Developing the market for sustainable and alternative proteins

Examining advances in protein alternatives to meat

Florian Wild
London, 20 November 2018
Meat alternatives through the decades
- from a German / Western European perspective -

1. 1990
   - Organic food market / Vegetarians
     - Soya granulate
     - Soya chunks
     - Grain / Pulses / Potato based patties

2. 2000
   - Asian Cuisine / Restaurants
     - Tofu
     - Saitan
     - Tempeh

3. 2010
   - Food Industry
     - Convenience products
     - New proteins: Milk protein, myco-protein, wheat protein granules
     - Atkin diet

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Advances in protein alternatives to meat

1. Organic food market / Vegetarians (1990)
4. Advances in process technology
   High moisture extrusion cooking
   Advances in protein ingredients - Diversification
   Lit.: Jonathan Safran Foer, Eating Animals (2020)

[picture: Wild/Fraunhofer IVV, 2012]
Advances in protein alternatives to meat

Outlines

- Advances in meat alternative: 1980-2010
- Consumers’ motivation towards meat alternatives
- Functional plant proteins
- Creating muscle meat-like fibrous structures
- Meat alternatives in the future food market
Basis for consumers’ choice

Tradition

Ethics

Food Safety

Sensorial Sensation

Social Settings

Indulgence

Quality

Convenience

Healthy Nutrition

Imitates & Analogues

Price

Food Security

Quality

Convenience

Healthy Nutrition

Vegetarians

Freshness

Image

FEARS

Sustainability

Education

Allergens

Health Status

Global Markets

Job

Conventional/ Organic

Animal Welfare

Climate Change

Individual Diets

Global Markets

[Domig 2012]
Consumers’ motivation to shift to meat alternatives

Healthy food, performance

Animal welfare

Sustainable food production

Innovation & indulgence

Low-priced food

Source: Indexmundi.com /2011
Food protein ingredients

Success factors

➢ Accepted sensory perception.
➢ Suitable techno- & bio-functional properties.
➢ Meeting food regulations, e.g. declaration.
➢ Marketing strategy addressing to consumers’ needs.
➢ Reliable and scalable supply chain.
➢ Being affordable.
# Food protein ingredients

- Complex and individual chemical composition from 20 basic units.
- Individual 3-D structure.
- Highly variable chemical and physical properties.
- Manifold proteins within a raw material.
- Manifold proteins in various raw materials.

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**New England BioLabs Inc.**

https://www.neb.com/tools-and-resources/usage-guidelines/amino-acid-structures
Food protein ingredients

Aqueous fractionation of pea

1. Dehulling
   - Hulls
   - Dehulled pea

2. Grinding
   - Aqueous protein extraction
     - Unsolubles
     - Solubles
       - pH 7-8.5
       - pH 4
       - pH 7

3. Precipitation
   - Supernatant
   - Curd

4. Neutralisation
   - pH 4
   - pH 7

5. Spray drying
   - Protein

Sugars and soluble proteins

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Food protein ingredients

**Heliaflor**
Organic Sunflower Products

Mushroom Protein.
The world's Next Generation Protein

Burcon and ADM push canola proteins

**PRoATein**
NATURAL LIFESTYLE BAR
Ingredients you can actually pronounce

**Algen in Klötze: Das grüne Steak**
Von Kathrin Schrader | 10.07.13, 18:18 Uhr

**Soliconic starts manufacturing protein from potatoes**
By Jess Halliday
06-Dec-2007 - Last updated on 19-Jul-2008 at 21:46 GMT

**CHiCK.P**
Bone Broth Powder, Concentrate, Liquid: What's the Difference?

**Lynside**
YEAST PROTEIN

**INSECTS as a PROTEIN ALTERNATIVE**

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High moisture extrusion cooking
High moisture extrusion cooking

(native) protein \(\rightarrow\) denaturation \(\rightarrow\) polymerization \(\rightarrow\) orientation and gelation

- red: disulfide bonding
- green: hydrogen bonding, hydrophobic and electrostatic interaction
High moisture extrusion cooking

Strand of textured plant protein
High moisture extrusion cooking

Strand of textured plant protein

[Wild 2016]
High moisture extrusion cooking

meat-free plate

[Wild 2016]
Meat alternatives in the future food market

Building trust in a reliable category

healthy food, performance

animal welfare

sustainability

costs

innovation & indulgence
Meat alternatives in the future food market

Building trust in a reliable category

“The public feels battered by inconsistent information.”

Prof. Susan Judd
University of Oxford

Queen’s Lecture 2018, Technical University Berlin

“Why broccoli is the most magical vegetable of all and raiding the fruit bowl could cut your risk by a quarter: What to eat to beat lung disease

Wonder diet cures heart disease

Dementia-suffering mother, 82, REGAINS her memory thanks to diet of walnuts, blueberries and brain-boosting foods

Lose weight to beat dementia

Queen’s Lecture 2018, Technical University Berlin
Meat alternatives in the future food market

Building trust in a reliable category

Meat tax ‘a sledgehammer to break a nut’

By James Ridler

The introduction of a tax on meat to save lives and reduce healthcare costs would be like using ‘a sledgehammer to break a nut’, a national meat trade body has claimed.
Meat alternatives in the future food market
Building trust in a reliable category

Adapted from: C. McCracken: Alternative Proteins, Hype or Hope?, Rabobank 2018.
Meat alternatives in the future food market

Building trust in a reliable category

Outlook & success factors

➢ Diversification on protein ingredients.

➢ Continuously improved products in all types of meat alternative: Appearance, texture, taste, nutritional value, pack-design.

➢ Wider diversification towards and from corresponding meat or fish products. Cross borders.

➢ Clean & clear labelling.

➢ Convenience products, ready to eat, ready meals, snacks.

➢ Transparent and open communication.

➢ Increasing industrial impact. Scale-up in the supply chain.

➢ Becoming more affordable.

➢ Increasing regulations.
Thank you
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