Creation of a catalogue of high-end product ideas for genetically heterogenic organic grain using a mix of culinary approaches, lead-user innovation and design thinking approaches

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Overview

Background

- The organic genetically heterogenic grain challenge
- The novel opportunities with single grain sorting
- Freekeh as a novel grain product

Materials and Methods

- Methodological framework in product innovation

Results

- Sensory value propositions from early creative screenings
- Example of outcomes
  - Lead-user developed and tested prototypes
  - Consumer responses to products

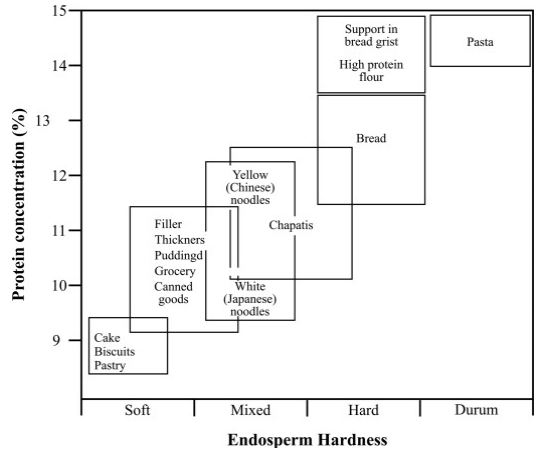
Conclusions and future perspective

The organic genetically heterogenic grain challenge (BOOST-project)

- Plant breeding and propagation to increase disease resistance in Danish organic grain
  - Common bunt disease
- Diverse genetic makeup increases disease resistance
  - Cultivars and Populations
- Organic farming limits the amount of fertilizer
- Denmark's soil and weather leads to challenges with protein content and baking quality for organic farming
  - Lower protein batches are sold as feed instead
  - For organic grain the generic feed prices are 20-70% lower than premium bread wheat

LANDSORTEN
STÆRKE ØKOLOGISKE KORNSORTER

Agrologica
Seeds for the future of organic farming



The novel opportunities with single grain sorting

- Assess grain quality at single kernel level by NIT
- New industrial scale sorter
  - Mobile unit in container or on truck
  - 15 tons/hour
  - Sorting cost for farmer is lower than lost revenue from feed price reduction



Freekeh as a novel grain product

- Parallel research project
- Traditional product from East mediterranean countries
- Harvested unripe - green stages
- EU-funded postdoc
- Documented aroma, taste and sensory qualities
  - Smoky
- Early harvested freekeh has distinct umami taste
- Preprint here



Freekeh pilot production



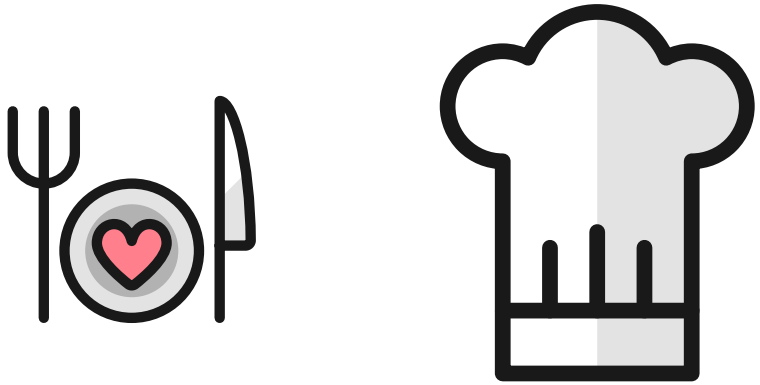
Pre- and post scorching

Research team's tasks in this arena

Based on the challenges and opportunities for the specialty organic grains:

- Deliver a catalogue of high-end product ideas that can increase interest in this type of grains in the food and hospitality sector

- Use our competences in food design thinking, innovation tools and culinary arts to experiment widely

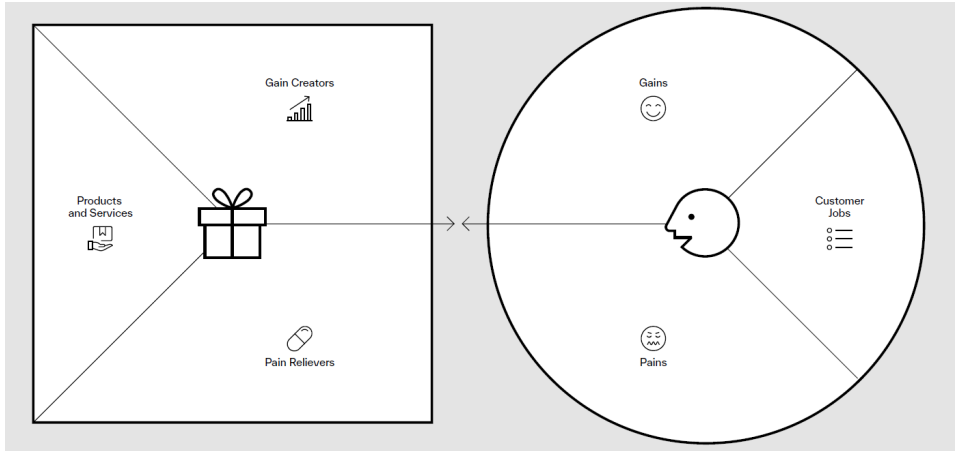


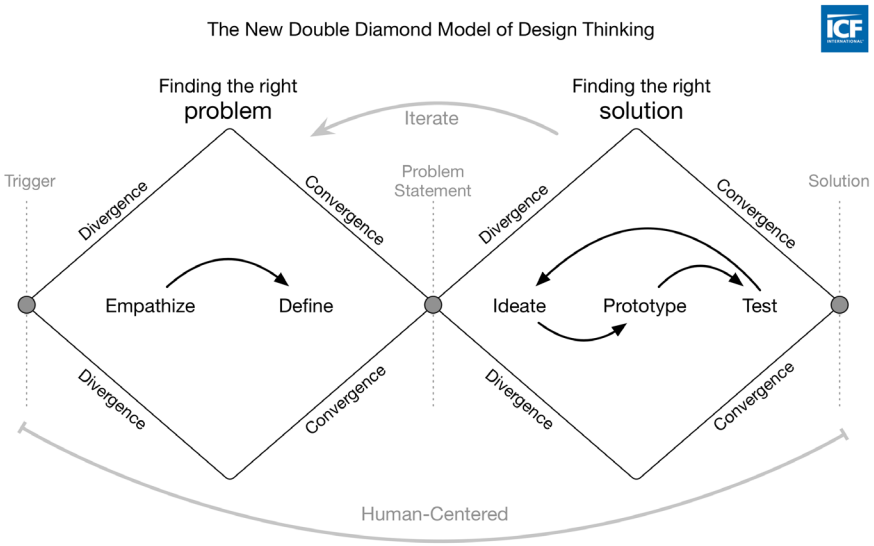


Methodological framework in product innovation

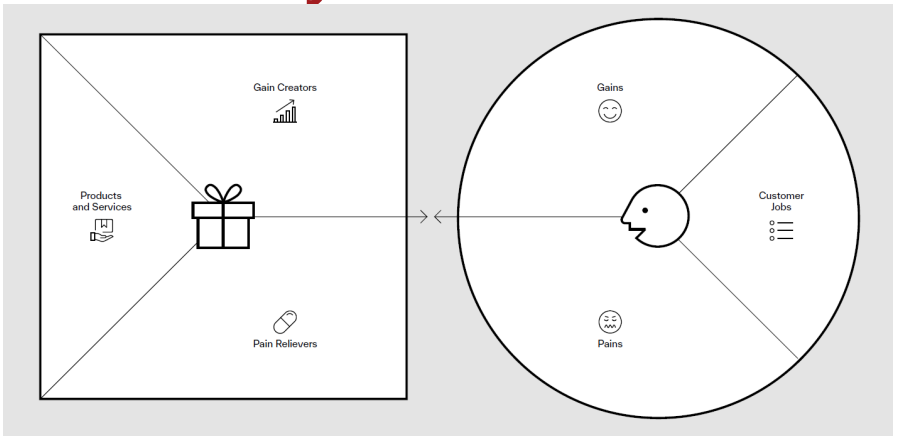
Food innovation expertise

- Food design thinking
- Value Proposition design
  - User-centric
- Prototyping in research kitchen
  - Double-diamond ideation and idea selection
  - Creative Design Methodology
  - Fast sensory characterization
- Lead-user input, ideas and evaluations
- Consumer testing in different scales and contexts
  - Mock-up restaurant, Food fairs and Convenience sample of consumers





Results: Sensory value propositions from early creative screenings



- Gain Creators
- Grain
  - Differentiated and distinct flavours
  - For some: Colourful
  - Low protein = High Starch excellent for Cakes and Pastry
- Freekeh
  - Ingredient to create additional or complementary flavours in beverages, foods, and dishes
  - Unique plant-based meat-like flavour
  - Umami

All prototypes

- Broths (Freekeh)
- Chips (Freekeh)
- Chocolate Chip Cookies
- Cold extracts (Freekeh)
- Cooked grains/freekeh
- Cracker/Crispbread
- Danish Butter cookies
- Focaccia (Freekeh)
- Koji (Freekeh)
- Kwass (Freekeh)
- Ladyfingers
- Marie Biscuits
- Savoury extract (Freekeh)
- Soft flatbread
- Sorbet (Freekeh)
- Sourdough
- Sourdough bread
- Sweet extract (Freekeh)
- Pastry

Dishes

- Freekeh Dessert
- Freekeh'otto
- Green Gazpacho (Freekeh)
- Pear Pie
- Quiche
- Salad (Beetroot, Freekeh, herbs)

Lead—user developed and tested example
Dessert - five elaborations of freekeh (Diego Suárez Garcia)

- The main component of this dish is the freekeh sponge cake. There are three layers of cake, in between is a freekeh butter cream in which only egg whites, butter and freekeh sweet powder. On top of the freekeh cake is a dot of freekeh miso reduction. To the side, is a freekeh chip, made with dehydrated spent freekeh. Finally, a custard was also made, using cream, egg yolks, freekeh sweet powder, and butter.



Lead-user and consumer tested prototypes

→ Develop concepts and Prototype several generation

→ Systematically Collect lead-user feedback

→ One more round of optimzation

→ Consumer test

Pop Nørregade



PopKorn



Pop Himmelblå



Pop Viola



Lead User evaluation

DANISH BUTTER COOKIES from low-protein fractions

- All prototypes well-received, delivering desired texture quality
- described as delicate, crumbly, and melting in the mouth

"very good" , "exceptional" , "much better than commercial ones"

Grain type Viola stood out - rich, exciting flavour & pleasant buttery, melt-in-mouthfeel and desirable crumbly texture

Grain type Norregade – flavour issues, lacking desired textural attributes

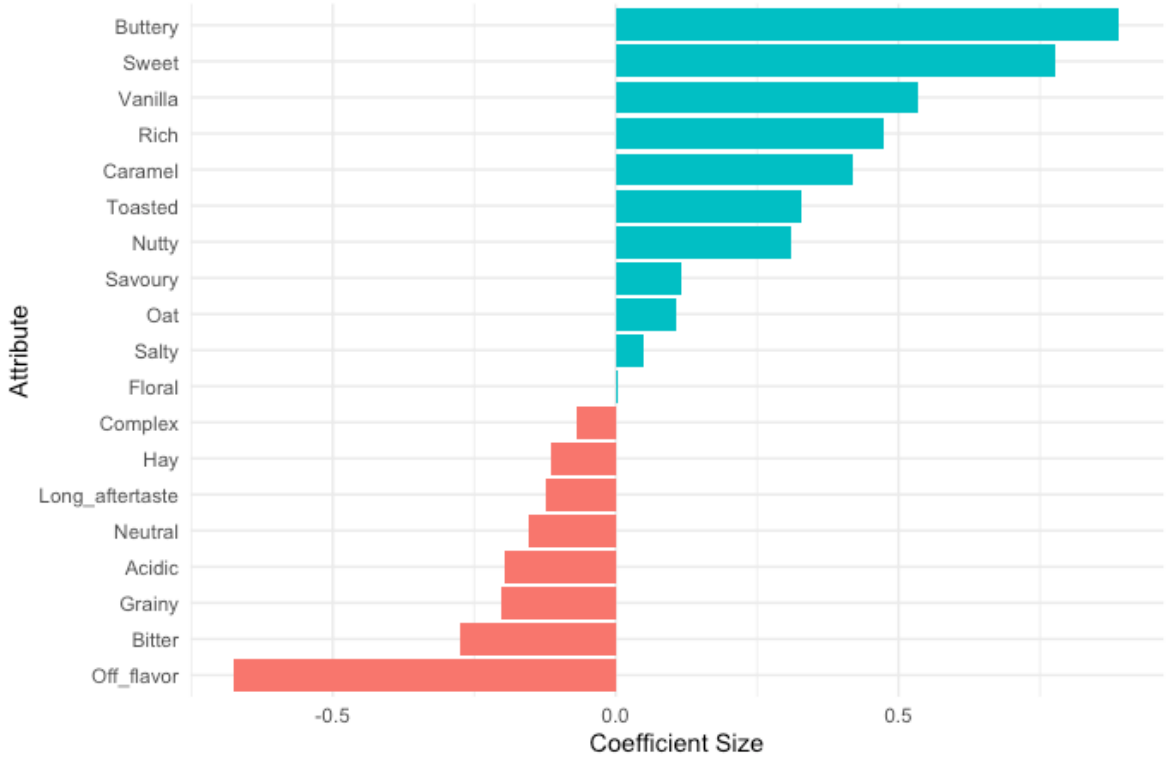


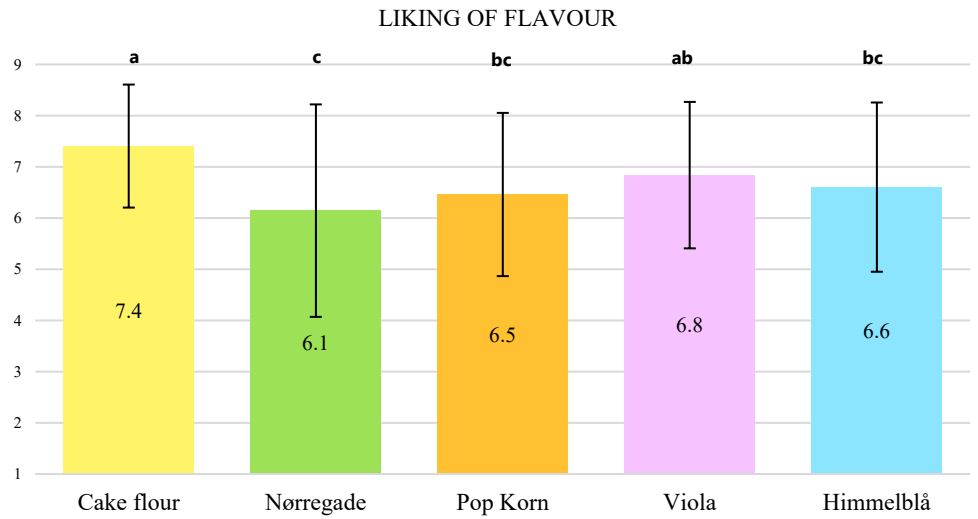


Consumer Test
FLAVOUR

Viola as high liking as reference!

- most *grainy*, most *nutty*
- low in *bitterness* and *off-flavour*





Nørregade lowest flavour liking

- High *long-aftertaste, off-flavour* or *bitterness*

All *buttery* with high frequency.

Rich, *caramel* and *toasted* – all same as reference

Conclusions and future perspective

- Demonstrated the qualities genetically heterogenic cultivars/populations
  - Both for sorted fractions, and for unsorted
- Identified unique advantages of Freekeh
  - Flavour booster
- Some challenges in consumer accept when texture/flavour is deviating from the low flavour intensity norms
- Diverse catalogue of ideas for free use for Danish bakers, chefs, and food producers
- The future work is to raise awareness among artisanal food/beverage producers and chefs

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