence in product positioning
  - Benchmarking against competitors
  - Quality control



# Vineland success stories

## By infusing consumer research into product development

- Created demand for a national sweet potato slip propagation industry and launched new variety Radiance
- Introduced Cold Snap™ pear – Winter's Favourite Fruit™ to the Canadian market and Happi Pear™ to North America





# Vineland success stories

## By infusing consumer research into product development

- Vineland's 49<sup>th</sup> Parallel Collection has created a new marketplace for cold hardy, low maintenance award-winning roses



- Vineland helped Okanagan Specialty Fruits on developing, testing and validating messaging for the non-browning Arctic<sup>®</sup> Apple

# Thank you

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