



trace r&d | 2009

Diamond/Diamant

Canada 

Platinum/Platine



Gold/Or

Manitoba 

 Ontario



Silver/Argent

Alberta

IBM[®]


ManitobaPork

CANADIAN
Cattlemen
THE • BEEF • MAGAZINE

Bronze/Bronze

Alberta Farmer Express
Canadian Poultry Magazine
Canadian Wheat Board /
Commission Canadienne du blé

Consumer & Marketing Demand Network
Gallagher Canada
Grainnews
Intelliware Development Inc.

Manitoba Co-operator
On Trace
Trace it Solutions

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VALIDATION TOOLS FOR TRACEABILITY

Begoña Pérez-Villarreal
AZTI-Food Research Division



Trace R&D 2009 – Winnipeg, Manitoba

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science + innovation

-  AZTI-Tecnalia
-  Tecnalia Corporation
-  Food Research

AZTI-Tecnalia, a Technological Centre specialised in Marine and Food Research, is a private non-profit organization, whose objective is the social development and the improvement of competitiveness in its area of influence by means of technological Research and Innovation.

www.azti.es

*We research...
the **Sea** and **Foods***



Trace R&D 2009 – Winnipeg





science + innovation

- AZTI-Tecnalia
- Tecnalia Corporation
- Food Research



*Sukarrieta
(Bizkaia)*



- **3** Research Centers (> 10.000 m²)
- **220** Personnel
- **17,7** Millions € (income)
- **30** European Projects running

*Derio · 2008
(Bizkaia)*



*Pasaia
(Gipuzkoa)*



INTRODUCTION

Traceability definition (*ISO 8402:1994*):

The ability to trace the history, application or location of an entity by means of recorded identifications.

Food industry and traceability in Europe:

General principles for internal traceability: from HACCP implementation

EU General Food Law regulation n° 178/2002



INTRODUCTION

Traceability in practice in a food business:

- comply with laws and regulations, and several opportunities:
 - to produce safer food products,
 - to better manage the production and processes,
 - to offer to their client bigger guaranties for quality attributes:
- ✓ sensory properties
 - ✓ origin
 - ✓ nutritional properties
 - ✓ type of production (organic,...)
 - ✓ absence of certain non-desirable compounds
 - ✓ care about environmental issues

TYPES

Internal Traceability:

The information internally generated in a food production unit

Chain Traceability:

The information that is received and sent by a food production unit

Including:

- raw materials suppliers
- ingredients suppliers
- packaging
- logistics and transportation
- wholesalers
- retailers

INFORMATION


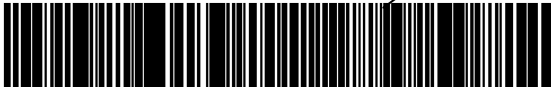
Traceability can play an important role as carrier of information regarding:

- ✓ origin,
- ✓ production method,
- ✓ species ID,
- ✓ handling,
- ✓ processing,
- ✓ additives,
- ✓ integrity of the cooling chain,
- ✓ and much more ...



INFORMATION

- Example of legally required information for fish boxes plus additional traceability information integrated in the same label

Zona de captura o de cría		Primer expedidor o centro de expedición Nº R.S.I. o Nº de autorización Domicilio Nombre	
Denominación comercial:			
Denominación científica:			
Peso neto: (Pto. Envasado)	Método de producción: (Pto. Envasado)	Modo de presentación o tratamiento:	
BARCO:			
 (01)98412345678908(3103)023000			
 (10)123A(414)8412345000010			

Area of origin
Food business identification
Latin name
Commercial name
Net weight
Captured/farmed fish
Product presentation
Vessel name

GTIN (Global Trade Item Number)
Net weight
Lot number
Business ID

INFORMATION

Important aspects with respect to information:

- Collection and handling of data
- Verification of the data

Internal Traceability:

Verification of internal data: quality management tools

Chain Traceability:

Need for a Validated traceability system



Validated Traceability System

What is it?

Is a system which assures that the information contained in the CV of a product is true and serves for its purpose

Why?

A good traceability system must be trustworthy, that is, must transport/contain reliable information

How?

By indicators capable of measuring the efficiency (“work as defined”) and reliability (“effective”, “serves the intended purpose”) of the relevant traceable data within each link of the chain



Validated Traceability System in seafood

This means to identify parameters and indicators to:

- Ensure the safety of the product
- Provide the expected quality to customers and consumers
- Prevent fraud in the food chain
- Ensure correct data management and information flow

Several traceability tools have been developed:

- A Practical Guide for the Validation of Traceability in the Seafood Chain
- Validation of fish ID methodologies based on DNA
- Demonstration of the use of validation tools in 2 commercialisation chains



01 Introduction

- > Foreword
- > The VALID Project
- > Partners

02 Objectives

03 Verification

04 Validation

05 Indicators

- > Classification of traceable data, records and indicators
- > Within the seafood chain...

06 Specific Validation Tools

- > Histamine
- > Biotoxins in bivalve molluscs
- > Volatile amines
- > Microbiological quality assessment
- > Degree of freshness
- > Methods for authentication of fish species
- > Product presentation and processing conditions
- > Presence of bioactive compounds
- > ID of geographical origin
- > Discrimination of wild from farmed fish

07 Glossary

08 Contact

09 Links

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VALID

Seafood traceability to ensure consumer confidence

The regulation (CE) Nº 178/2002, by which the general rules and requisites of the food product legislation are established, define traceability as the possibility to find and follow the trail of a food product, through the production, transformation and distribution stages.



The guide aim is to facilitate anyone who is involved in the seafood chain to identify the indicators that will tell him if his traceability system complies with the established standards and serves to its purpose with efficaciousness. This means that the system is not only efficient and error free but it also reliable and the information registered is real.

Efficiency and Reliability

Efficiency, that is, the traceability system works, ensuring that: the records are completed, the good practices of traceability are respected, there are no information gaps or lack of information.

Reliability, that is, the information gathered by the traceability system is reliable and free of errors, determined by the best indicators related to food safety, quality and fraud.



Classification of traceable data, records and indicators...

SAFETY

QUALITY

FRAUD

INFORMATION FLOW

Within the seafood chain...



A PRACTICAL GUIDE FOR TRACEABILITY VALIDATION IN SEAFOOD PRODUCTS

Available on line at:

www.azti.es/valid

A PRACTICAL GUIDE FOR TRACEABILITY VALIDATION IN SEAFOOD PRODUCTS

Contents

Indicators mapping

Classification of traceable data, records and indicators

SAFETY

QUALITY

FRAUD

INFORMATION FLOW

- Short information about each indicator and its relevance
- Short analysis of the available methods
- Recommendations for the use and selection of the most adequate
- Links for more information



A PRACTICAL GUIDE FOR TRACEABILITY VALIDATION IN SEAFOOD PRODUCTS

Within the seafood chain

Most important traceable data and indicators of their efficiency and reliability for each link within the seafood distribution chain

Fishing
vessels

Loading
enterprises and
auction markets

Processing
plants

Transport and
storage

Traders and
wholesalers

Retailers
Distributors
Caterers



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Description of link main operational procedures and short analysis of the related traceability practices. Some general recommendations are given.

Fishing vessels are considered to be vessels that catch fish, that may carry out basic operations on the fish such as bleeding, gutting, heading, washing, grading and weighing, and then stow the fish and transport it to the point of discharge. Fish may also be frozen on fishing vessels. Fishing vessels may carry out their own discharging operations that may include grading, weighing and boxing the fish on discharge, prior to dispatch of their products into the hands of the next food business. Alternatively, the next food business may discharge the fishing vessel.

The trade units created by the fishing vessels can range from single large fish or boxes of graded fish that have been individually labelled by the vessel, to the entire hold of mixed fish passed into the hands of the next food business.

Fishing vessels such as factory vessels, that carry out further processing operations such as filleting, are considered to be both fishing vessels and processors.

SAFETY

QUALITY

FRAUD

CHAIN INFORMATION FLOW

SAFETY

	Verification parameter	Efficiency Indicator	Reliability Indicator	
			What	How
SAFETY FISH	Formation of histamine	<ul style="list-style-type: none"> Time/temperature records Species identification 	<ul style="list-style-type: none"> Histamine 	<ul style="list-style-type: none"> AOAC Official Methods <p>Reference: Regulation 2073/2005</p>
	Contamination by chemical products	<ul style="list-style-type: none"> Identification of catch area Species identification 	<ul style="list-style-type: none"> Hg, Cd, Pb Sn (canned products) HAP Concentration of dioxins and dioxin-like PCBs 	<p>Reference: Regulation 333/2007</p> <p>Reference: Regulation 333/2007</p> <p>Reference: Regulation 333/2007</p> <p>Reference: Directive 2002/69/CE</p>

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A PRACTICAL GUIDE FOR TRACEABILITY VALIDATION IN SEAFOOD PRODUCTS

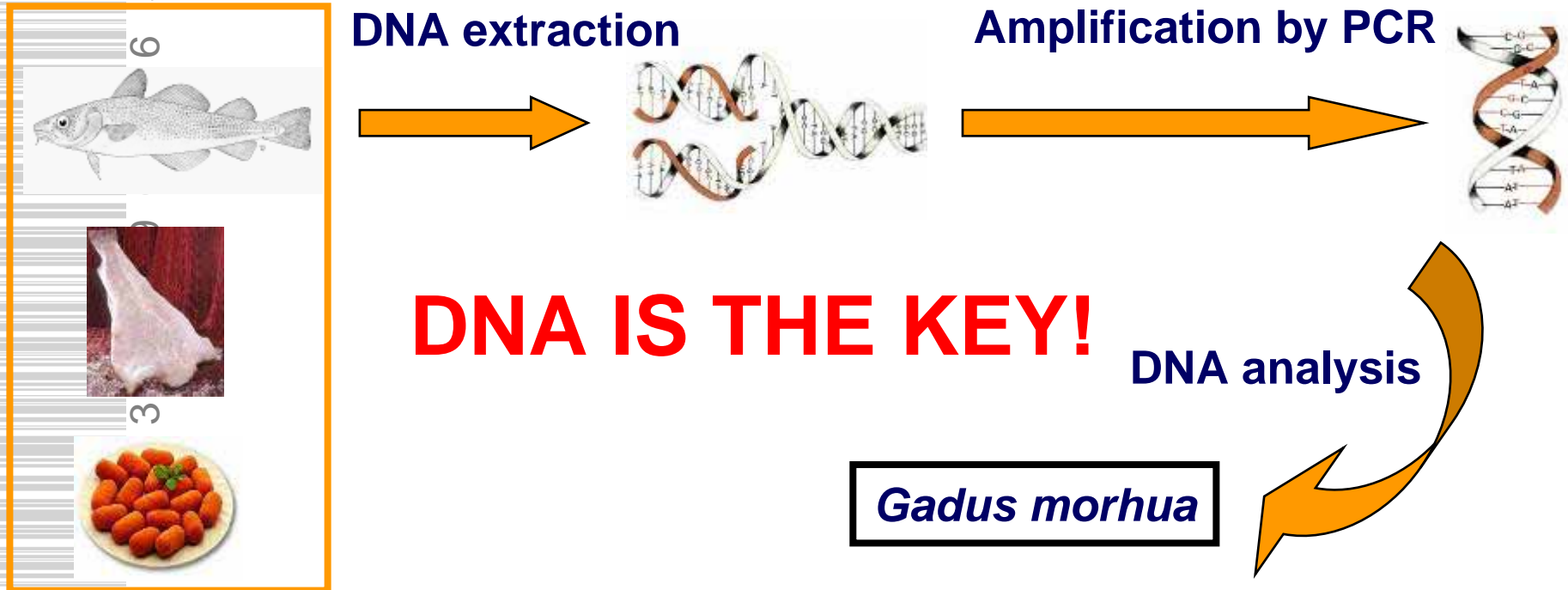
Specific validation tools for:

- Methods for authentication of fish species.
- Histamine and biogenic amines
- Toxins in bivalve molluscs.
- Volatile amines.
- Microbiological quality assessment of seafood products.
- Sensory evaluation of quality of fresh fish.
- Product presentation and processing conditions.
- Identification of geographical origin.
- Discrimination of wild from farmed fish.

Fish species identification

Methodologies

- Molecular methodologies based on DNA

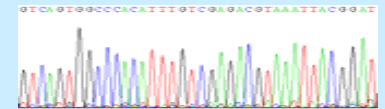




Validation of of fish species identification based on DNA

Sequencing (FINS) as Gold Standard Validation method

- The most robust technique
- Reference materials are needed:



Tool

DNA database



- 53 species & 727 sequences to compare results
- Dynamic & public system: www.azti.es/dna_database

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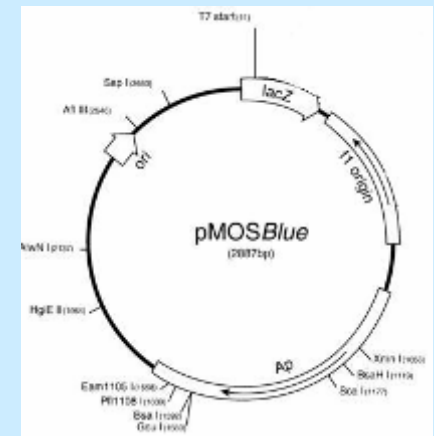
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Tool

Plasmid based standards



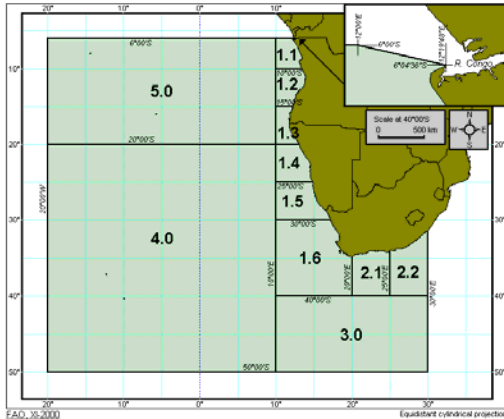
- Certified DNA standards to standardise and calibrate
- Applied for patent: PCT No. ES2007/000777
- Intercomparative Test: 8 labs/4 EU countries involved



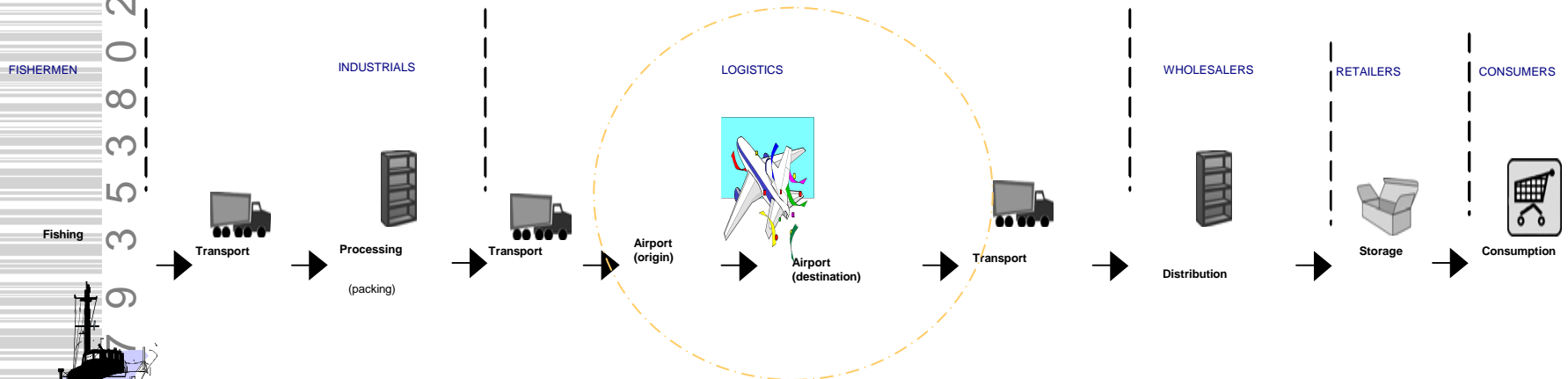
Validation of the traceability chain

South African Hake to Europe

FAO 47 ZONE



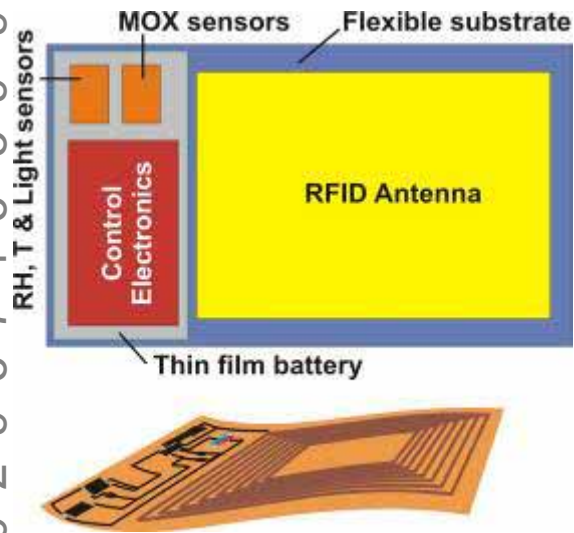
The chain involves a set of transactional characteristics that constitute common basic elements for the organization of the international fish trade:



South African Hake “Merluza del Cabo” (*M. paradoxus* and *M. capensis*) Commercialisation Chain

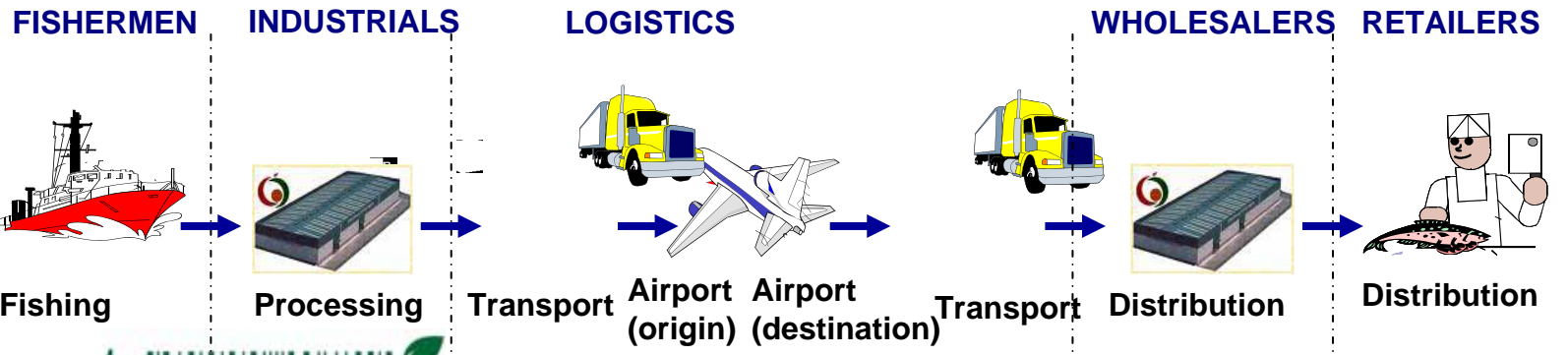
Validation of the traceability chain

Synergies with EU project:



Fish monitoring during logistic transport (air and truck):

Using a Flexible Tag Microlab (FTM) integrating sensing and RFID communication capabilities with user interface for additional traceability ID data



1) Selection of verification parameters associated to the specific operator

- Pathogen growth and toxin formation as a result of temperature/time abuse
- Freshness
- Manipulation and process
- Species authentication
- Product presentation
- Backward traceability
- Forward traceability
- Product identification



2) Identification of the efficiency and reliability indicators

Reading more about traceability....

- “Validation of traceability”, Begoña Pérez-Villarreal; Félix Amárita; Carlos Bald; Miguel Angel Pardo; Ibán Sagardia. In “Improving seafood products for the consumer”. Woodhead Publishing Limited. Book chapter 26. Pp. 539-566 (2008)
- “Food Traceability in Spain. Traceability of Tuna, Iberian Pork and Wine”, Alberto González de Zárate and Begoña Pérez-Villarreal. In “Traceability around the world” Pp. 89-103. ISBN 13-978-0-9553707-1-7 (2008)



