Future of Alternative Proteins
Driving opportunities across the food value chain

Presenter: Harini Venkataraman, Research Analyst, Lux Research
Agenda

1. Alternative protein drivers and trends
2. Innovating across the value chain
3. Profiting from the consumer impact
Drivers for alternative proteins

Growing population
Environmental concerns
Consumer preference

Demand for alternative proteins
Drivers for alternative proteins

- Consumer preference
- Supply concerns
- Environmental concerns

Demand for alternative proteins

- Plant proteins
- Algae
- Insects
- Cellular agriculture
Drivers for alternative proteins

Consumer preference
Supply concerns
Environmental concerns

Demand for alternative proteins

Plant proteins
Algae
Insects
Cellular agriculture
Diving into plant proteins

1st generation: soy

2nd generation: pea, lupin, chickpeas, canola etc.

3rd generation: quinoa

Plant proteins
Alternative proteins market set to grow fast

By 2024:

37.8MMT

$12 Billion Market
Alternative proteins market set to grow fast

By 2024:

37.8MMT

$12 Billion Market

Opportunity:

Second generation proteins will grow much faster than soy
Second generation plant proteins on the rise
Second generation plant proteins on the rise

Meet substitutes and lentil pasta: Legume products on the rise in Europe

GULF NEWS

On the pulse: why beans, peas and lentils are making a comeback

REUTERS

Big Ag turns to peas to meet soaring global protein demand
Second generation plant proteins on the rise

Meat substitutes and lentil pasta: Legume products on the rise in Europe

39% increase in legume products in the EU

On the pulse: why beans, peas and lentils are making a comeback

Big Ag turns to peas to meet soaring global protein demand
Agenda

1 | Alternative protein drivers and trends
2 | Innovating across the value chain
3 | Profiting from the consumer impact
Where are the right near-term opportunities across the value chain for “second generation” proteins?
Sustainable ways to produce second generation proteins
Develop seed varieties with increased protein content and high yield
## INNOVATIONS IN Production agriculture

<table>
<thead>
<tr>
<th>Who?</th>
<th>How?</th>
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</thead>
<tbody>
<tr>
<td><strong>Equinom</strong></td>
<td>Directed breeding process, combining genomic sequencing and big data analysis to pick hybrids</td>
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<tr>
<td><strong>Calyxt</strong></td>
<td>Non-transgenic approaches to crop modification of one or more nutrition-related traits</td>
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<tr>
<td>THE UNIVERSITY OF QUEENSLAND AUSTRALIA</td>
<td>Speed breeding techniques to cut novel trait development time in half</td>
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Creating opportunities for ingredient production

Production agriculture → Food ingredients → Food products → Consumer impact
LUX TAKE

Improve extraction technologies to achieve higher yield and quality for second generation proteins.
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<tr>
<td><strong>Burcon</strong></td>
<td>Gentle extraction method based on ionic shift properties to produce pea, canola protein isolates</td>
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<tr>
<td><strong>ProLupin</strong></td>
<td>Extraction method for proteins, fibers, and oils from lupine seeds using supercritical CO$_2$</td>
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<tr>
<td><strong>Innovopro</strong></td>
<td>Aqueous extraction governed by isoelectric precipitation to produce chickpea protein concentrates</td>
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Formulating the right product

Production agriculture → Food ingredients → Food products → Consumer impact
LUX TAKE

Improve final product formulation

e.g. taste, texture, organoleptic properties
## INNOVATIONS IN Food products

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<tr>
<td><strong>Extrusion process</strong></td>
<td>Extrusion process applied to meat analog products by varying</td>
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<td><strong>temperature and pressure</strong></td>
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<td><strong>Eliminating off-flavors</strong></td>
<td>Eliminating off-flavors for pea protein-based dairy products</td>
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<tr>
<td><strong>Shear cell technology</strong></td>
<td>Shear cell technology to impart meat-like texture to plant proteins</td>
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Agenda

1 | Alternative protein drivers and trends
2 | Innovating across the value chain
3 | Profiting from the consumer impact
Innovating based on consumer trends is quite stressful
Innovating based on consumer trends is quite stressful

You can turn this into an advantage!
INNOVATIONS IN
Consumer impact
Consumers are seeking better, healthier, & tastier solutions for non-meat protein sources
INNOVATIONS IN
Consumer impact
Consumers are seeking better, healthier, & tastier solutions for non-meat protein sources

EXAMPLE:
INNOVATIONS IN

Consumer impact

Consumers are seeking better, healthier, & tastier solutions for non-meat protein sources

EXAMPLE:

Growing consumer interest in plant-based diet can trigger novel opportunities!
Consumer trends can trigger opportunities

- Production agriculture
- Food ingredients
- Food products
- Consumer impact

Growing consumer interest in plant-based diet
Consumer trends can trigger opportunities

Increased demand for plant protein-based foods
Growing consumer interest in plant-based diet
Consumer trends can trigger opportunities

Production agriculture

Food ingredients

Efficient methods to extract novel plant proteins

Food products

Increased demand for plant protein-based foods

Consumer impact

Growing consumer interest in plant-based diet
Consumer trends can trigger opportunities

Production agriculture

Optimizing crops for high protein content

Food ingredients

Efficient methods to extract novel plant proteins

Food products

Increased demand for plant protein-based foods

Consumer impact

Growing consumer interest in plant-based diet
Key Takeaways

1. Profit from the rising dominance of second generation proteins
Key Takeaways

1. Profit from the rising dominance of second generation proteins
2. Look for ways to innovate up and down the food value chain
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<td><strong>2</strong> Look for ways to innovate up and down the food value chain</td>
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<td><strong>3</strong> Turn consumer trends to your advantage</td>
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Thank you for joining us.