



Innovation in Bakery Ingredients



Bingen,
6th October 2009

Kari Tronsmo
Director Innovation
Center Bakery
Ingredients

Outline

- Personal introduction
- R&D in Bingen and innovation themes
- Natural functionalities - Project JOKER
- Introduction of the tour



Personal introduction

Kari Tronsmo

Director Innovation Center Bakery Ingredients



- ECPM Strasbourg, France
MSc Analytical Chemistry
- Norwegian University of Life Sciences & Nofima / Matforsk, Norway
PhD Cereal Chemistry
- University of Reading, UK
Visiting scientist
- Danone research, R&D biscuits, France
Research manager
Senior product development manager
- CSM Innovation Center Bakery Ingredients, Germany
Since 2008



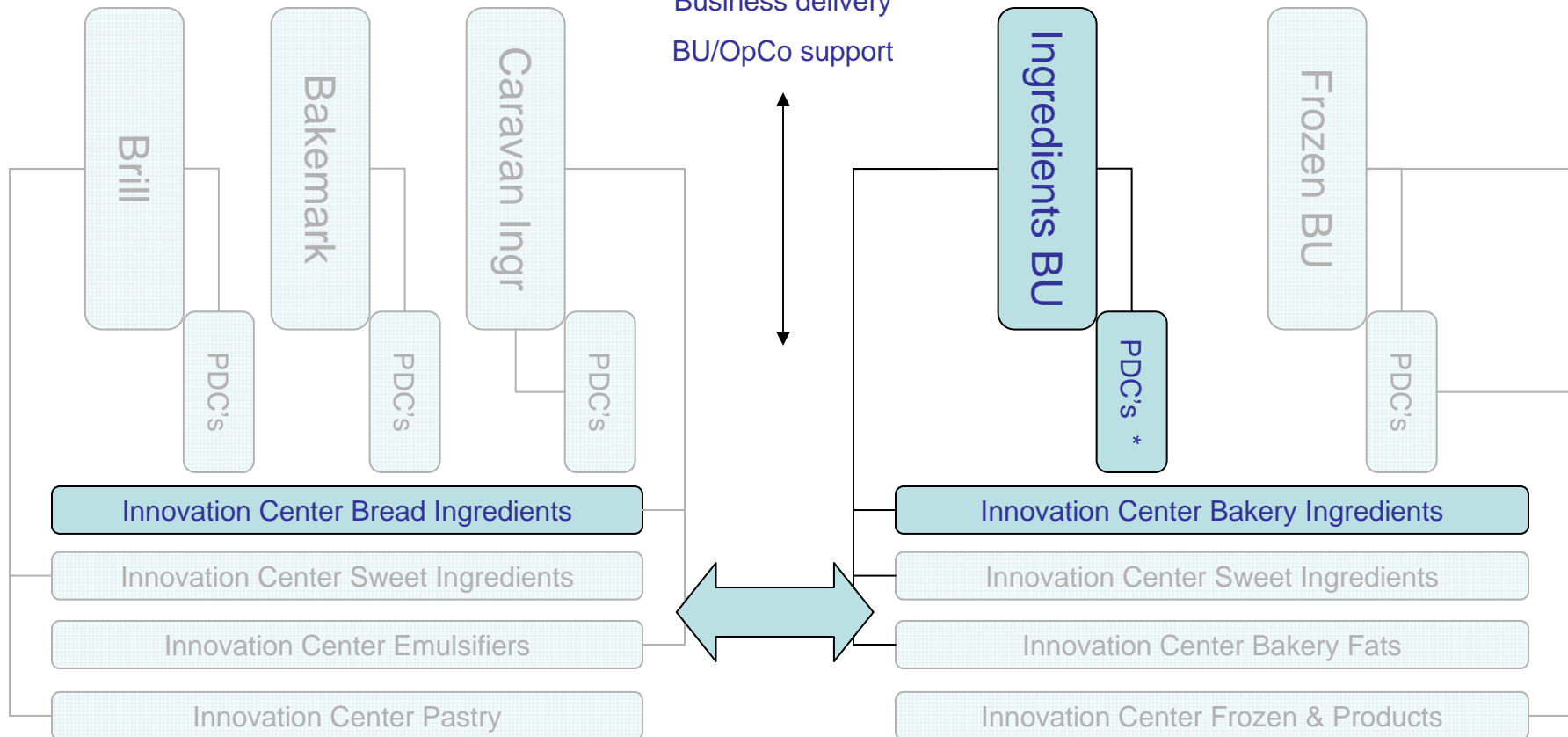
The IC Bakery Ingredients in the CSM R&D network

BSNA



BSEU

Program definition
Business delivery
BU/OpCo support



* 3 PDC groups in Bingen

Welcome to Bingen



Innovation Center Bakery Ingredients

- The people
 - Competencies: Food technology, food engineering, analytical and cereal chemistry, enzymology, nutrition, baking specialists
 - 4 nationalities: Germany, France, Norway, UK
- The facilities
 - Equipped for all types of European baking
 - Bread and pastry test bakeries
 - Analytical labs
- The areas of expertise
 - Raw Materials: Flour, seeds, fibres, enzymes, emulsifiers, malt, sourdough
 - Ingredient production: encapsulation, extraction, fermentation, extrusion
 - Bakery processes: mixing processes, fermentation processes, baking
 - Analytical & sensory

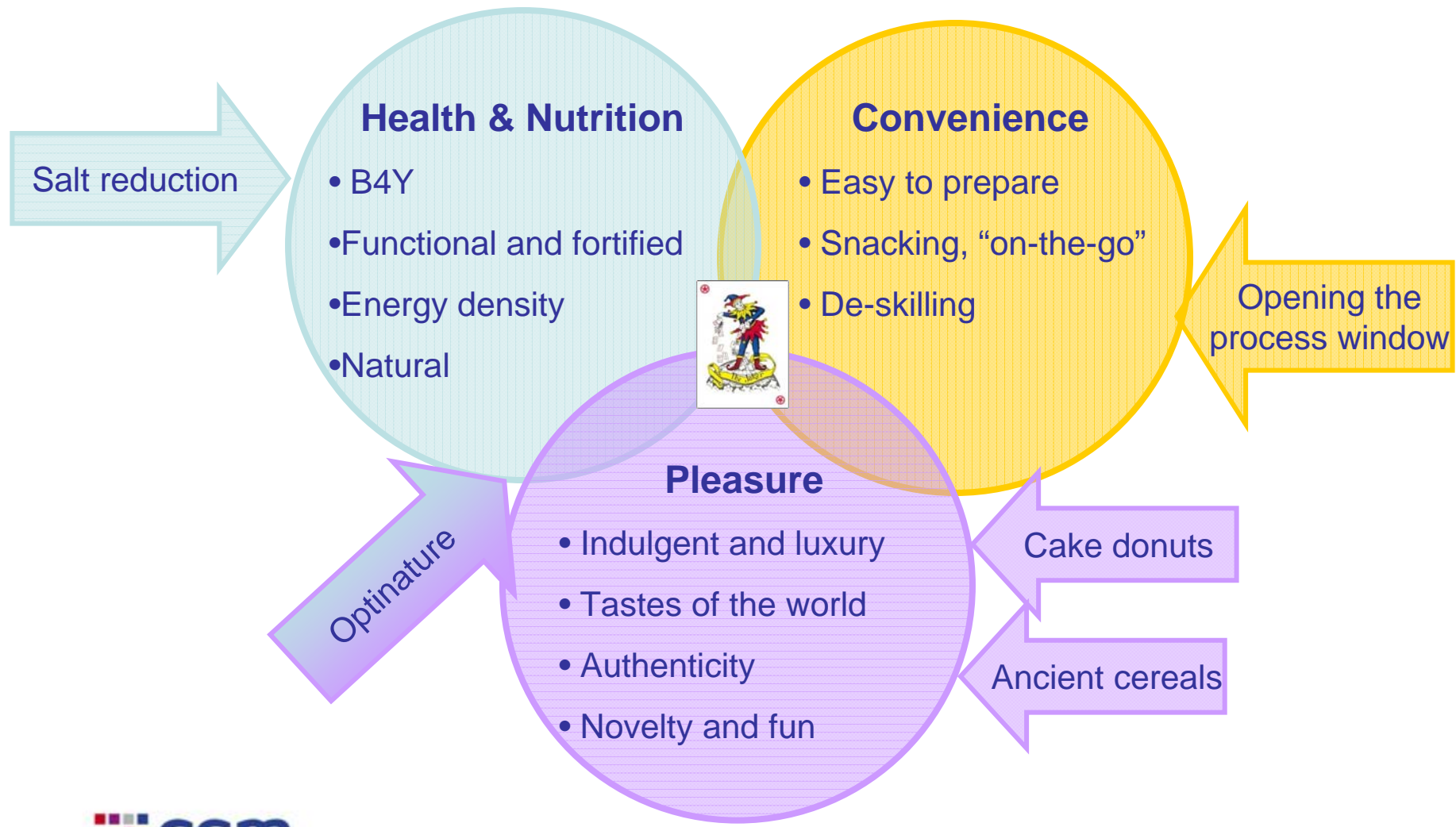


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Joker in the sweet spot of major market trends



The Challenge of natural bread improvers



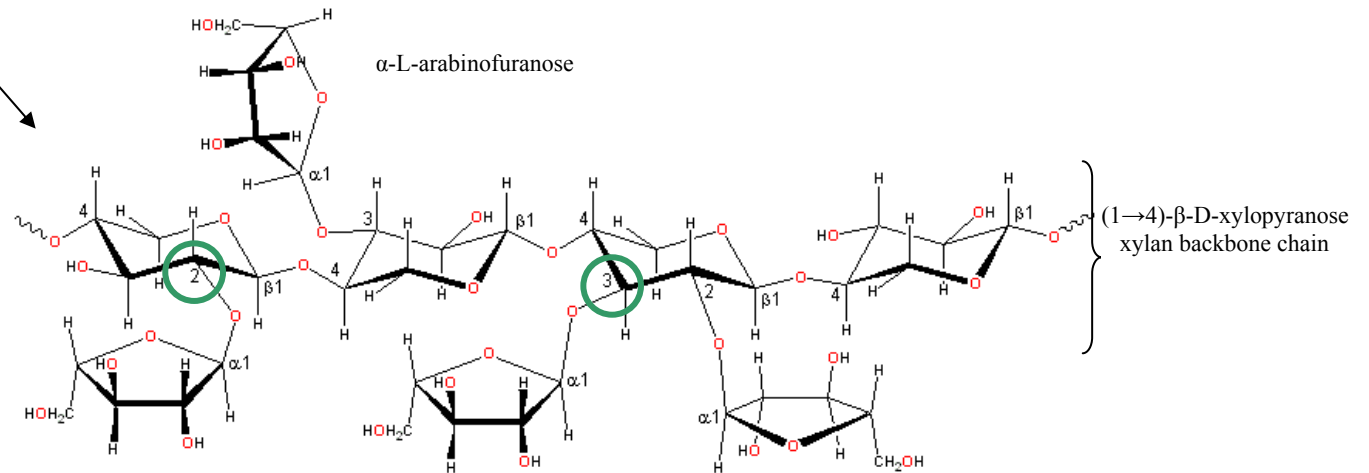
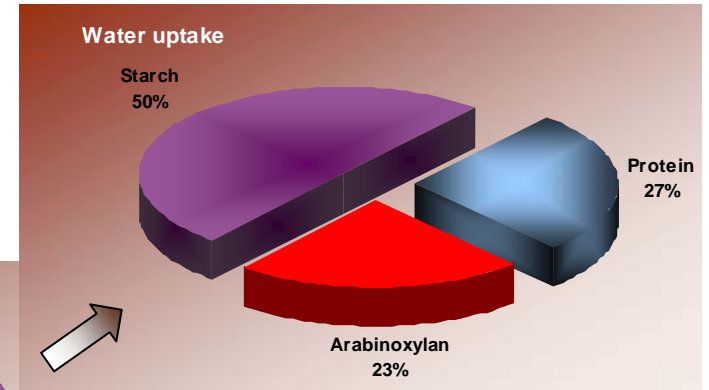
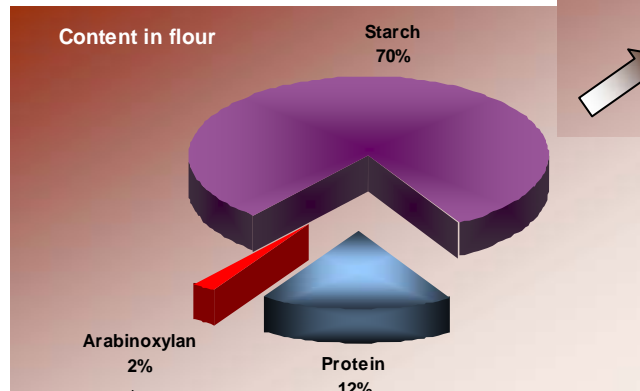
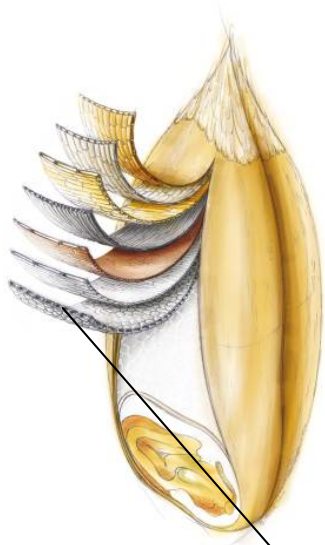
Typical build-up of bread improvers		
Functionalities	Raw Material tool box	Natural bread improvers
Volume & shape	Emulsifiers SSL, CSL, MDG, DMG, Datem,.. Enzymes Redox systems Ascorbic acid, ADA, Cysteine,.. Grains & Malts	Vegetable oils & fractions
Processability		Enzymes
Fresh keeping		Sourdough powders
Aroma & Taste		Grains & Malts
Colour		Cereal protein (fractions)
		Milling streams
	Fibres & natural gums	
	Ascorbic acid	

Requiring deep understanding of Cereal Science

Multiple raw materials; multiple interactions

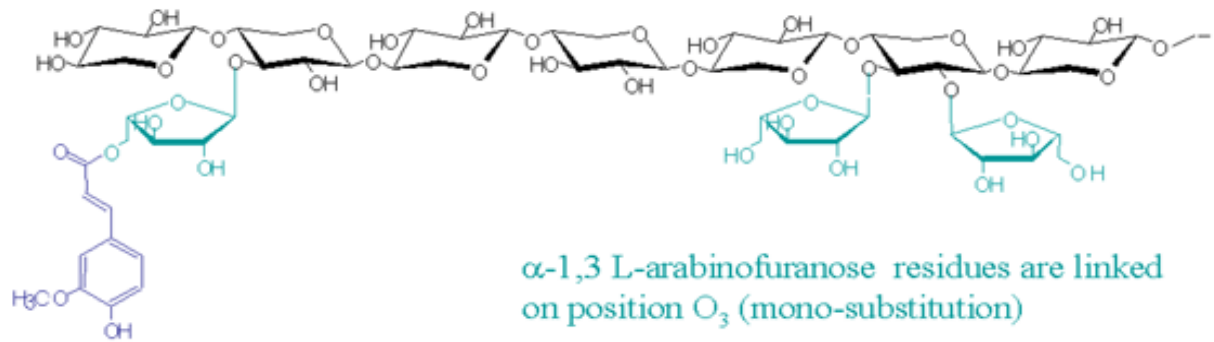
→ steering 5 key functionalities the right way

Wheat composition



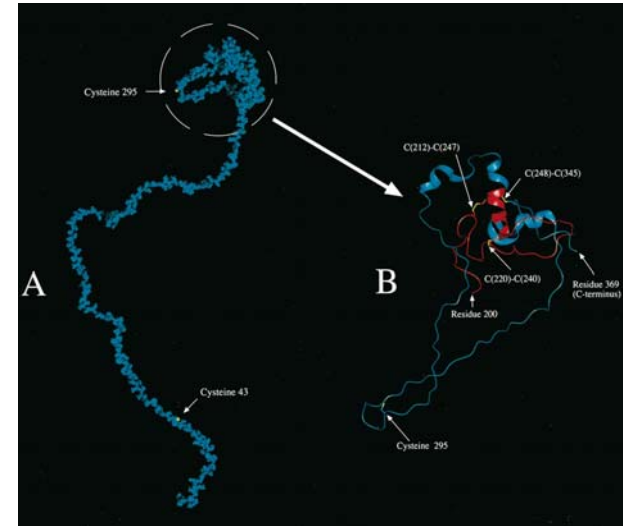
Arabinoxylan and gluten structure and crosslinking

$\beta(1\rightarrow4)$ -linked D-xylopyranose chain



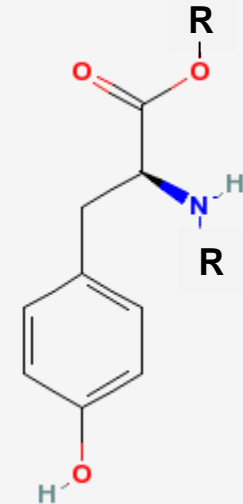
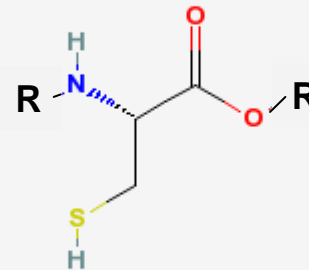
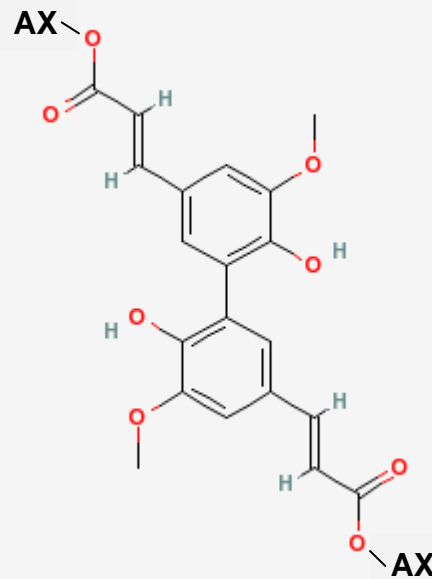
Ferulic acid is linked on position O₅ from Araf

α -1,3 L-arabinofuranose residues are linked on position O₃ (mono-substitution) and on position O₂ and O₃ (di-substitution)



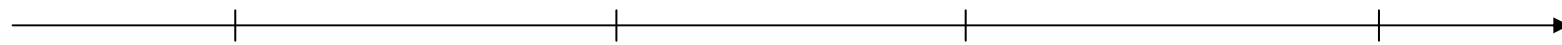
42K LMW-GS (Masci et al. 1998)

- Crosslinking occurs via
- Diferulic acid crosslinking
 - Sulphydryl – ferulic acid
 - Tyrosine – ferulic acid



Benefit

Brioche



Control

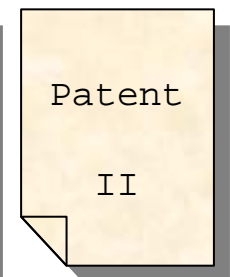
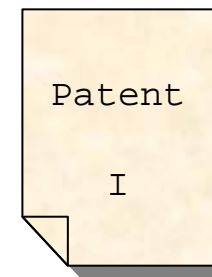
Joker x1

Joker x2

Joker x3

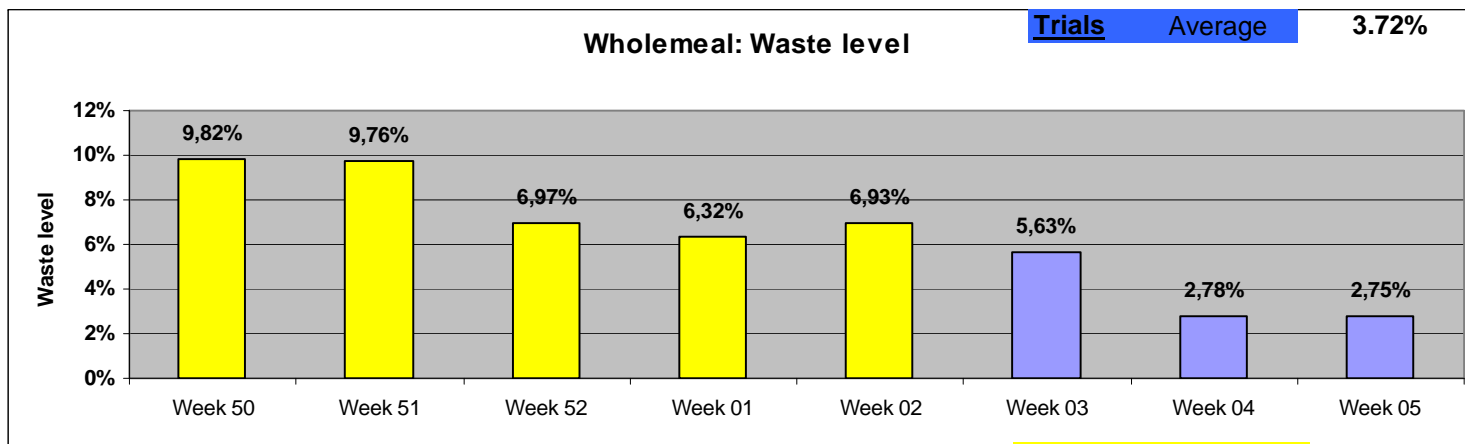
Case study: Stability of salt-reduced doughs

- Customer
 - A leading industrial manufacturer with 12 bakeries
- Customer Problem
 - Very high waste levels in salt-reduced doughs
 - Rapid response required
- CSM solution
 - An improver providing dough strengthening → improved dough handling properties → reduced waste levels
 - Combination of two technologies
 - Resulting from two innovation projects
 - Two patents filed
 - Product name: Dough stability extra
- After prototype testing, the customer requested 12 week trial
 - in two products
 - at two sites

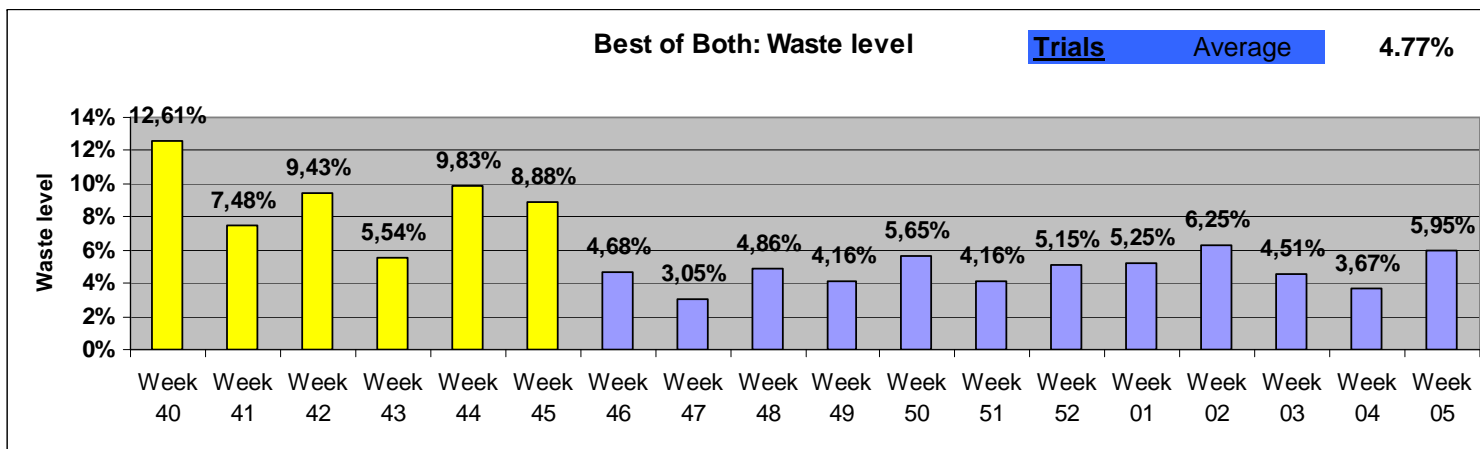


Results of trials in plant bakery

Control Average 7.96%



Control Average 8.96%



Functional ingredient



Application



Benefit



Bread
- improvers
- mixes

Clean label replacement of
- Monoglycerides
- SSL
- DATEM
- Phosphate

Enhanced gas retention
Dough stability



Confectionary mixes

Freshkeeping

Robustness to processing flexibility

Cost optimisation



Frozen
- crude
- pre-proved

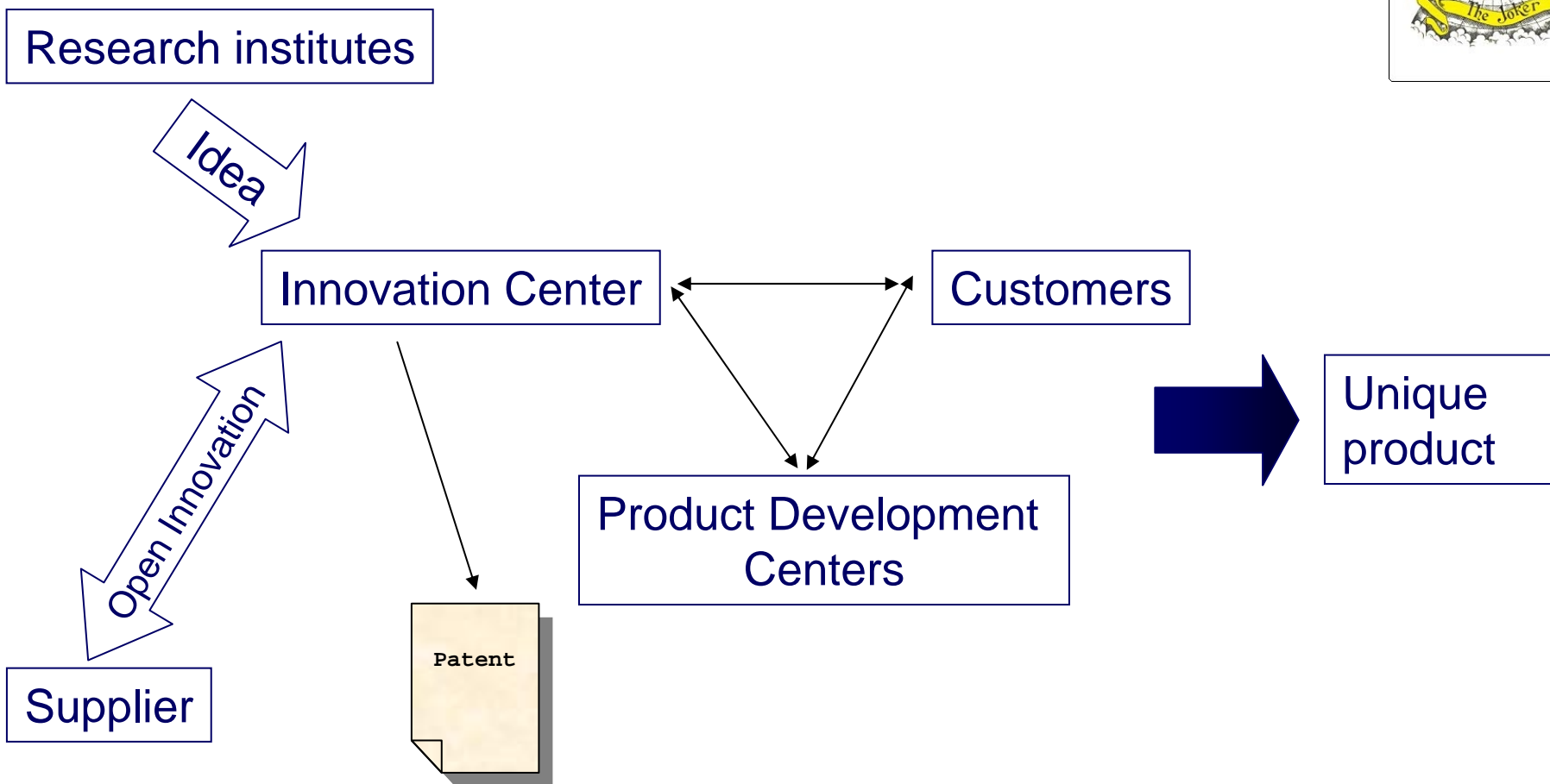
Increased proof stability

Increased oven spring

Some Joker Products



How did we make it work?



Partnership

Performance

Passion

Summary

- The bread ingredients market is moving towards more natural and label friendly products
- CSM has the knowledge to provide label friendly solutions for a large range of products
- Joker is a patent protected proprietary building used in many successful recent launches





Any questions?

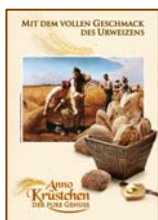


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Bakery Ingredients

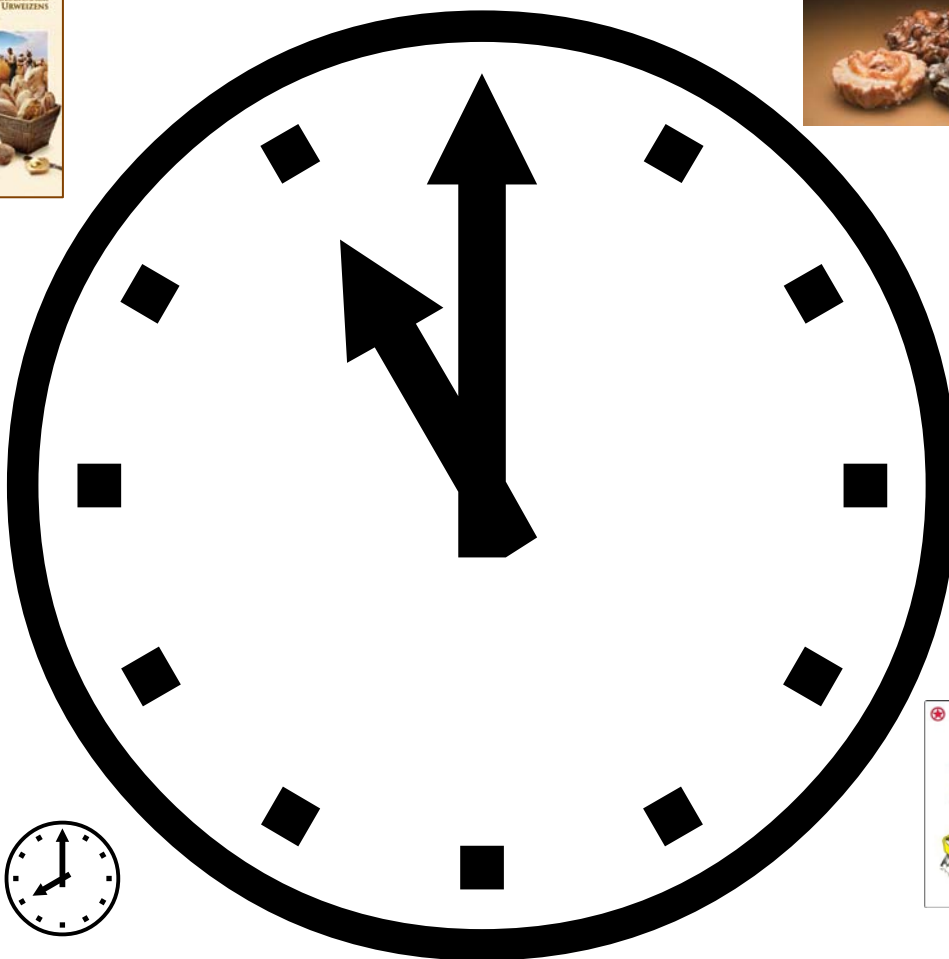
www.csm.nl

Tour of the innovation center

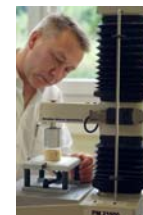
Ancient cereals



Opening the process window



Cake donuts



Fresh keeping & Texture



Joker & Stability in salt-reduced doughs



Low salt - full taste