PROTEINS FROM THE STARCH INDUSTRY AND THE CHANGE IN CONSUMER TRENDS

DG Agriculture's Civil Dialogue Group on Starch – Brussels 02.12.2019

Ingredion

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STARCH.EU

AGENDA

The European Starch Industry's supply

Ingredion in brief

The change in consumer needs

Plant based protein food

EU Plant Protein Plan – Starch Europe recommendations

Conclusion

Proteins are part of the European starch industry's value chain

5.3M TONNES
Proteins & Fibres

VERY HIGH PROTEIN CONTENT (60% - 90%)

1.1M TONNES

FOOD & DRINK (35%)

FEED (65%)

MEDIUM PROTEIN CONTENT (15% - 30%)

4.2M TONNES

FEED (100%)

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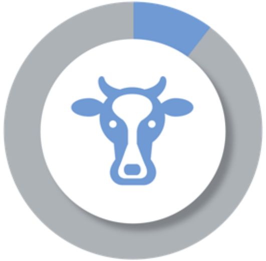
Starches, sweeteners, proteins, hydrocolloids and nutrition ingredients for 60 industry sectors

53% FOODS

11% BEVERAGES



10% ANIMAL NUTRITION

7% BREWING

19% ADDITIONAL APPLICATIONS

Ingredion Outlook

11,000+
employees

3% of sales*
invested in R&D in 2018

Presence in
40+
countries

$5.8 Billion
net sales in 2018

28
Ingredion
Idea Labs®

350+
scientists

Customers in
120+ countries

2,170,000
metric tons of crops sustainably sourced

66% of key suppliers have SMETA audits (or equivalent)

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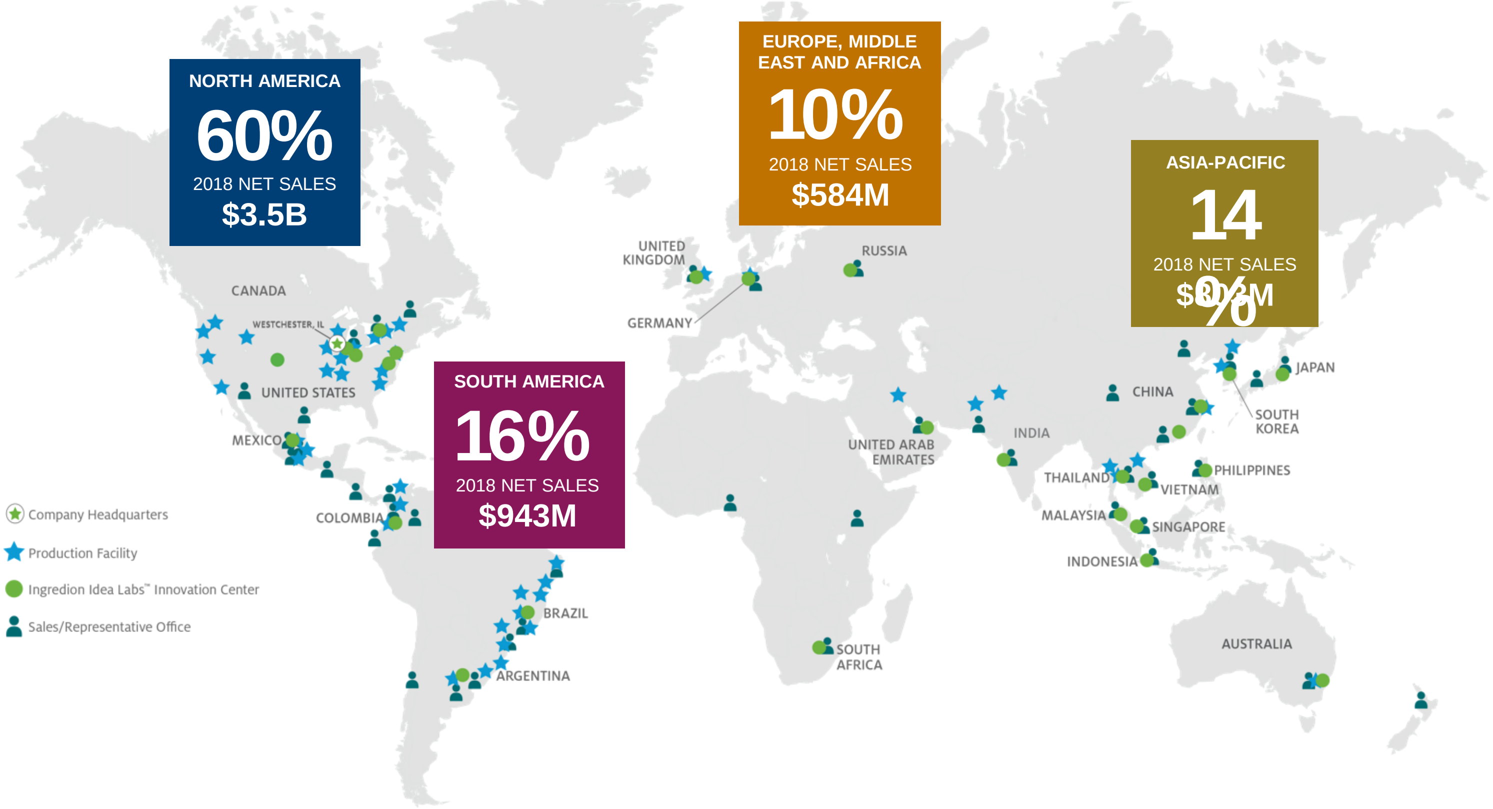
* Speciality sales

Global reach with local touch



NORTH AMERICA
60%
2018 NET SALES
$3.5B

SOUTH AMERICA
16%
2018 NET SALES
$943M

EUROPE, MIDDLE EAST AND AFRICA
10%
2018 NET SALES
$584M

ASIA-PACIFIC
14%
2018 NET SALES
$803M

*Percent sales by region in millions USD

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Driving Growth Roadmap

DRIVINGROWTH

Ingredient Solutions That **Make Life**

Customer Co-Creation and Consumer Preferred Innovation

VALUE CREATION

Specialty Growth Platforms

- STARCH-BASED TEXTURIZERS
- CLEAN AND SIMPLE INGREDIENTS
- PLANT-BASED PROTEINS
- SUGAR REDUCTION AND SPECIALTY SWEETENERS
- FOOD SYSTEMS

VALUE CREATION

Core Food and Industrial Ingredients

Supply Chain and Operational Excellence

Sustainable and Trusted Sourcing

Purpose and Performance Driven Culture

Experience the Ingredion difference

$>150M investment in plant protein manufacturing

Protein pilot plant

Consumer insights on plant-based protein and lifestyles

Ingredion Idea Labs® center with dedicated protein team

Proprietary sensory lexicon

PLANT-BASED PROTEINS

Plant/crop science expertise

Nutritional science and clinical research expertise

Protein characterization expertise

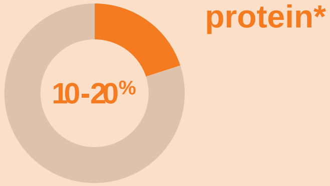
Applications Insight

Proteins of the future R&D

A full portfolio to help you find the right pulse protein solution for your specific need

Pulse flours

Lentil, pea, chickpea and faba bean



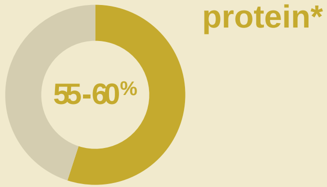
Clean label, gluten-free replacement for flours and starches

Great in pastas and savory snacks

HOMECRAFT® Pulse flours

Pulse concentrates

Lentil, pea and faba bean



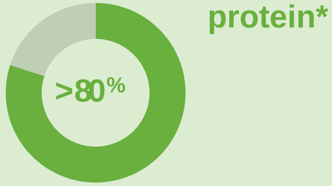
Balanced nutrition with protein, fiber and micronutrients

Great in baked goods and bars

VITESSENCE® Pulse protein concentrates

Pulse isolates

Pea protein isolate



Enables “source of / high in protein” claims

Great in nutrition bars, drink mixes, and meat and dairy alternatives

VITESSENCE® Pulse protein isolates

* dry basis

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Trends show more people want more protein

Demand for protein has been on the rise for more than a decade

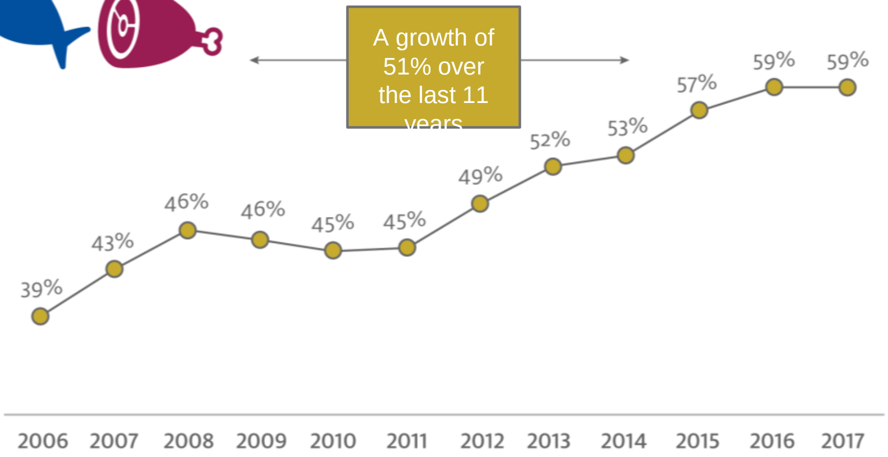
75%

OF U.S. CONSUMERS SAY PROTEIN CONTENT IS AN IMPORTANT FACTOR IN FOOD/BEVERAGE PURCHASE DECISIONS[1]

50%

OF U.S. CONSUMERS HAVE USED PLANT PROTEIN IN THE PAST YEAR[2]

Percentage of general population who completely/somewhat agree that they seek out foods that are high in protein



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Demand for plant protein is on the rise, even among meat eaters

North American consumers, including meat eaters, are open to plant based foods.[1]

60%

of consumers believe plant based foods provide benefits.[2]

44%

of general population in NA want to consume less meat, while **more than half want to increase consumption of vegetables**. [4,5]

86%

of consumers buying plant-based products are meat eaters.[3]

		how I eat TODAY	how I eat TOMORROW	
MEAT EATER	any variety of meats	71%	55%	-16%
FLEXITARIAN	limit meat (but don't exclude entirely)	19%	25%	+6%
VEGETARIAN	no meat, but animal byproducts okay	2%	5%	+5%
POLLOTARIAN	no meat except poultry	2%	3%	
PESCATARIAN	no meat except fish and seafood	1%	5%	
VEGAN	no animal products or byproducts	1%	2%	
RAW FOODS	only uncooked & unprocessed foods	1%	2%	
OTHER	all other approaches	3%	3%	
TOTAL		100%	100%	

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Sources: 1. Ingredion Proprietary Qualitative Study conducted by Mindspot, 2018. 2. Ingredion Proprietary Research, U.S. Pulse Protein Study Ph2 Quant US Report Conducted by Infiniti, 2016. 3. NPD Group Survey March 2018 Organic & Non Organic Forum. 4. Ingredion Proprietary Study Conducted via the Food Advisors Council, NA, March/April 2018. 5. Datassential trends presentation 10/18, based on US consumer study.

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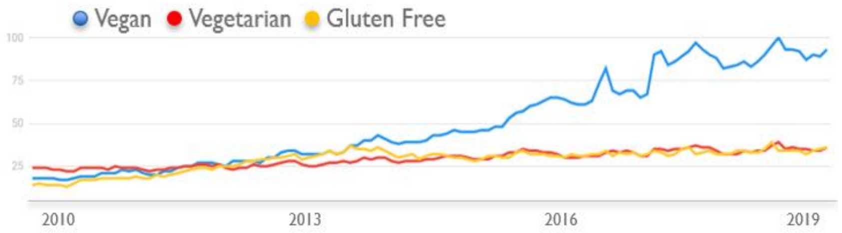
Similar trends are observed in Europe

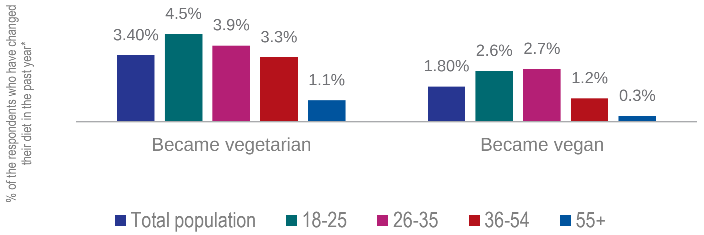
Young generations driving the change for increased demand for meat and dairy alternatives

Google Trend Search, SEO analytics (2019)



The **vegan trend quadrupled** in the 10 years between 2009 and 2019. It now gets almost **3 times** more interest than vegetarian and gluten free searches.

Change in diet in past year by generation



Gen Z consumers (18-25) led other age groups in becoming vegetarian, while **Millennials** (26-35) and Gen Z (18-25) **are more likely than others to become vegan.**

PUSH DRIVERS

- Health concerns
- Animal welfare & ethics
- Sustainability

Growth of Plant-based Proteins

PULL DRIVERS

- Curiosity
- Personal nutrition

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*Plant based = products with the terms “plant based,” “plant-based,” or “100% plant” on the packaging.

Source: Google SEO Trend Analytics (2019), Ipsos MORI Global Advisor Survey(2018), Robobank: The European Market for Meat Substitutes 2019.

Reasons for a plant-based diet are manifold: increasing concerns about food safety, the pursuit of sustainability and the wish for animal welfare are mostly mentioned.

Animal welfare is the most stated reason for becoming vegan

47% of Europeans currently do not think there is sufficient choice of animal welfare-friendly food products in shops and supermarkets

Meat production is a principal driver of environmental change and natural resource depletion

The livestock industry accounts for an estimated: **40%** of global arable land, **29%** of agricultural freshwater use and **15%** of all human-made greenhouse gas emissions

Meat is the #1 food safety concern for European consumers

Main concerns are around…

1. Antibiotic, hormone or steroid residues in meat **(44%)**
2. Pesticide residues in food **(39%)**
3. Environmental pollutants in fish, meat or dairy **(37%)**
4. Additives like colors, preservatives or flavorings used in food or drinks **(36%)**

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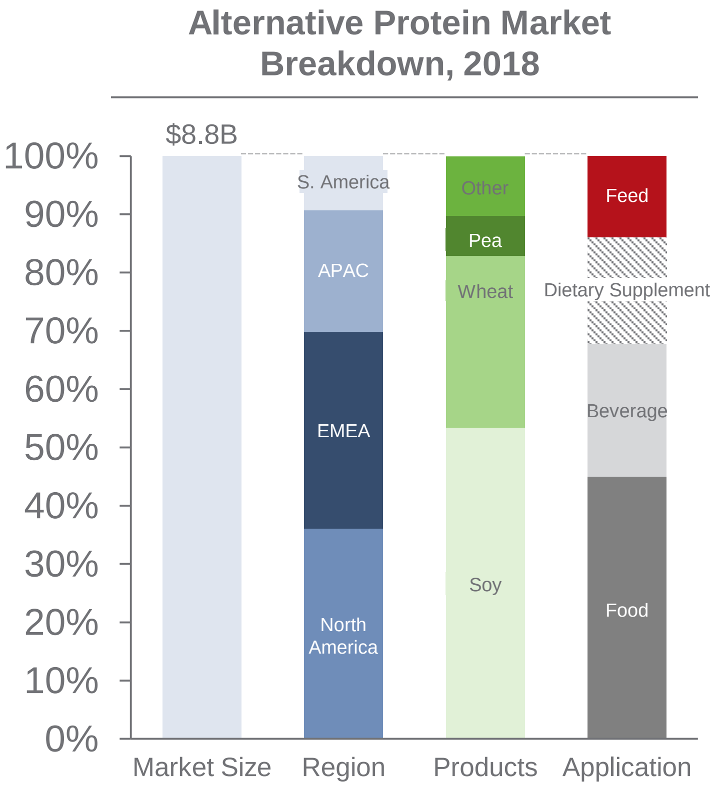
Source: Special Eurobarometer Wave EB91.3, Food Safety in the EU, European Food Safety Authority, June 2019

The global alternative protein market was ~$8.8b in 2018

Plant protein accounted for the majority of the market



Soy, wheat, and pea protein account for the majority of the current alternative protein market

- Accounted for ~90% of the market in 2018
- Pea growing rapidly and clear third
- Other constitutes rice, mycoprotein, algal and insect

Food and Beverage account for ~70% of total application of the alternative protein market

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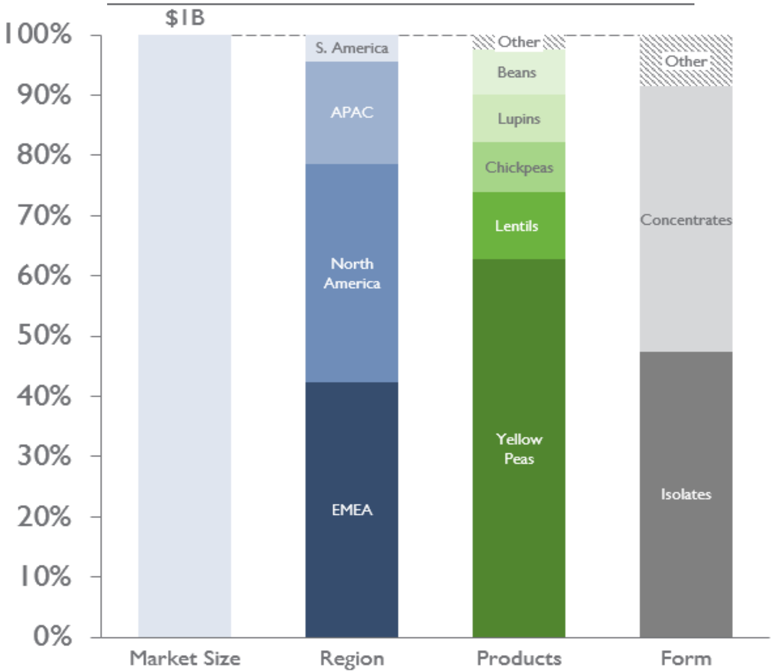
The pulse protein market was ~$1B in 2018

Yellow peas accounted for over 60% of the market

Pulse Protein Market Breakdown, 2018



Yellow peas account for the majority of the current pulse protein market

- Accounted for ~63% of the market in 2018
- The next largest products are lentils, chickpeas, lupins and beans
- Although peas currently account for the largest market share, this mix is expected to shift over time

Isolates and concentrates account for over 90% of the market; hydrolysates account for less than 10%

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By 2054 plant protein is expected to be 1/3 of all proteins in the US[3]

Plant-based protein as an ingredient is expected to grow with a 12% CAGR.[1]

Plant-based food and beverage market is growing **5 times more** than total food sales.[2]

Growth of Plant-based Alternatives by Category

Category	Dollars	Growth
Milk	$1.9B	6%
Meat	$801M	10%
Meals	$387M	6%
Ice Cream	$304M	26%
Yogurt	$230M	39%
Creamer	$226M	40%
Butter	$189M	5%
Cheese	$160M	19%
Tofu and Tempeh	$118M	5%
Ready-to-Drink Beverages	$103M	23%
Condiments, Dressings, and Mayo	$70M	7%
Spreads, Dips, Sour Cream, and Sauces	$21M	52%
Eggs	$6M	38%
TOTAL PLANT-BASED FOODS	**$4.5B**	**11%**

52 weeks ending April 2019.
Commissioned data from SPINS.

PLANT BASED FOODS ASSOCIATION

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1. Grand View Research 2019, 2. Food Business News 7/17/19 referencing The Good Food Institute (G.F.I.) and the Plant-Based Foods Association (P.B.F.A.) , 3. PBFA, 2018

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25% of the global population cut back on animal-based products or avoid them completely. As a result, plant-based alternatives are flooding the markets.

Omnivorous
73%

Flexitarian
14%

Vegetarian
5%

Vegan
3%

Pescatarian
3%

Alternative Meat Market

NA $1 B
Global $4 B } 2018

NA $2 B
Global $5 B } 2020

Total Global Dairy Alt. Market
16.7 % CAGR

2017 $12 B → 2025 $41 B*

Orkla
Head Brands: Naturli & Anamma

Monde Nissin
Head Brand: Quorn

Violife
Head Brand: Violife

Danone
Head Brand: Activia

Source: Ipsos MORI Global Advisor Survey. N=20313 28 countries; Innova; Food Ingredients; Sep. 2019

* Includes all dairy products: Grandview Research, 2018

The need for soy-free & wheat-free plant protein is rising

Consumer concerns

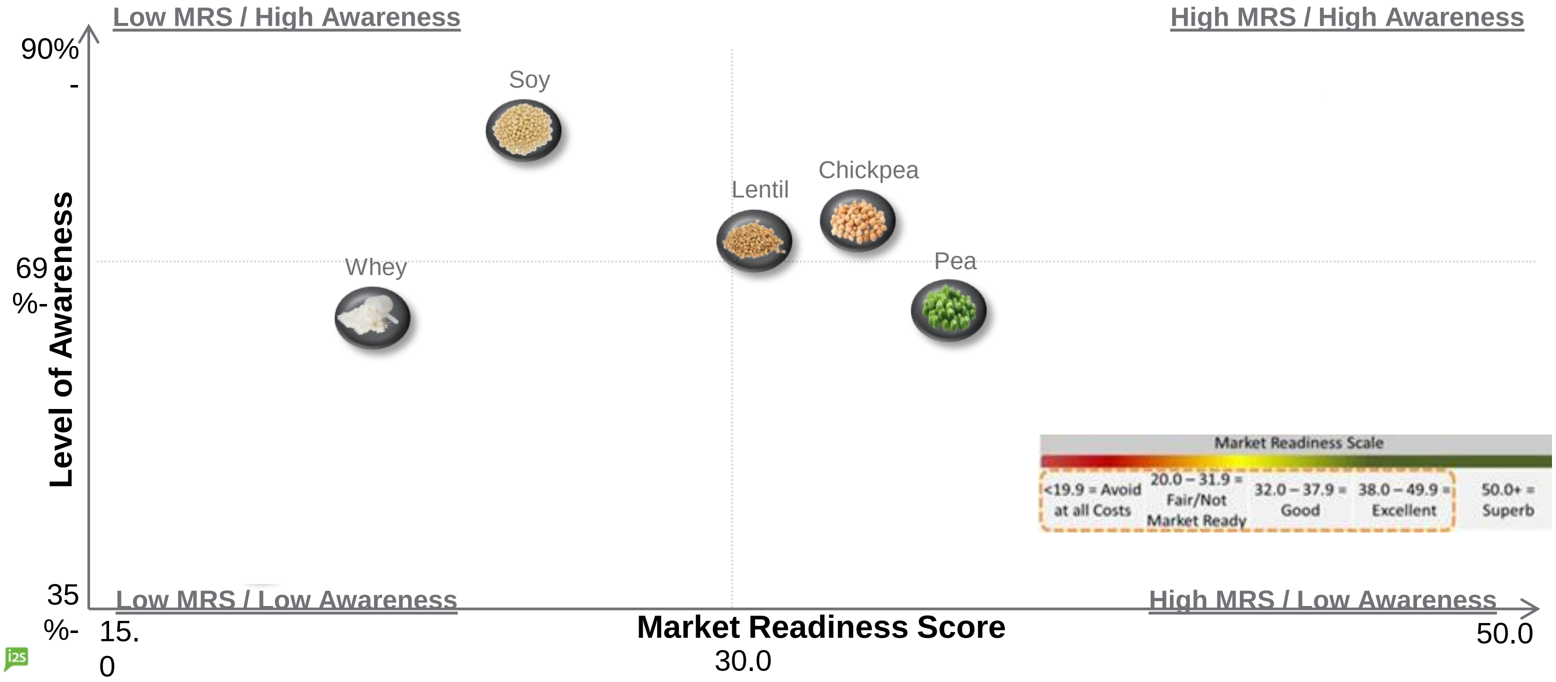
Hexane processing	GMO	Isoflavone - likened to estrogen
“Link” of incidence to breast cancer	Allergenicity	Proposal to revoke heart health claim
Weight management	Dietary choice	Allergenicity

Drivers → Soy-free Plant-Based Protein Movement

Drivers → Wheat (gluten)-free Plant-Based Protein Movement

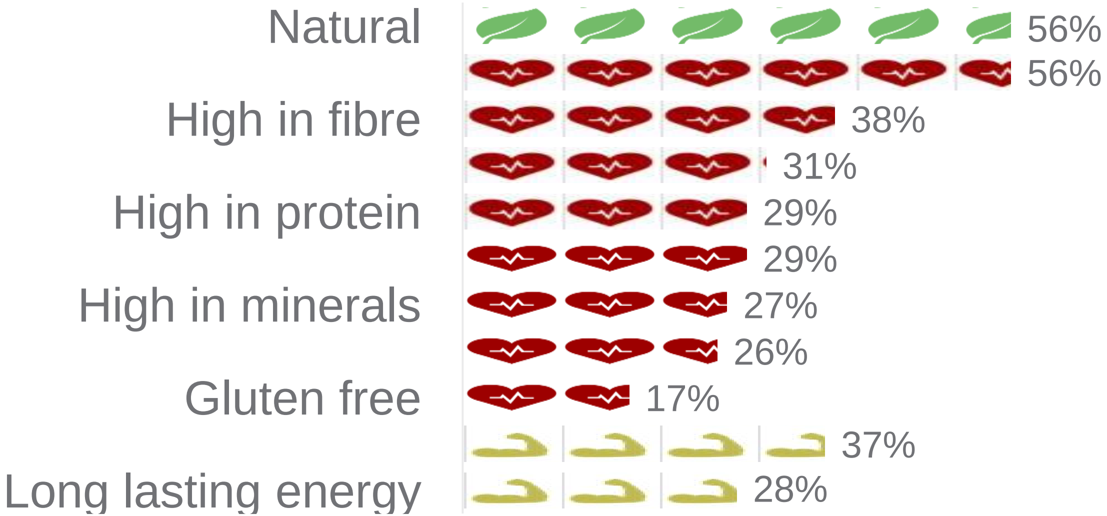
Animal-Free Alternatives

Pulses have higher market readiness than soy and whey



Consumers show high awareness for pulses and associate multiple health benefits with pulses, says Ingredion research

2/3 of consumers are aware of pulses being used as an ingredient such as flour or protein



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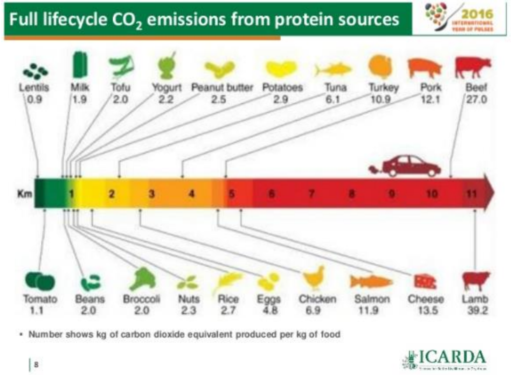
Pulses are the future of sustainable food

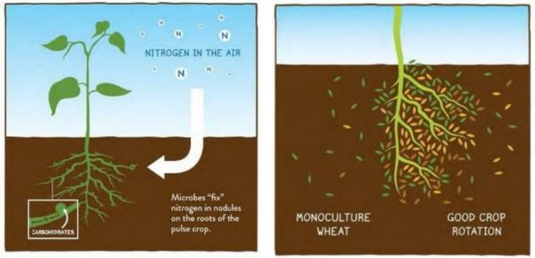
Pulses have a low carbon footprint

Greenhouse gas emissions from crop production are largely caused by nitrogen fertilizers. Pulses require less nitrogen because the create their own fertilization by pulling nitrogen from the air and into the soil



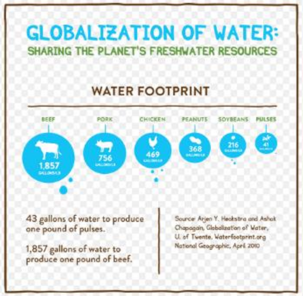
Pulses enrich the soil where they grow

Pulses support a healthy and diverse farm system. They enrich the soil health by leaving behind nutrients including nitrogen and beneficial microbes for the next crop.



Pulses are water and fertilizer efficient crops

Pulses use just one-tenth of the water of other proteins. For example it takes only 41 gallons of water (~155 litre) to produce 1 lbs (~450g) of pulses compared to 800-1,800 gallons of water (~ 3,000 – 6,800 litre) to produce the same amount of animal protein. Pulses extract water from a shallower depth, leaving more water deep in the soil for other crops, which makes them well-adapted for drought pr



It can be challenging when choosing and working with plant proteins

What's the **right protein level** for preferred protein label claims?

What **functionality** will the protein add?

How does that **differ** from the animal ingredient we typically use?

What considerations do we have for **flavour, texture, consistency** and **quality**, and **cost effectiveness**?

How do we **formulate** 100% plant-based foods and scale them up for launch?

Ingredion's capabilities & expertise in targeted applications can help manufacturers remove pain points

Alternative Dairy

Replicate the functionality, taste and nutrition of traditional dairy products
Pulses & starches/gums for texture
Pulses to build protein content

Alternative Meat

Replicate the functionality, taste and nutrition of meats
Juiciness, elasticity, bite, cooking properties, nutritional parity

Bakery/Snacks

Create on-trend products
Increase protein with excellent taste/texture profile
Gluten/soy free products optimizing organoleptics, and cost
Remove allergens: egg bases/binders, dairy, soy, and wheat

Pet Food

Create on-trend pet food and treats
Clean label, grain free, nutritious ingredients providing the functionality such as texture, structure, binding, thickening, gelling

Plant breeding & crop science

Market Research
Primary consumer studies on plant-based eating

Nutrition Science
Protein expertise and novel clinical research studies

Protein Pilot Plant
Dedicated to fostering protein development excellence

Sustainability
Green objectives that align with customer commitments

Sensory
A new vocabulary to evaluate pulse proteins

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EU Plant Protein Plan – Starch Europe recommendations

1. Include the EU starch industry's plant protein products in the 5 action areas recommended by the EU plant proteins report, e.g.
   - ✓ stakeholder platform's first meeting in Finland on 18-19 November 2019
   - ✓ Inclusion of the EU starch industry's own categories of plant protein products in the Commission's balance sheet to feed outlets

2. Support the innovation at each level of the plant based-value chain

3. Resolve the legal vacuum of plant protein products in the EU promotion policy (Regulation 1144/2014)

Integrate plant proteins in Horizon Europe’s Food2030 priorities

- ✓ Nutrition & Health:
  - Invest in EU-grown plant protein products
- ✓ Climate & sustainability
  - EU-grown raw materials (CAP greening architecture) and
  - Best Available Techniques (BREF)
- ✓ Innovation and communities
  - Starch plants anchored in agricultural communities
- ✓ Circularity and resource-efficiency
  - Zero-waste; bioeconomy

STARCH EUROPE

Innovation funding at each level of the plant-based value chain

- **In seeds:**
  - to achieve better and more stable yields &
  - greater disease resistance in protein crops

- **In the processing know-how**
  - to extract proteins and to convert them into animal protein alternatives

- **In the application know-how**
  - on the functionality, quality and consistency of starch-protein-products in food applications

EU promotion policy (Regulation 1144/2014)

Albeit a focus on plant proteins,

some processed agricultural plant-protein products (e.g. plant-based foods)

are not eligible to today's EU's promotion programme

(€ 190 million in 2019)

Starch Europe, ENSA and EUVEPRO reached out to DG Agriculture:

- letter in April 2019

- meeting in September 2019

Recommendation to

- extend the list of eligible products contained in Annex I of Regulation 1144/2014, and/or

- to dedicate a specific part of the 2020 promotion budget to:

- Plant-based protein food products
- Plant-based drinks with a minimum protein content of 2.8 mg / litre.

Labelling of plant based alternatives to meat

- Support for the labelling of plant-based alternatives to meat:
  - for consumers looking for non-meat protein sources, it is important that they can identify suitable products
  - therefore denominations that apply to meat should also be available to be used for plant based alternatives e.g. “veggie burger”

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- Drawing on their cross-benefits, to integrate plant protein products into the forthcoming initiatives such as:
  – EU Farm to Fork strategy
  – EU promotion policy
  – Horizon Europe
    - Circular Bio-based Europe’s future Public Private Partnership
    - Food 2030 & cluster 6
  – Sustainable finance
    - Taxonomy

Thank you!