Consumer Acceptance of Biotech Ingredients: What a long, strange trip it's been...

September 26, 2024

Tony Pavel

Partner

Washington DC

202.434.4264

Pavel@khlaw.com

Agenda

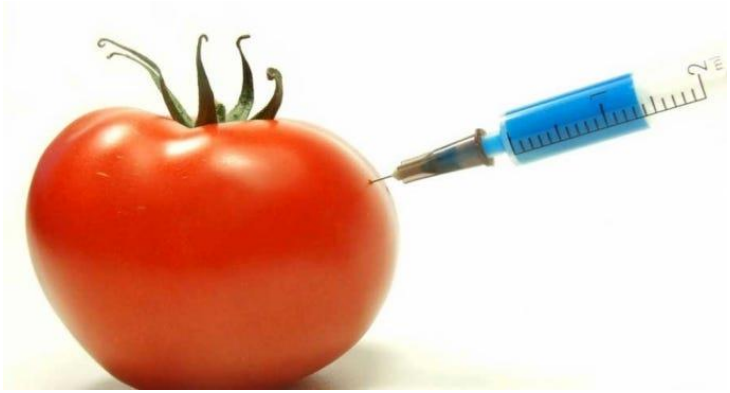
- History of Biotech Ingredient Labeling
- GMO Generations 1 and 2
- Modern Trends and Examples
- Shifting Consumer Attitudes
- Consumer Perception Studies
- Challenges to Consumer Acceptance
- Moving Forward

History of Biotech Ingredients Labeling (1)

- Humans have been cross-breeding and selective breeding plants and animals for thousands of years
  - **1982:** FDA approves first product developed through genetic engineering: insulin
  - **1986:** The Coordinated Framework for Regulation of Biotechnology
  - **1990**: FDA approves microbially produced rennet (chymosin)
  - **1992**: FDA releases policy statement re Foods Derived from New Plant Varieties
  - **1994**: First approved genetically engineered (GE) produce the “Flavr Savr” tomato is approved

History of Biotech Ingredients Labeling (2)

- 1990s: First broadly adopted generation of Genetically Modified (GM) food becomes available on the market: corn, soybeans, etc.
- DNA modification of fruits and vegetables to create pest and disease resistance
  - E.g., Preventing Papaya from extinction due to papaya ringspot virus
    - p.s. – Cavendish bananas are on deck next
- But this is the imagery consumers saw:

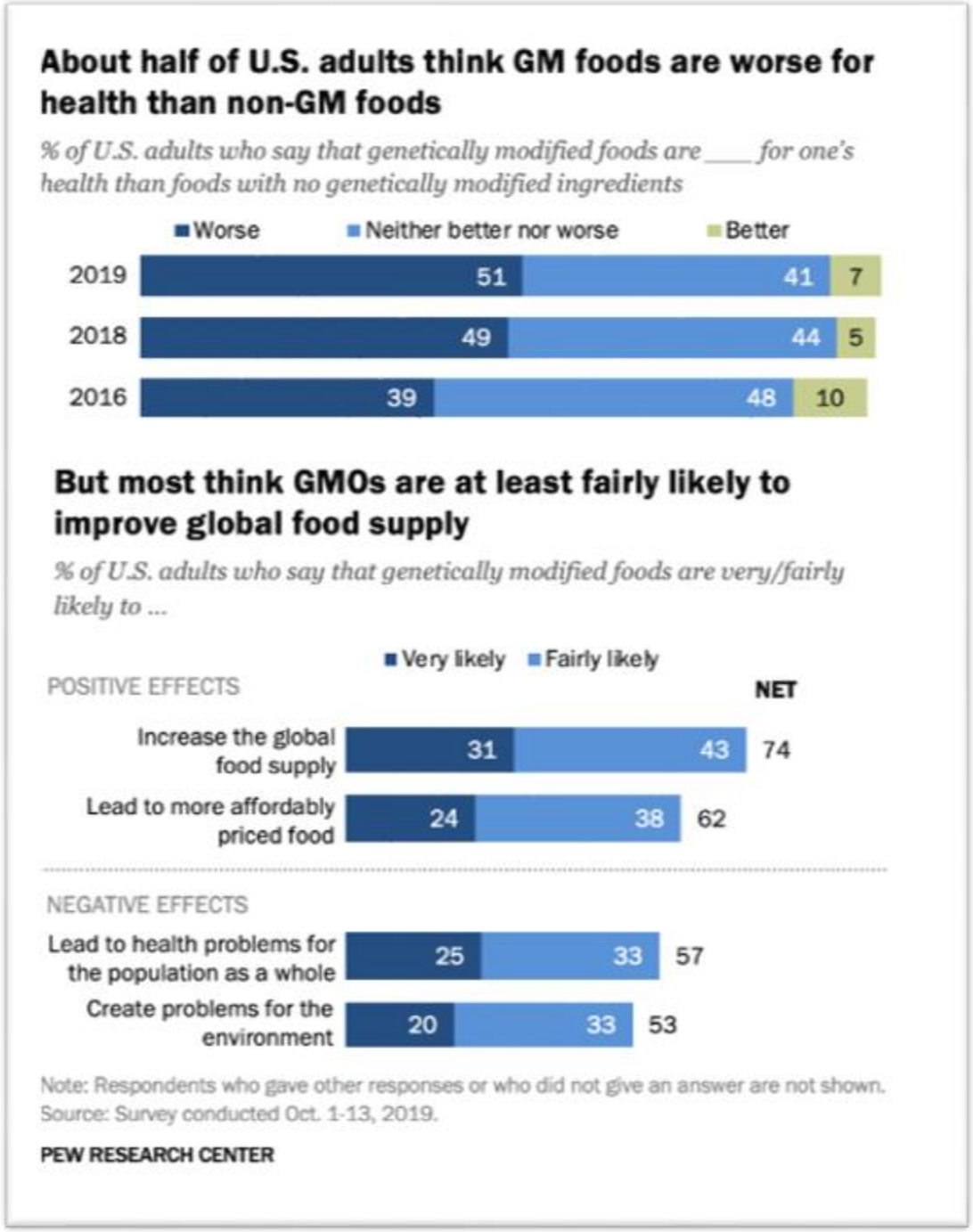


History of Biotech Ingredients Labeling (3)

- Despite voluminous research finding substantial equivalence between GMO/Non-GMO foods, lack of transparency allowed consumer concern to grow
- Controversy around terminology and labeling
- Created the opportunity for new niche markets
- Non-GMO project- certifying organization
  - Implied “free from” labels for products (including kitty litter)
- States began creating a patchwork of labeling regimes that created further confusion among consumers that NBFDS sought to remedy

National Bioengineered Food Disclosure Standard (2016)

- Establishes national food disclosure standards for BE Food
  - Exclusions: Animal feed, refined oils and sugars, & incidental additives, food served at restaurants, food produced by small manufacturers, meat/poultry - unless the most predominant ingredient is subject to labeling or the second most predominant ingredient after broth/stock/water is subject to labeling …
  - **"Bioengineering"** is defined as food that "contains genetic material that has been modified though in vitro recombinant deoxyribonucleic acid (DNA) techniques and for which the modification could not otherwise be obtained though conventional breeding or found in nature."
- Compliance was required by 2022.
- USDA establishes a list of bioengineered foods (14 foods are currently on the list with 2 more being added by 2025).



Pew Research Shows Continued High Level of Mistrust in GM but many are beginning to see advantages

Second Generation of GM- Consumer Focused

- Adds nutritional value to consumers
  - Biofortified:
    - Purple tomato= high levels of anthocyanins
    - Pink Pineapple = higher concentrations of lycopene; sweeter
  - More appealing flavors, colors, and textures
    - Which of these is a GMO and which were made with radiological/chemical mutagenesis:
      - Seedless watermelon
      - “Cotton Candy” grapes
      - Ruby Red Grapefruit

Precision Fermentation and Cellular Agriculture

- Second Generation of GM utilizes even more precise technologies to provide solutions that bring “visible” benefits to consumers
  - Ex. Precision Fermentation: the process of engineering microorganisms (*e.g.*, yeast, fungi, bacteria, etc.) to produce nutrients such as proteins, amino acids, vitamins, fat, etc.
  - Cell-cultured or cultivated meat: process of culturing animal cells *in vitro*

Photo Credit: The Good Food Institute

Market Examples

- Delivering benefits to consumers in terms of nutritional value, taste and texture preferences, and appealing to environmental and social concerns around animal products and climate change
  - Bored Cow- milk alternative made with milk protein from precision fermentation instead of cows
  - Impossible Foods - plant based meats
  - Smart Sweets- sugar-free alternative candy

Shifting Attitudes

- **GMO Generation 1**: Benefits were largely invisible to the consumer and there was a lack of transparency creating distrust
- **GMO Generation 2:** Products have consumer focused benefits rather than supplier side benefits that are visible and transparent
- Generational shift = more acceptance
- Cargill Hartman study
  - 40% of U.S. adults are immediately ready to try precision fermentation
  - Gen Z- younger consumers are much more ready to use these products—more comfortable with technology

Cargill Hartman Study

Keller & Heckman

69% Agree we need to find ways to meet society's nutritional needs with fewer resources like energy, water, carbon

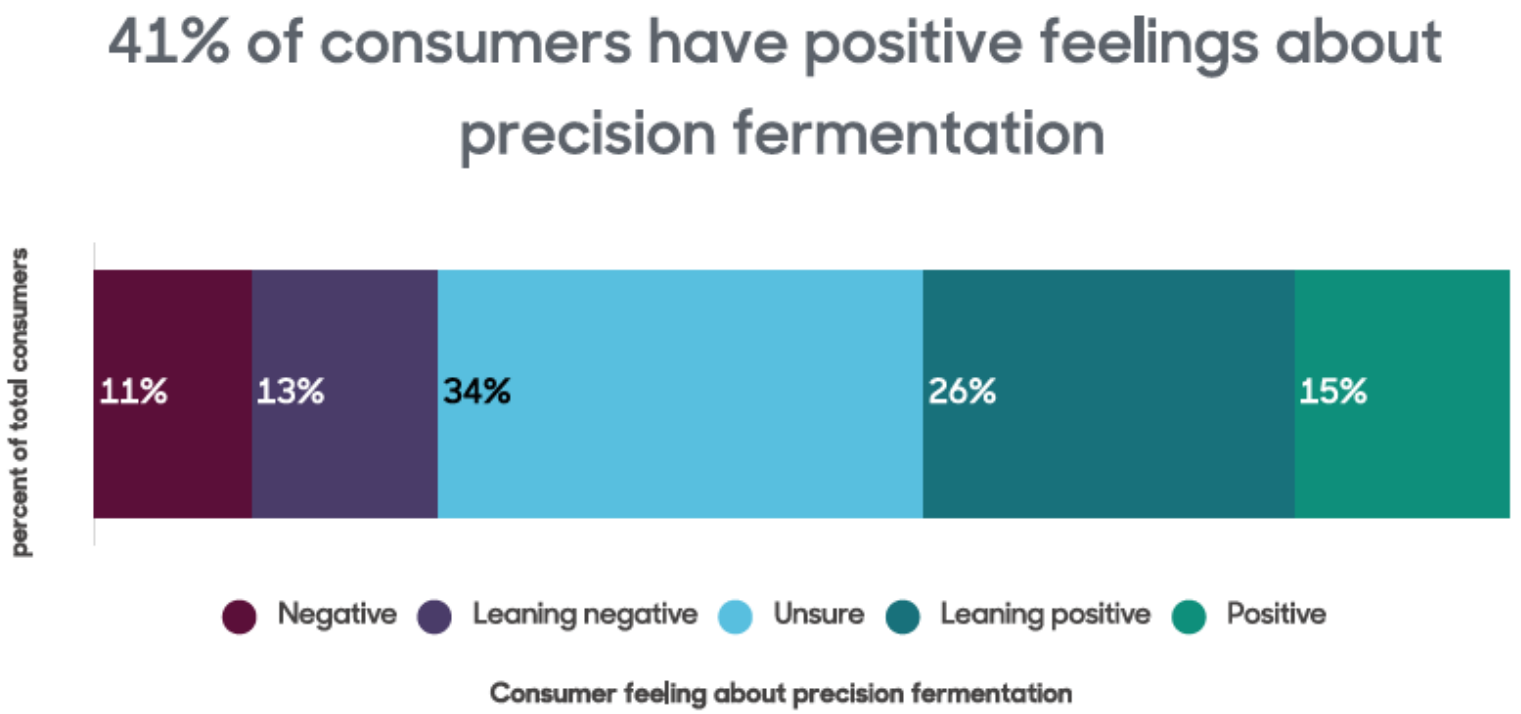
61% Agree Science and technology are our best hope to address climate change

60% Agree scientific and technological innovations can make food more sustainable

56% Agree scientific and technological innovations can make food more health

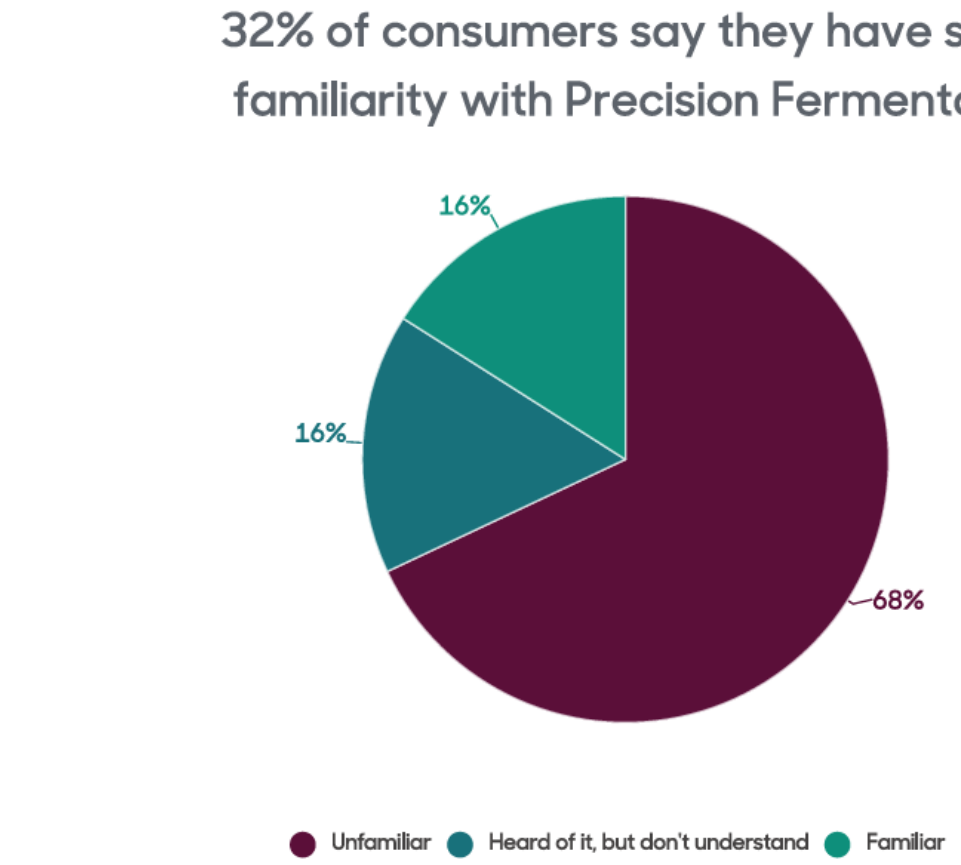
52% Are willing to drastically change their lifestyle to live in a more environmentally friendly fashion

New Hope Network Food Tech Survey Results



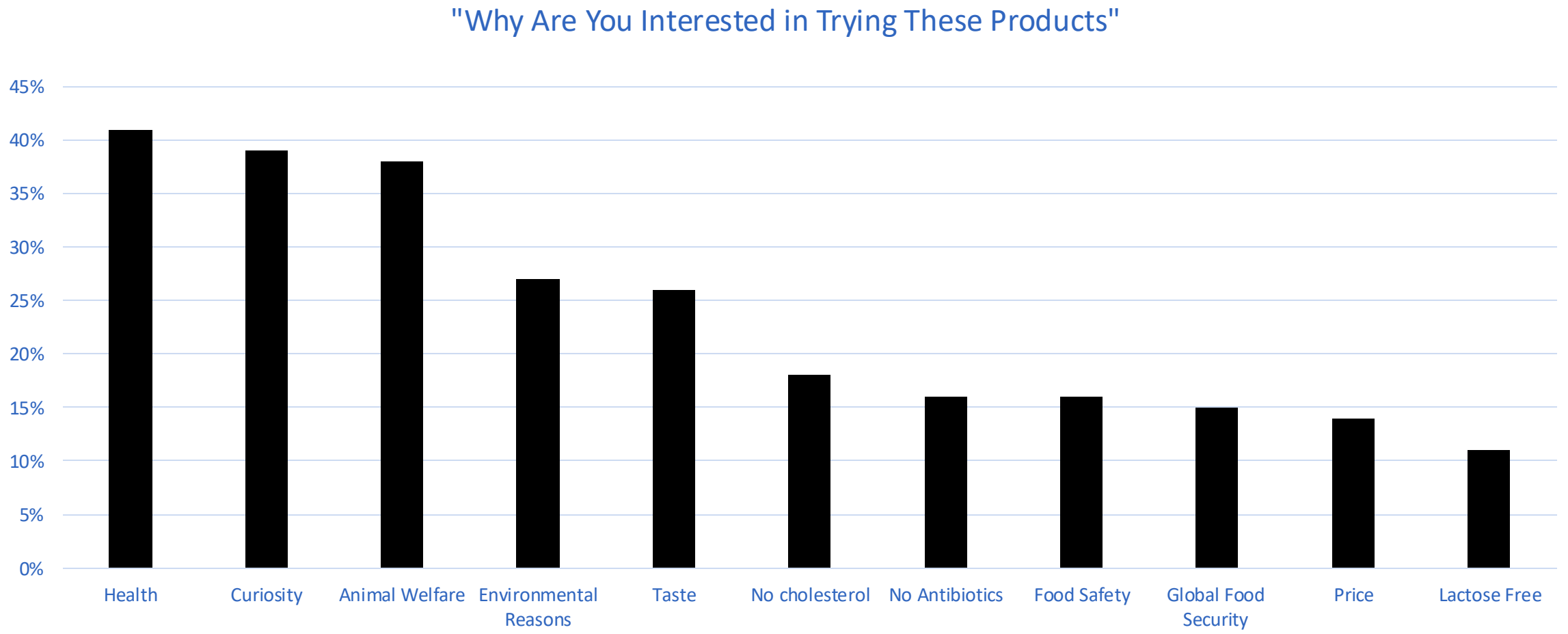
Source: *New Hope Network NEXT Data & Insights* Food Tech Survey N=1,500 collected week of August 8, 2022.
Question: "How negative or positive do you feel about precision fermentation being in the grocery stores where you shop?" Scale of 1-10: Negative=1,2; Leaning Negative=3,4; Unsure=5,6; Leaning positive=7,8; Positive=9,10

Increasing Consumer Education is Key

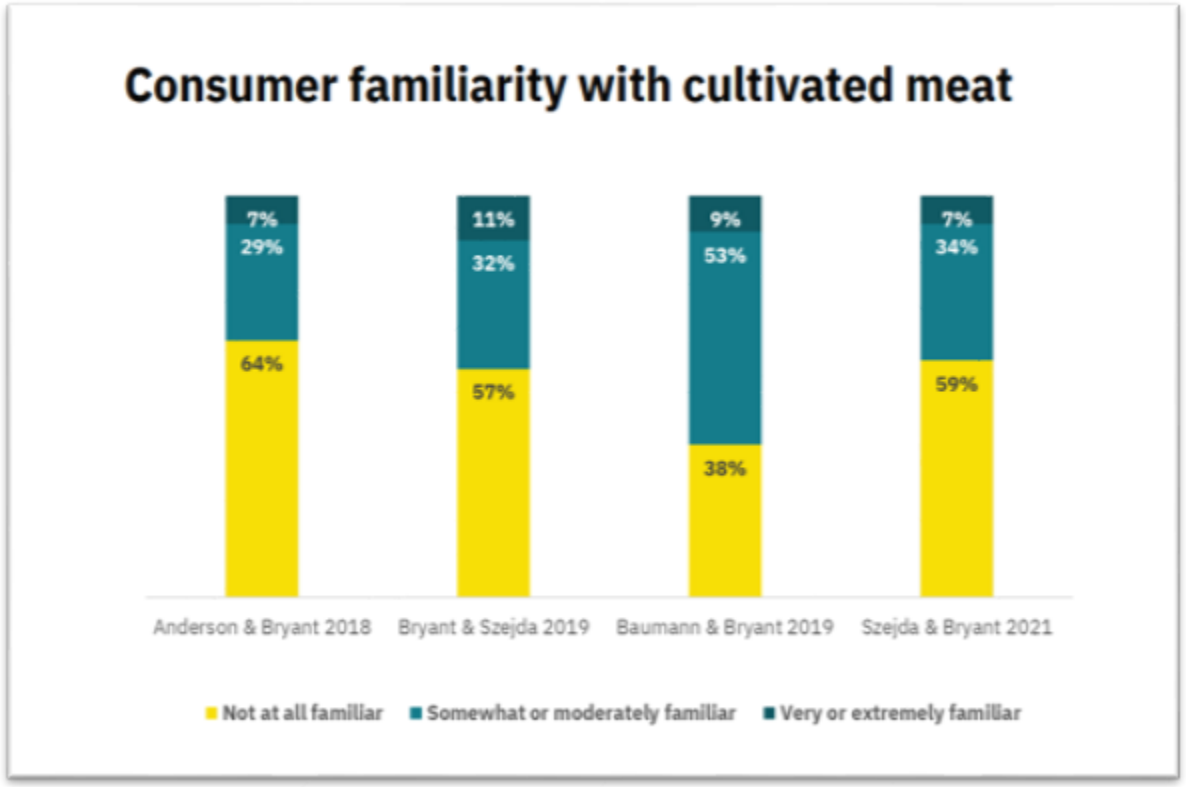


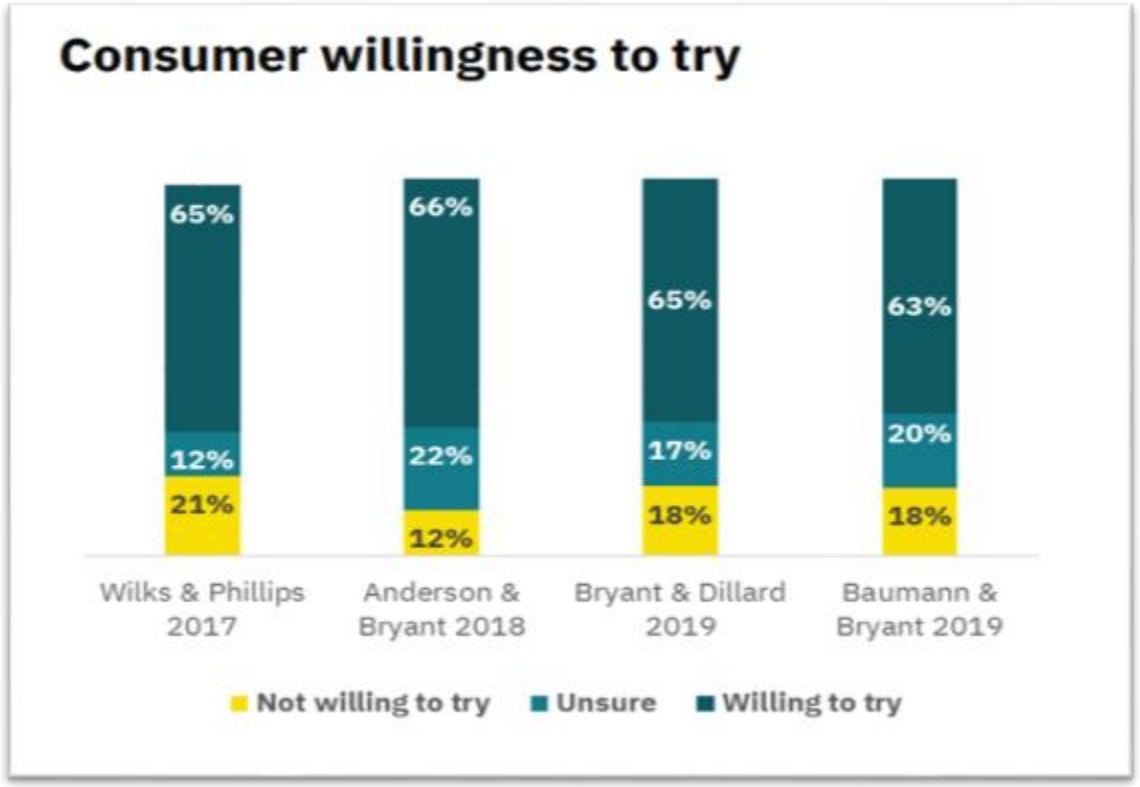
Source: *New Hope Network NEXT Data & Insights* Food Tech Survey N=1,500 collected week of August 8, 2022
Question: "Are you familiar with precision fermentation?"

Top reasons for Trying PF– Averages Across All Markets GFI Study



GFI Cultivated Meat Adoption Fact Sheet 2024





Challenges

- Nomenclature continues to evolve
- Consumers want transparency and more information regarding their food, but longer and more technical descriptions can be confusing and unappealing
- Consumers find PF conceptually challenging
- Dichotomy between animal-based v. plant-based
  - PF and other food technologies fall into a third category

Politics at play …

- Cell Cultured Meat
  - Banned in:
    - Florida
    - Alabama
    - (and Italy)
  - Bills introduced:
    - Arizona
    - Kentucky
    - Tennessee
- FDA & FSIS authorizations
- However – not "approvals"

Moving Forward

- Messaging will be key - clarity and transparency
- Increase public education and awareness
- Bring value and characteristics to market that consumers want – make the value proposition real
- Remember – there is room in the food system for many production methods, and that we should be moving towards circular, sustainable supply chains to deliver nutrition, value, and choice

Thank You

Any questions?

Anthony Pavel

Partner

Washington DC

202.434.4264

Pavel@khlaw.com