The cooperation with the seafood industry in demonstration projects

Begoña Pérez-Villarreal

ITD 3 Coordinator:

Demonstration and SME involvement

'From technology development to technology transfer'

Demonstration Road Map

- Demonstration plan & policy
- Platform and facilitators network for technology transfer
- 2 internal calls for proposals
- 2 external calls for partners (2006-2007)
- 4 demo projects launched originating from results obtained
- 18 industries and associations involved

Some of the industrial partners involved:

BioGLane
The Green LANE to BIO actives
OH

J. RETTENMAIER & SÖHNE GMBH+CO.KG
JRS
Fasern aus der Natur
Fibers designed by Nature

PESCANOVA
Lo bueno sale bien

EUROMED

REIKIA
BACALAO DESALADO

ANGULAS AGUINAGA

Demo 1

Pulsed light technology to improve safety and shelf life of seafood products

Coordinated by AZTI-Tecnalia

Amaia Lasagabaster

Iñigo Martínez de Marañón

Industrial participants-Seafood processors:

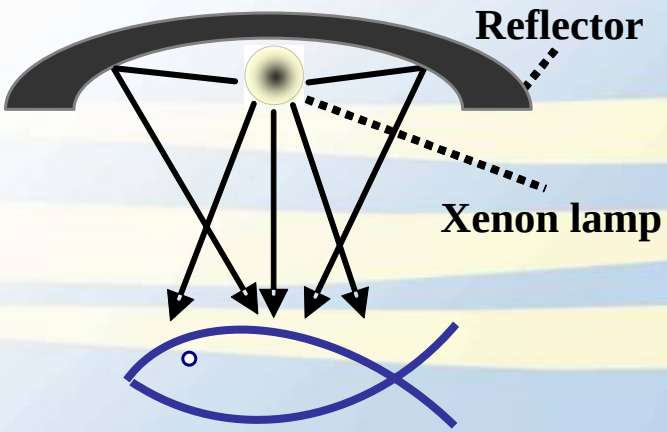
REIKIA BACALAO DESALADO

ANGULAS AGUINAGA

PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

PULSED LIGHT TECHNOLOGY

- Novel **non-thermal decontamination** process
- Successive repetition of very **short** (325 µs) and **high power** pulses
- **Broadband light** emission (λ = 200-1000nm)
- Great amount of light in the **UV-C**



PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

OBJECTIVE

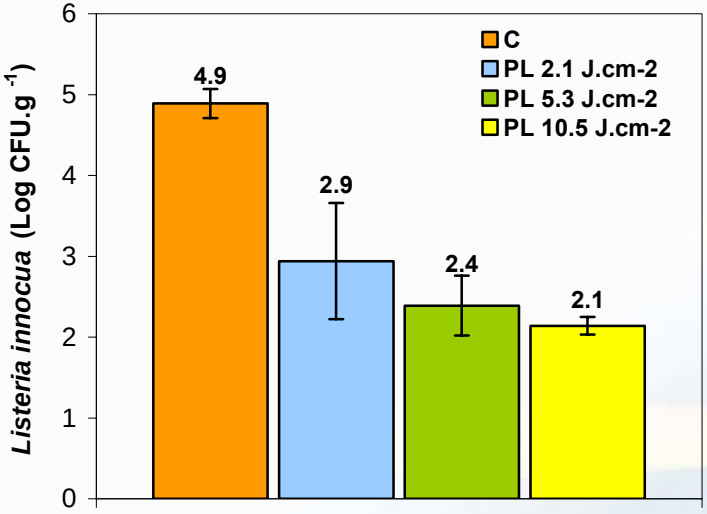
Demonstrate the suitability of pulsed light technology as an additional hurdle to **reduce** the **surface contamination** of seafood products.

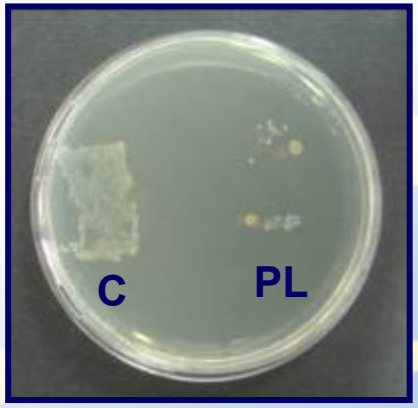
PARTICIPANTS

- **2 seafood industries**, with 2 different seafood products/industry
  - **2 preserved semifinished seafood products**
  - **2 convenience seafood products**
- **2 manufacturers** of **pulsed light** technology → **2** different pulsed light **semi-industrial systems**

PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

IMPROVEMENTS ON SEAFOOD SAFETY

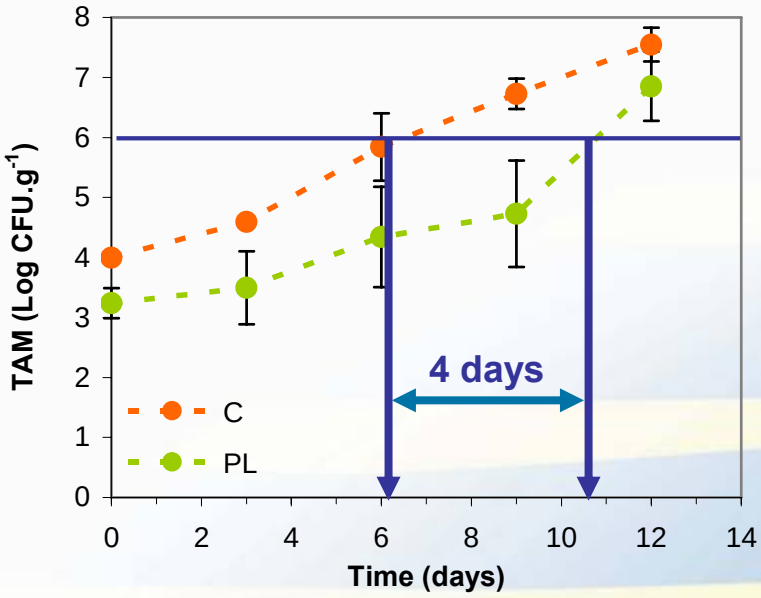




- *L. innocua* inactivation depends on the **seafood product surface properties**
- **Pulsed light process improves the safety** of preserved semifinished products and convenience seafood products by reducing *Listeria* hazard

PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

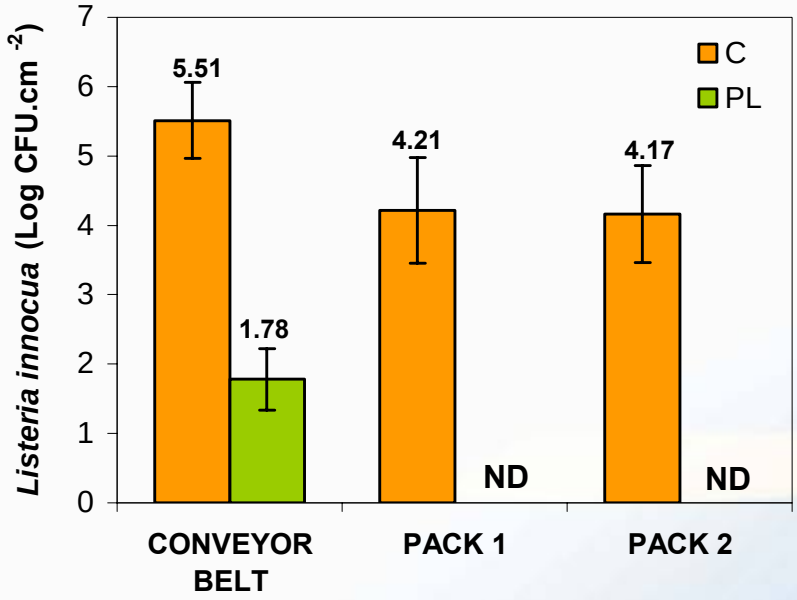
IMPROVEMENTS ON SEAFOOD QUALITY & SHELF LIFE

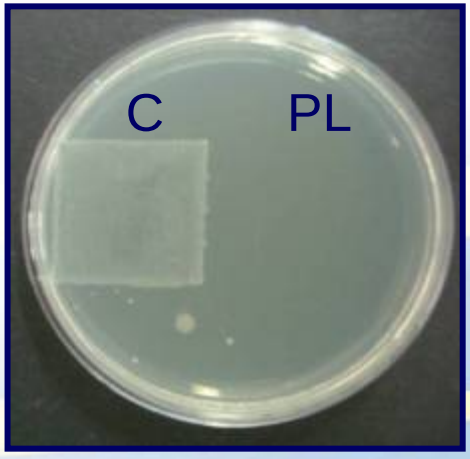


- **Pulsed light process could increase the shelf life** of seafood products (microbiological criteria)
- **No modifications** in **odour**, **appearance** nor **overall acceptability** of treated seafood products

PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

EFFICACY ON PROCESS SURFACES & PACKAGES





- **Very efficient** process in inactivating *L. innocua* in **process surfaces and packaging materials**
- **Decontamination of critical points of the process chain (conveyor belts, process surfaces, packages, etc.)** by pulsed light would **reduce** any potential danger of **cross-contamination → Improvement on safety**

PULSED LIGHT TECHNOLOGY TO IMPROVE SAFETY AND SHELF LIFE OF SEAFOOD PRODUCTS

CONCLUSIONS

Low light doses (≤ 10.5 J.cm^{-2})

Short treatment time

Surface decontamination of seafood products

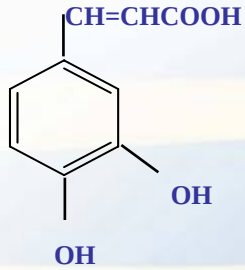
Surface decontamination of packaging materials and/or previously packed seafood products

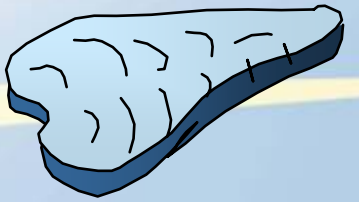
Decontamination of processing surfaces, devices and environments (air, …)

Pulsed light processing could increase the shelf life and/or improve the microbial safety (*Listeria* hazard) of seafood products

Demo 2
Natural Antioxidant Extracts enriched in Caffeic Acid for Seafood Products

- **Coordination by Isabel Medina, CSIC, Instituto de Investigaciones Marinas**





- **Industrial partners:**

  Euromed S.L.N.E., Bioglane S.L.N.E., Pescanova, S.A.

MAIN OBJECTIVE

To evaluate and demonstrate the antioxidative effect of plant extracts enriched in caffeic acid in frozen fish.

Specific objectives

Production and characterisation of a natural extract based on caffeic acid.

Determination of the antioxidant activity of this extract in fish tests.

Determination of the activity of the extract in real industrial conditions.

IMPLEMENTATION PLAN

1. Selection of natural sources useful to purchase caffeic acids and derivatives: Euromed and Bioglane

2. Identification and characterisation of the natural extracts: Euromed and Bioglane

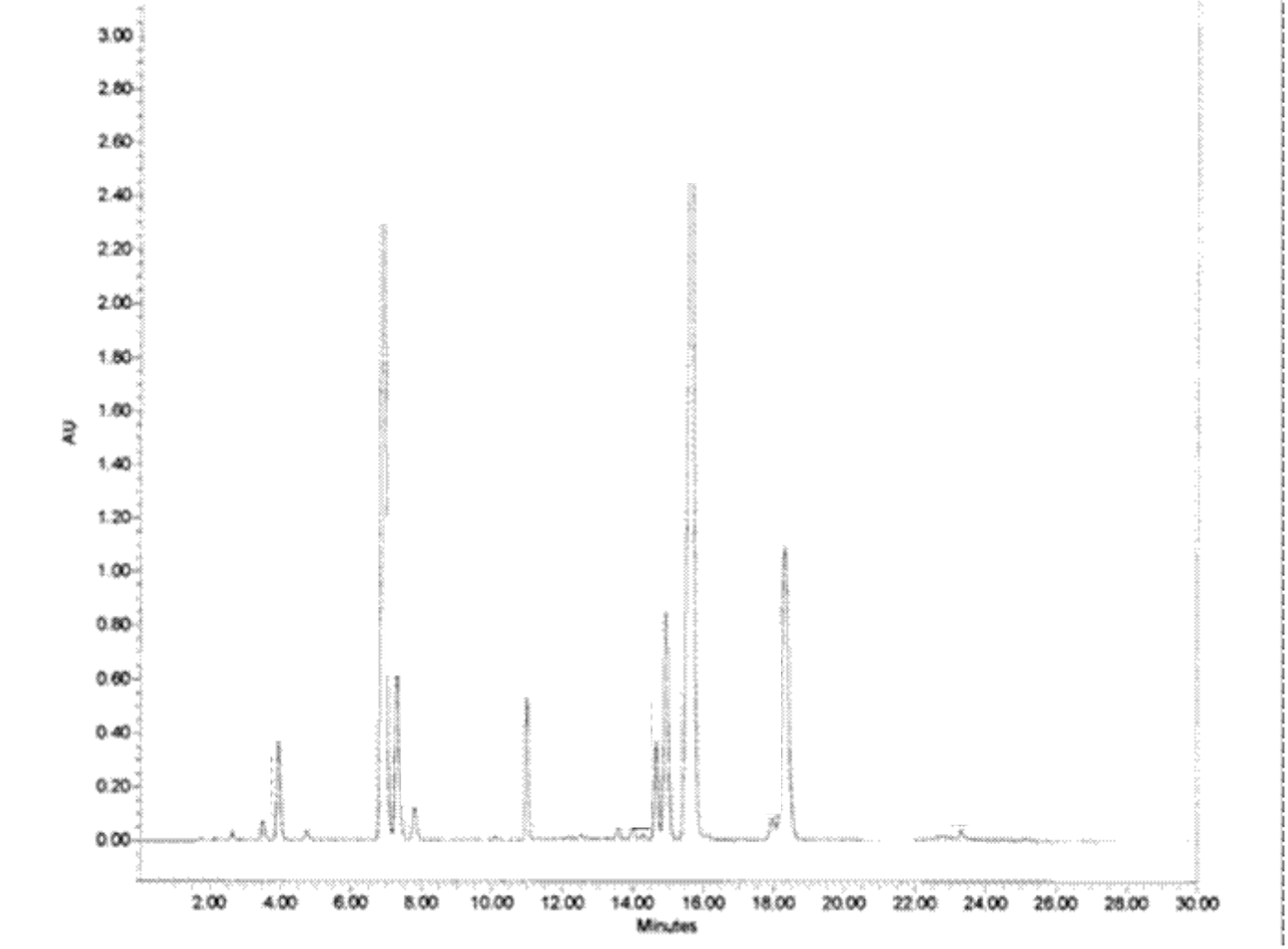
3. Tests on fish muscle models. IIM-CSIC

4. Selection of the most effective and appropriate extract: IIM-CSIC

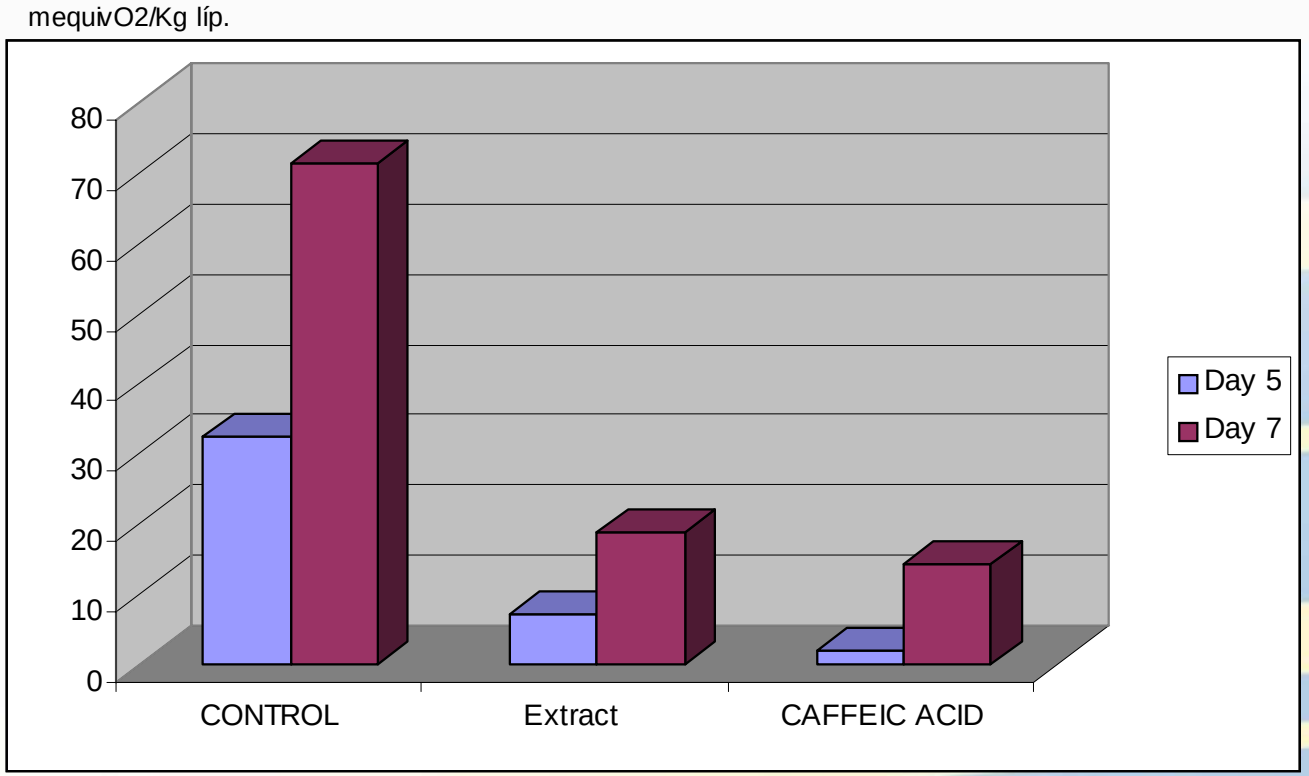
5. Optimisation of the antioxidant conditions: IIM-CSIC

6. Tests on real products: Pescanova and IIM-CSIC

First Results on Plant Extract Composition



First Results on Plant Extract Activity



Demo 3
TraceShell – A useful tool for the Bivalve sector

Coordinated by Traceability pillar 6 main partners

'Traceability to ensure consumer's confidence'

Objectives

To define

Test &

Validate

A common standard for the implementation of traceability in the European bivalve production and commercialization chain

Road map for TraceShell

- TraceShell scheme: lists parameters “data elements” that are commonly used in the different stages of the production process.

↓

- Shellfish sector selects the most relevant traceability information data in the industry

↓

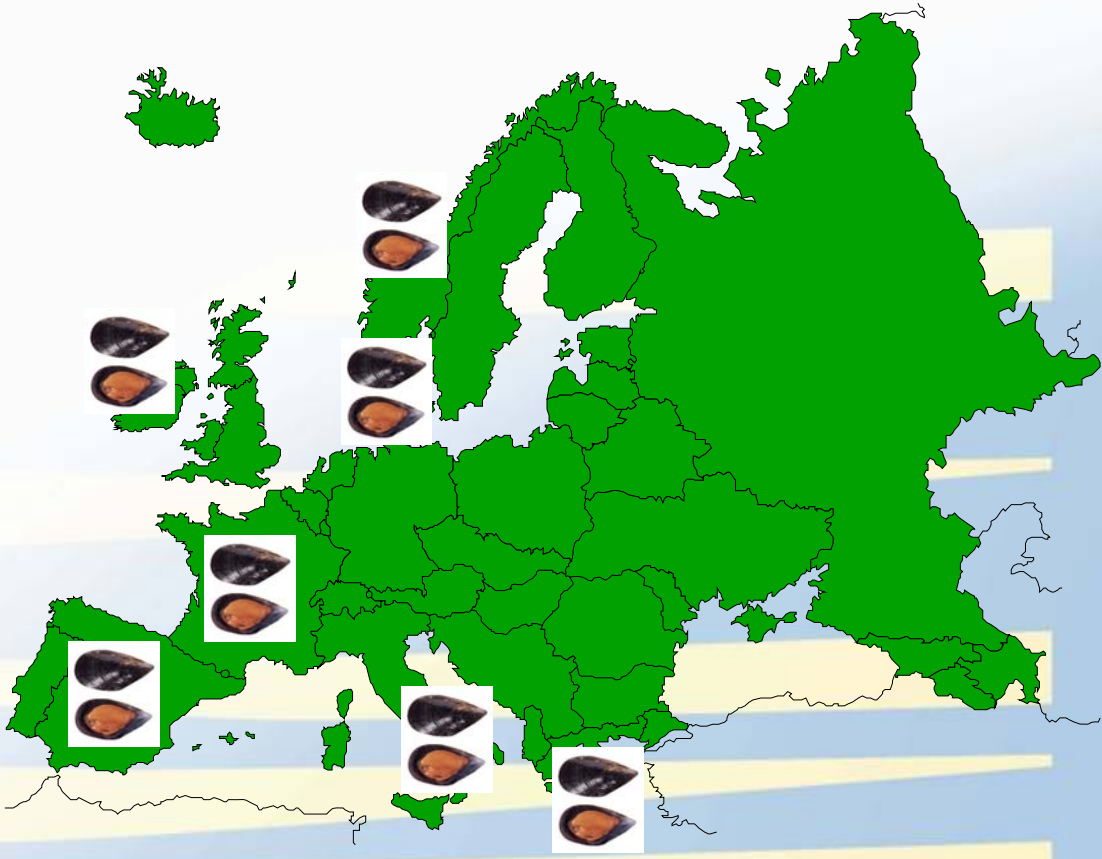
- Consensus on the data elements and evaluation of adapted Information Tools

↓

- Common traceability standard for the European bivalve sector

Partners

- Bivalve farming facilities (mussels, clams, oysters)
- Producers and commercialization associations
- National sector organizations
- From 7 European countries: Denmark, France, Greece, Ireland, Italy, Norway, Spain



Demo 4

Fish restructured products with commercial dietary fibres

Isabel Sánchez-Alonso, Javier Borderías, Mercedes Careche
CONSUMERPRODUCTS
Instituto del Frío
Spanish Council for Research (CSIC)
Madrid
Spain

APPROACH

CONSUMERPRODUCTS

- **Technological properties of DF have been screened for restructured seafood**
- **Good technological properties**
- **Good consumer acceptance**
- **Knowledge gained can be applied to many product concepts**
  - **…either as new products developed within CONSUMERPRODUCTS**
  - **…or applied to product concepts given by industries (Demonstration project)**

DEMO project

- Nutritional claims
  - **Source of- (>3% or 1.5 g/100 Kcal) and/or high- (>6% or 3 g/100Kcal) DF.**
- Industry 1: Seafood producing industry
  - **DFs will be used in two product concepts from the company**
- Industry 2: Ingredient producer
  - **Assessment in the selection of dietary fibres**

FIRST RESULTS

1) Selection of Product Concepts

- **Aim to introduce up to 4% DF (high in fibre, if it is calculated per Kcal) into formulations with the least sensory changes**
- **Meeting with company 1**
  - *Two commercial products selected*

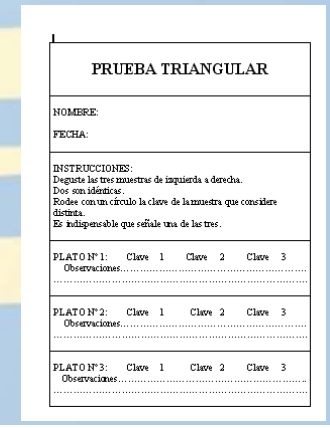
2) Selection of DF

- **Meetings with company 2 – Spain & Germany**
  - *Presentation of their DF portfolio with new developments*
  - *Provision of wheat DF: vitacel WF200, WF600, WF600/30, MCG 0018 and vivapur MCG611F*
  - *Technical assessment in the companies premises*

FIRST RESULTS

3) Optimization

- **Customized selection of the fibre type and way of incorporation for the two products**
- **Triangular tests – muscular gel type product**
  - *5 types of wheat DF at 2 & 4 % compared with the control*
  - *Panellists (n=30 per session)*
  - *WF600/30 and MGC0018 selected since no differences detected from control*
  - *Considering the requirements about the amount to incorporate for being able to make a nutritional claim, the range of DF to study goes from 2% to 4%*



PRUEBA TRIANGULAR

NOMBRE:

FECHA:

INSTRUCCIONES:
Deguste las tres muestras de izquierda a derecha.
Dos son idénticas.
Rodee con un círculo la clave de la muestra que considere distinta.
Es indispensable que señale una de las tres.

PLATO Nº 1: Clave 1 Clave 2 Clave 3
Observaciones.....

PLATO Nº 2: Clave 1 Clave 2 Clave 3
Observaciones.....

PLATO Nº 3: Clave 1 Clave 2 Clave 3
Observaciones.....

NEXT

3) **Optimization (cont.)**

- Triangular tests – minced product
  - ***On going***

4) Scaling up

5) Limited consumer test

6) Exploitation or dissemination of the results

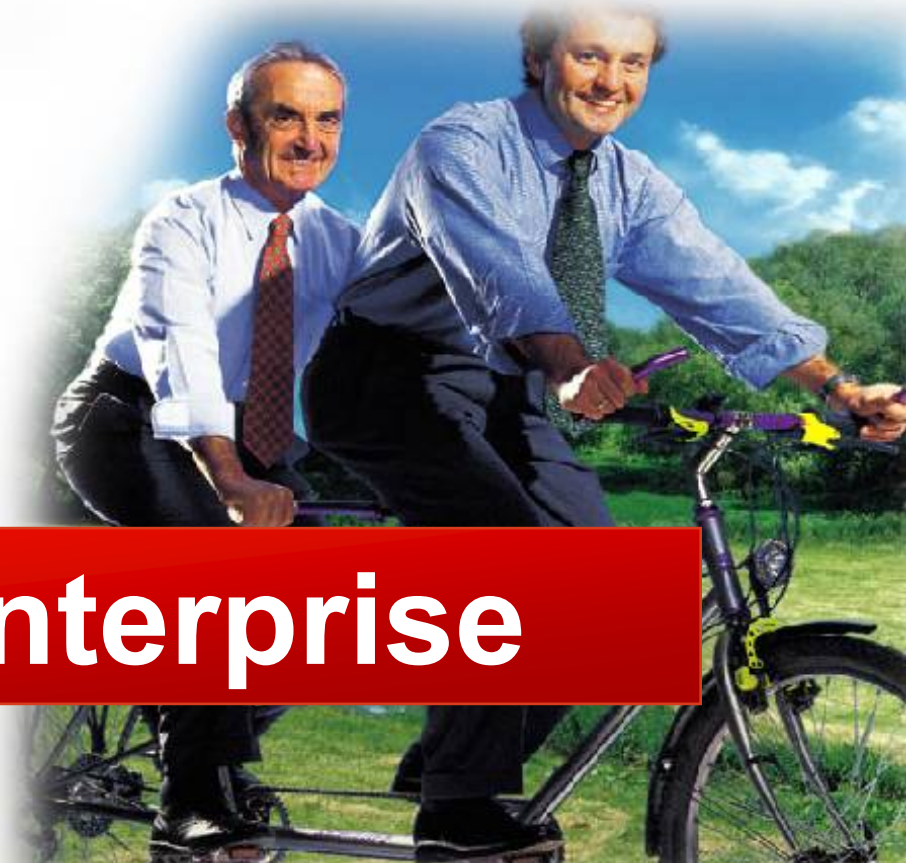
Company presentation

J. RETTENMAIER & SÖHNE
GMBH+CO.KG

JRS

Fibres designed by Nature

- Established in 1877
- Employees > 1200
- 12 Production Plants



A Family Enterprise

JRS Offices world-wide

Headquarters:

Rosenberg

JRS Offices:

Asia/ Pacific
Austria
Benelux
China
Czech Republic
England
Finland
France
Italy
Japan
Latin America
Mexico
Poland
Russia
Spain
USA

More than 200 representatives world-wide !

Overview VITACEL®

Cereal Fibres & Pea Fibre

type	WF 600-30	WF 200
colour	white	white
structure	micro-powder	fibres
dietary fibre content	~ 97 %	~ 97 %
flavour and taste	neutral	neutral
bulk density	162 - 219 g/l	72 - 98 g/l
∅ fibre length	**30 µm**	**250 µm**
∅ particle size	-	-
∅ granule diameter	-	-
water binding capacity	**~ 500 %**	**~ 830 %**
oil absorption	**~ 310 %**	**~ 690 %**
preferential application fields	➢ beverages ➢ instant products ➢ fish	➢ processed meat ➢ sausages ➢ fish

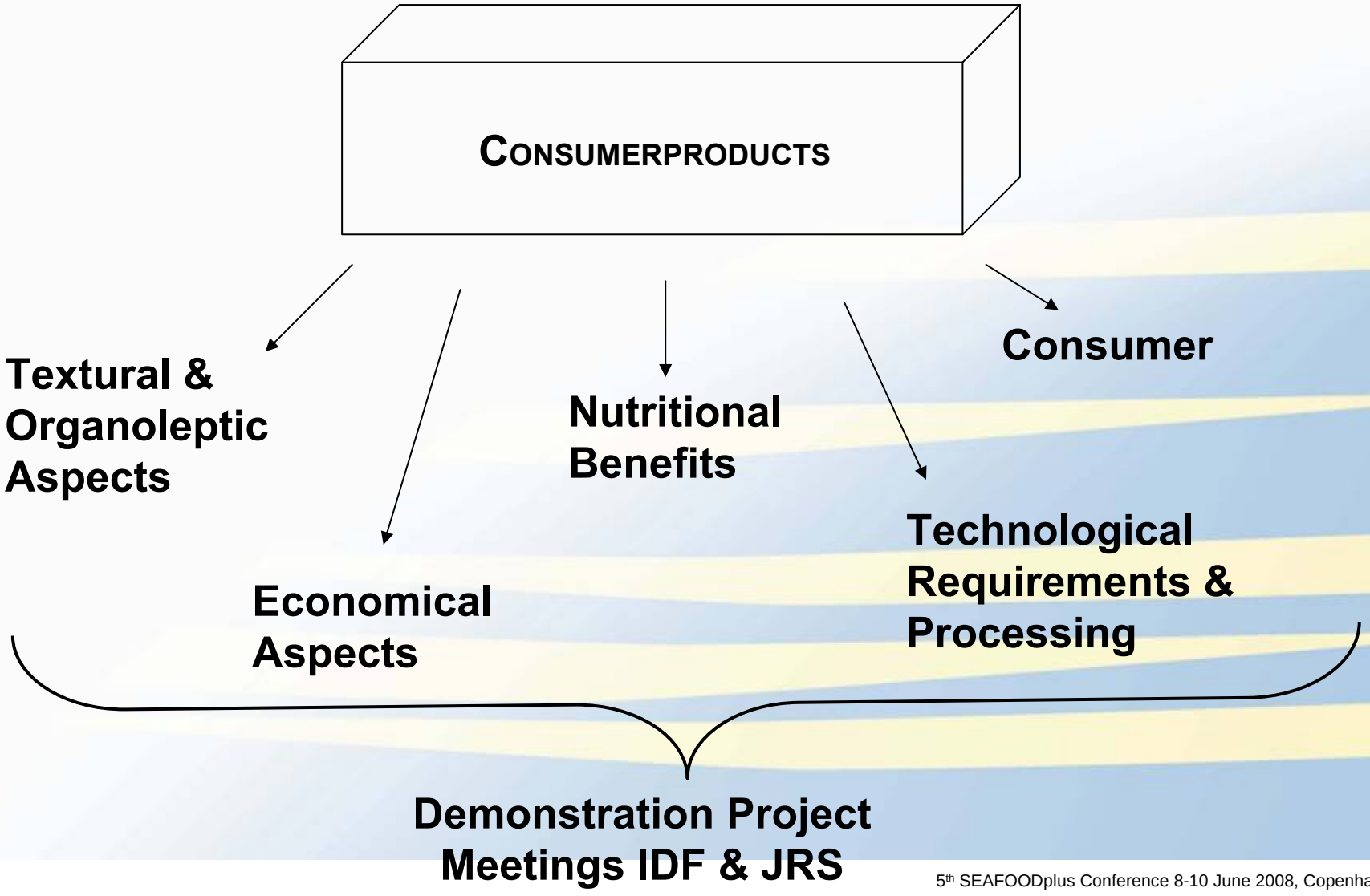
type	EF 200
colour	off-white to beige
structure	powder
flavour and taste	neutral
bulk density	350 - 580 g/l
insoluble dietary fibres	min. 65 %
soluble dietary fibres	min. 0,5 %
resistant starch	min. 1,5 %
starch	10 - 16 %
pH-value (10 % suspension)	4,0 - 7,0
average particle size	70 – 300 µm
water binding capacity	1100 - 1400 %
oil absorption	2-3 g oil / g
preferential application fields	➢ meat ➢ sausages ➢ fillings ➢ vegetable products ➢ vegetable soups

Colloidal System

Type	VITACEL® MCG 0018
Objective target	fat replacement system
Aim	fat replacement
Composition	microcristalline cellulose, carboxymethyl cellulose
Appearance	white coarse powder
Shear force needed for activation	minimum 2500 rpms as high as possible
Activation	in cold water or ice water (ratio 1:1)
Saturation time	--
Relative gel appearance	milky white from fluid to gel like (cohesive)
Taste and odour	neutral
EU Labelling*	Stabilisers (cellulose, carboxymethyl cellulose)
EU Labelling with E-Number*	Stabilisers (E460, E466)
Preferential application fields	➢ meat and sausage products ➢ cakes ➢ cookies

*We would ask you to consider the regulation for foodstuff applications and that for declaration in your country.

Cooperation Instituto del Frio (IDF) & JRS



Textural & Organoleptic Aspects

- Fibre characteristics:
  - Softness / Hardness
  - Structure
  - Colour
  - Taste

- Fibre concept:
  - Solubility (Molecul structre, Length)
  - Insolubility (Fibre length, Diameter, Level of extraction)

- Fibre mechanism: WBC; WHC

Technological requirements and processing

- Production process:
  - Timing of fibre addition
  - Hydratation status
  - Preactivation / - hydration
  - Shear forces

- Technological paramters:
  - WBC / WHC
  - Texture / Dosage
  - Gel / Creaminess
  - Network
  - Protein interaction

Processed fish - market examples – Italy

INGREDIENTI: SURIMI (MERLUZZO ALASKA POLLACK, ZUCCHERO, STABILIZZANTI: E 420 - E 450), ACQUA, AMIDO, ALBUME, SALE, FIBRA DI FRUMENTO, AROMI, ESALTATORE DI SAPIDITÁ (GLUTAMMATO MONOSODICO), ESTRATTO DI GRANCHIO, SPEZIE.

Processed fish - market examples – South Africa

A better life with seafood…

SEAFOOD plus

www.seafoodplus.org