25 urte años years 1981 - 2006

ikertzen eta berritzen
investigando e innovando
researching and innovating

Traceability experiences in the Spanish food industry

Begoña Pérez-Villarreal

azti tecnalia

The value of Specialisation

KNOWLEDGE AND INNOVATION

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AZTI-Tecnalia, Technological Centre, is a non-profitable organisation committed to the social and economic development of the food and fishing industries, and to the protection of the marine environment and its natural resources.

Marine Research

Food Research

The value of Specialisation

KNOWLEDGE AND INNOVATION

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An activity geared towards solutions to our customers, using an innovative model which balances the ability to generate and collect technology by diffusion and transfer.

- **Technological research and development**
- **Technology transfer**
- **Technical services**
  - -Technical advice and consultancy services
  - -Analysis and testing
  - -Technological training and diffusion

- **197 personnel (162 employees & 35 trainees)**
- **16 Million € (income)**
- **30 European Projects running** ** facts 2005*

- **2 Research Centres (10.000 m²)**
- **3 Technical Offices in South-America (Chile, Argentina y Ecuador)**

Sukarrieta (Bizkaia)

Pasaia (Gipuzkoa)

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TRACEABILITY IMPLEMENTATION

Nowadays, traceability in the different food chains is based on collaborative agreements along the different supply chain actors and is based on the increasing use of standard tools in each point.

Key Points

1. **Correct identification of products.**
2. **Capture and registration of the information.**
3. **Transmission of the information.**

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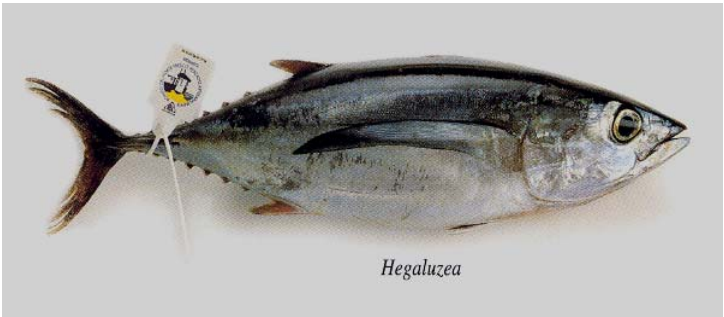
PRODUCT IDENTIFICATION

All commercial and logistic units need to be identified unequivocally.

Identification systems must allow the automatic capture of the data.

A) Ear tags

B) Bridles that can be fastened



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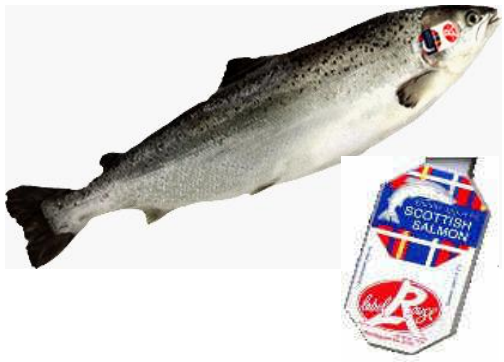
PRODUCT IDENTIFICATION



C) Fishclip type

Manual application clamp.

D) Inserted labels (Qualimark)

Semi-automatic application

With possibility for data inclusion

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PRODUCT IDENTIFICATION

E) Adhesive inviolable labels

Directly applied on meat and fish products

Examples seen in:

- Denomination of Origin meat products and Quality Certification systems (e.g. “Ternera Gallega”)

- Fish products with MSC Certification (e.g. rock lobster)

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PRODUCT IDENTIFICATION

F) Conventional labelling

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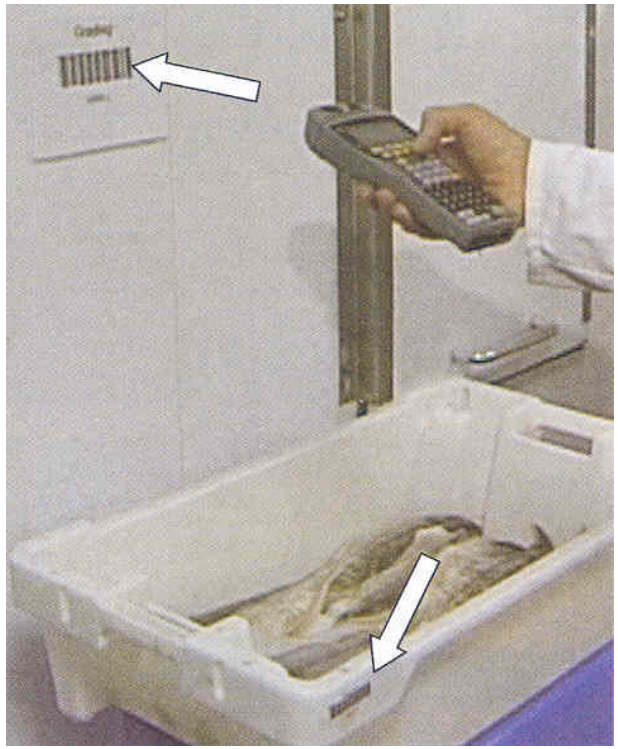
PRODUCT IDENTIFICATION

G) Bar codes (1D)-EAN

Ideal for packaged products

Universally used, but with reduced information content (max. 20 characters). EAN/AECOC norms.



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PRODUCT IDENTIFICATION

PDF 417

DATAMATRIX

H) BIDIMENSIONALS (2D)

Can contain significant information (up to 2000 characters)

Can be a good complement to bar codes.

Interesting when:

- There is not a good access to a remote computer.
- The label or the object/product to be identified is small.

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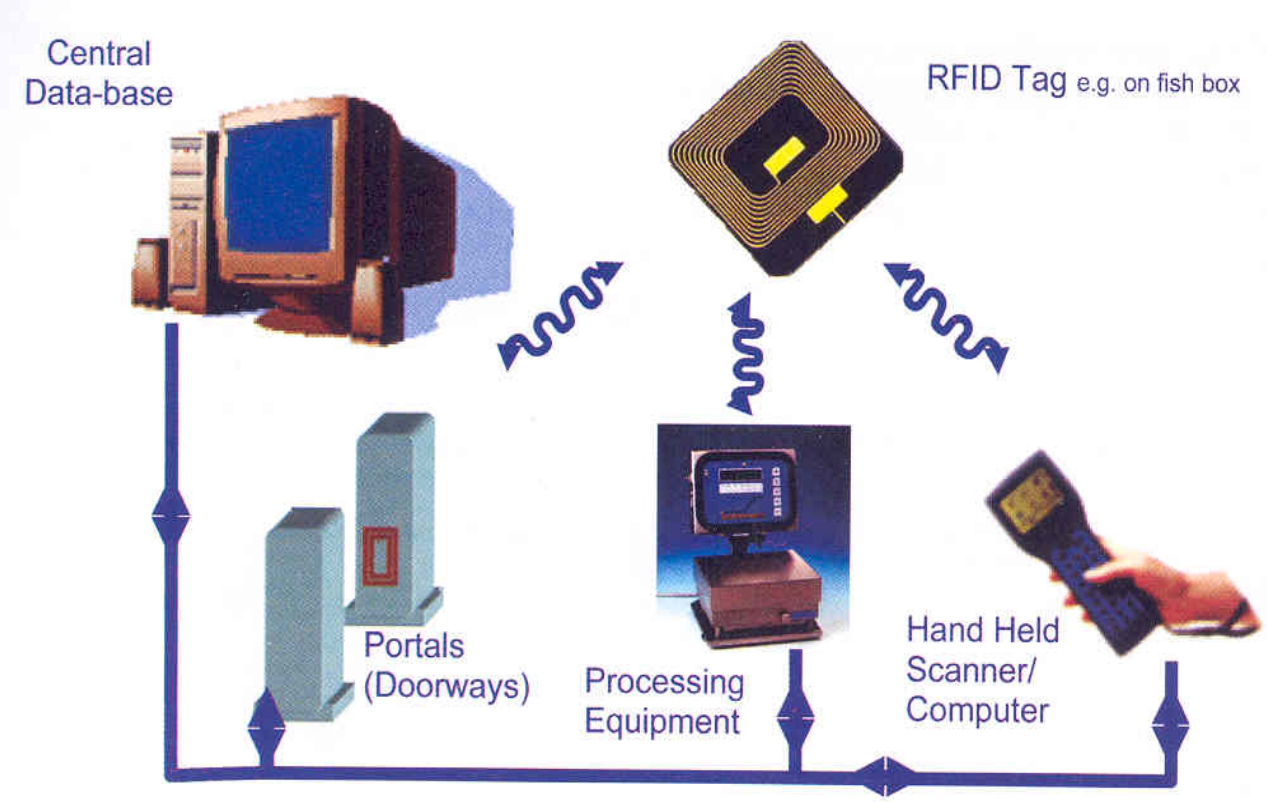
PRODUCT IDENTIFICATION

I) RFID (Radiofrequency identification)



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PRODUCT IDENTIFICATION

I) RFID (Radiofrequency identification)

There are encapsulated models, to facilitate their introduction under the skin.

The capsule can be lately reabsorbed.

Labels with transponder or microchip

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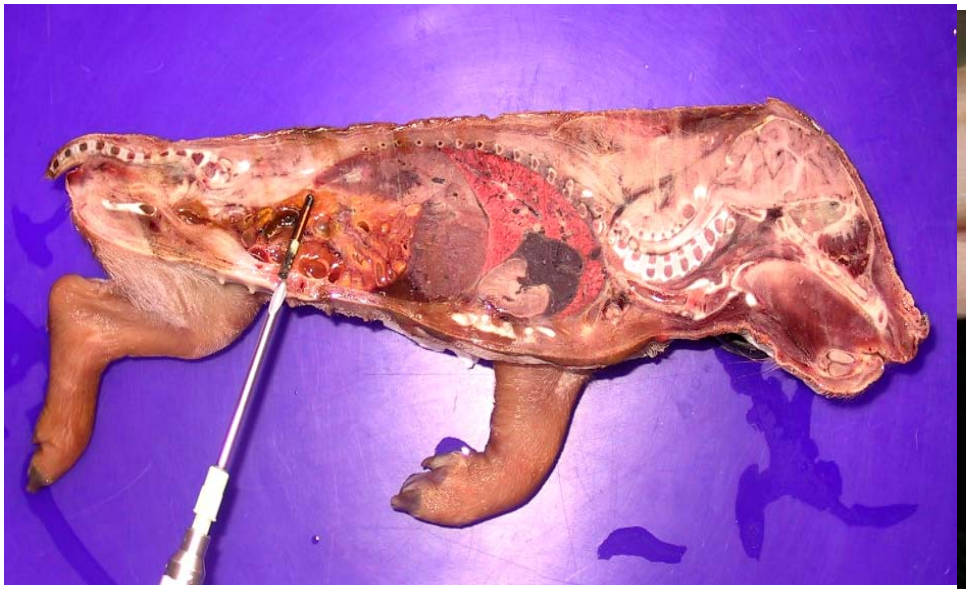
PRODUCT IDENTIFICATION

I) RFID (Radiofrequency identification)



Project EID & DNA Tracing (Universidad Autónoma de Barcelona)

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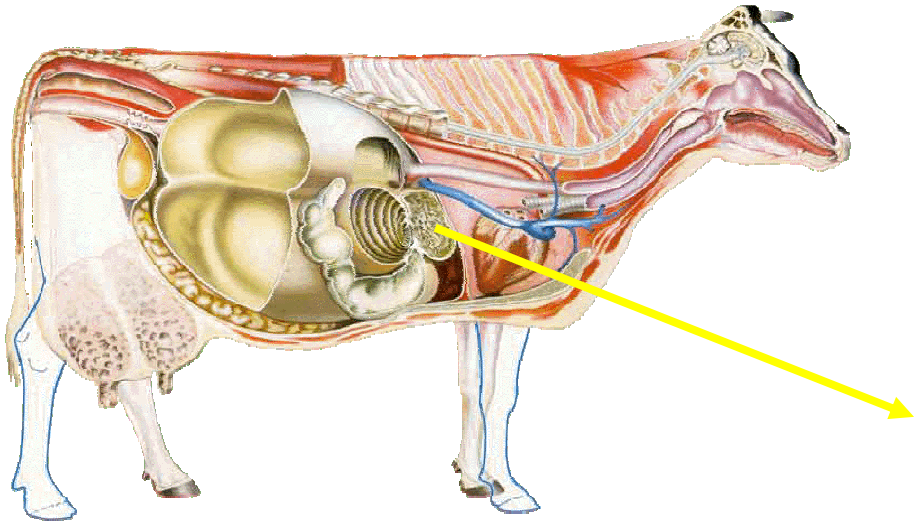
PRODUCT IDENTIFICATION

I) RFID (Radiofrequency identification)



Project EID & DNA Tracing

(Universidad Autónoma de Barcelona)

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PRODUCT IDENTIFICATION

I) RFID (Radiofrequency identification)

SIEMENS: Antena que permite leer hasta 200 tags, a una distancia de 800 mm

OMRON

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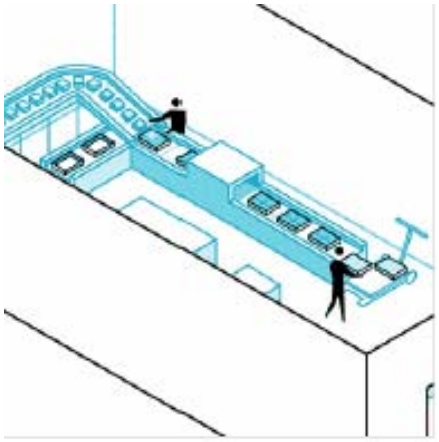
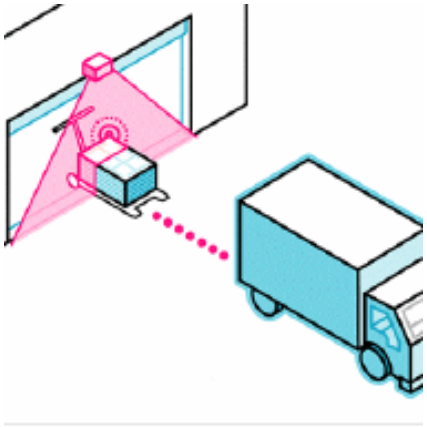
I) RFID (Radiofrequency identification)

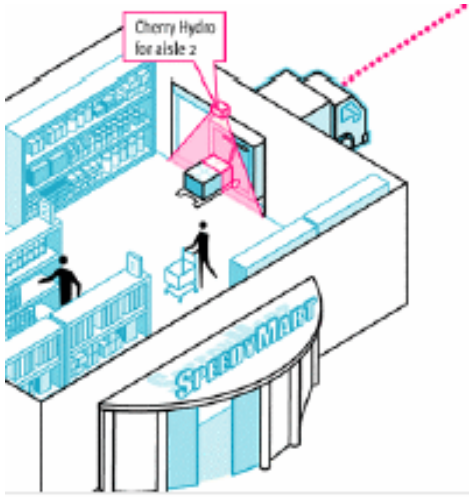
Identificación de las unidades comerciales



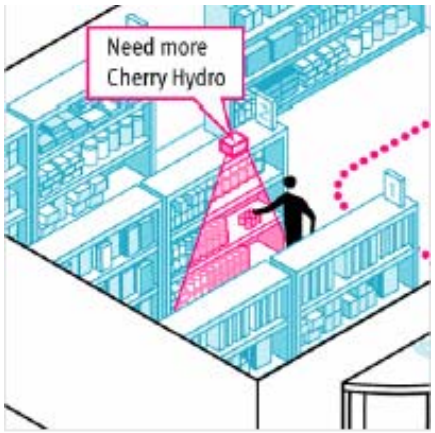
Identificación de las unidades logísticas: cajas y/o palets



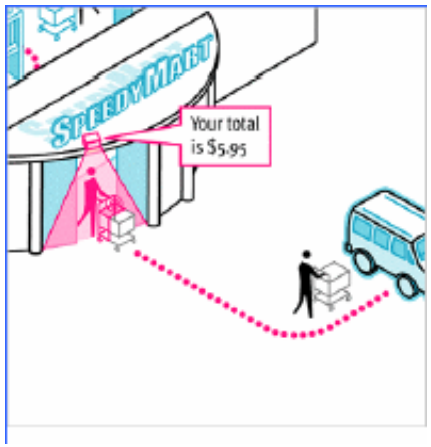
Lectura a la salida del almacén del fabricante



Lectura al entrar en el supermercado



Lectura al retirar el producto del lineal



Lectura y cargo en la cuenta del consumidor

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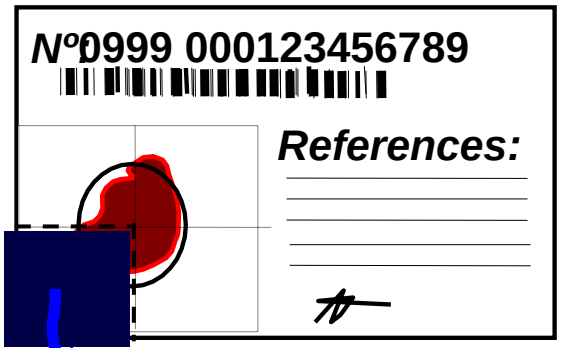
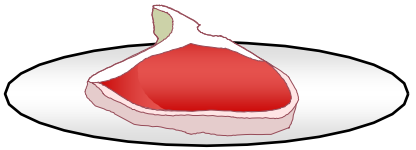
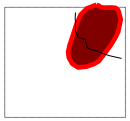
J) Genetic markers

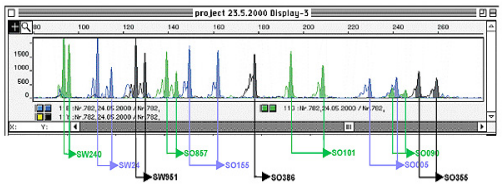


Card for biological samples

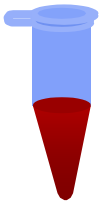


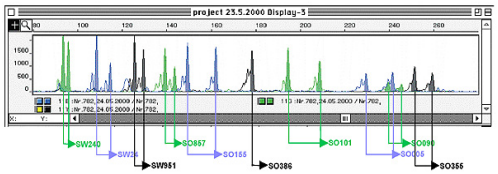
Analysis and comparison

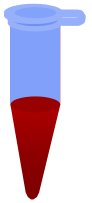




DNA Extracted







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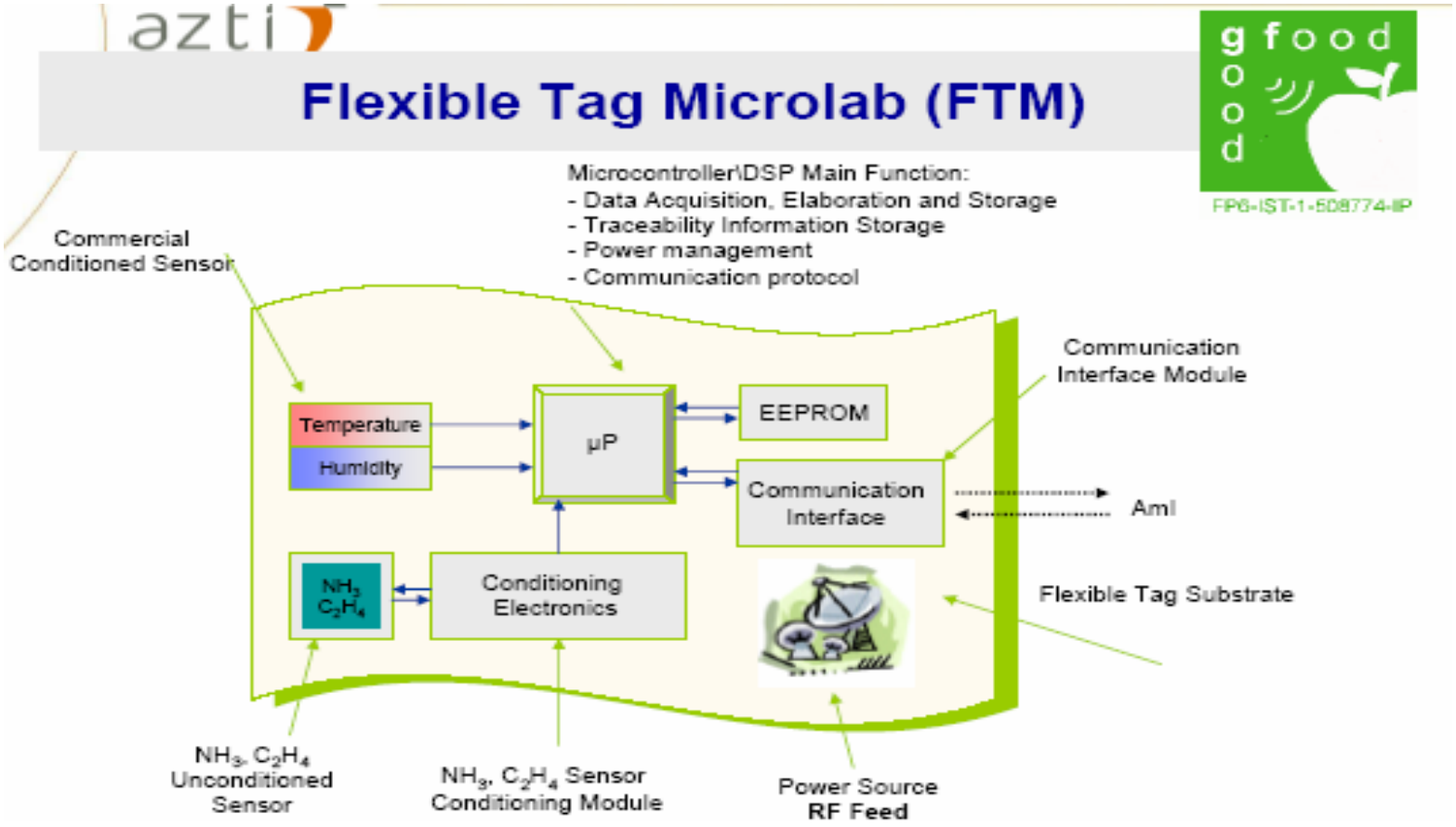
PRODUCT IDENTIFICATION

J) Intelligent labels



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PRODUCT IDENTIFICATION

J) Intelligent labels

Proyecto Jumbos (LECHE PASCUAL)

Producto

- Huevo líquido ultrapasteurizado Pascual
- Envase de 1.000 kgs., de alto valor unitario
- 49 días de caducidad
- Temperatura de conservación: entre 0º y 3ºC

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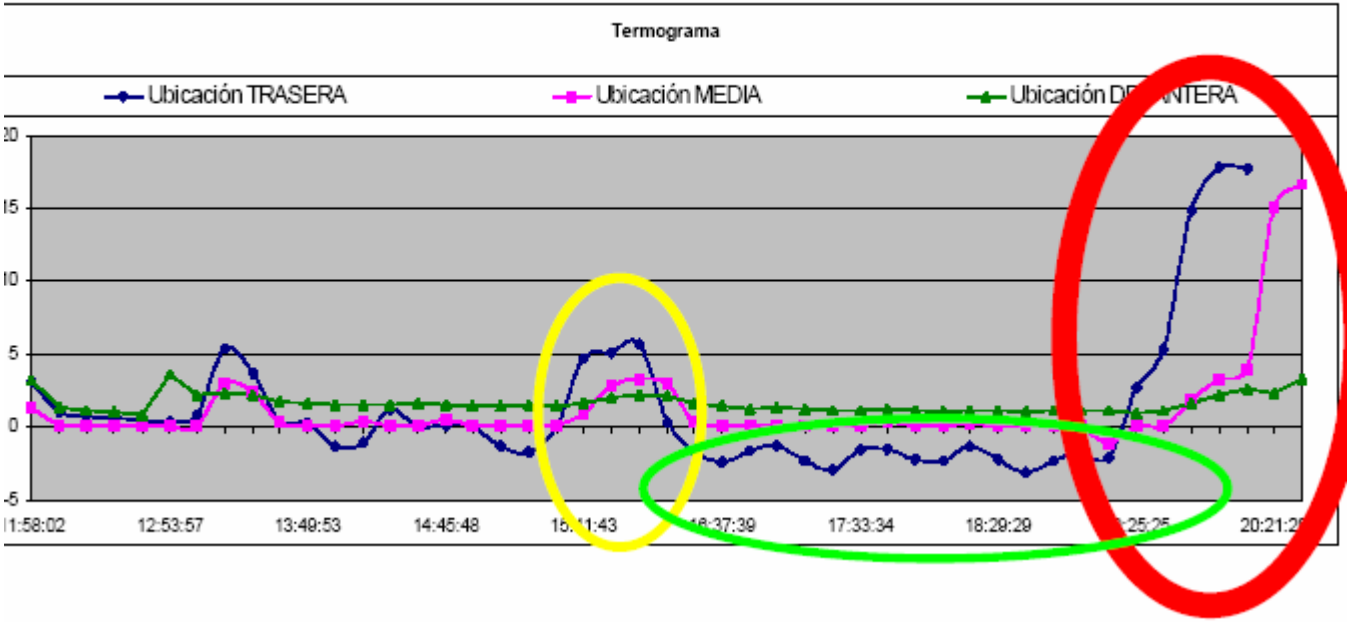
PRODUCT IDENTIFICATION

J) Intelligent labels

Situación real en un transporte de temperatura controlada



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PRODUCT IDENTIFICATION

J) Intelligent labels

Cadena de Distribución

- Esquema de la cadena de suministro

- Envíos directos a Clientes Industriales
- Sistema de control hasta ahora: el termógrafo del camión + una sonda electrónica

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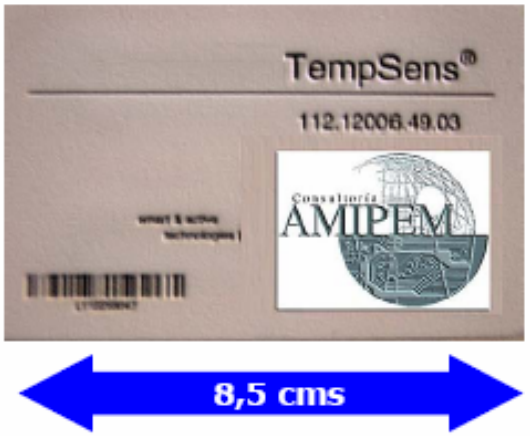
PRODUCT IDENTIFICATION

J) Intelligent labels

Solución planteada

- Utilización de un tag RFID con termógrafo
- Tag **activo** en la captación de temperatura y **pasivo** en la emisión de datos
- Utiliza una batería de papel
- Un tag por jumbo



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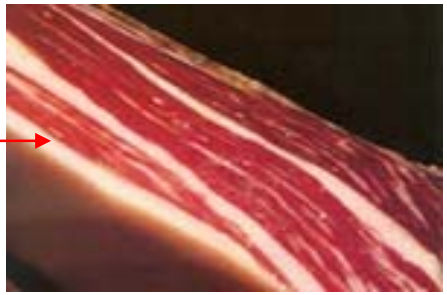
Traceability “pig to ham” in Iberian pork

TRACEABILITY "PIG TO HAM" IN IBERIAN PORK

- Sociedad Hispano-Japonesa creada en el año 2005.
- Inscrita en la denominación de origen **Dehesa de Extremadura Campo**.
- Producción anual de 15.000 canales.
- Granjas en Guarañana y Palazuelos (Badajoz), explotaciones en extensivo, matadero homologado y fábrica-secadero en Montanchez.



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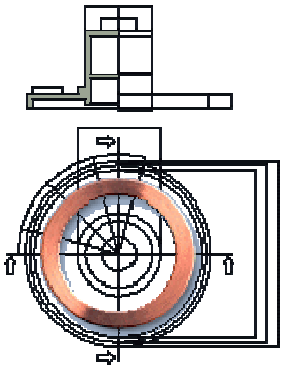
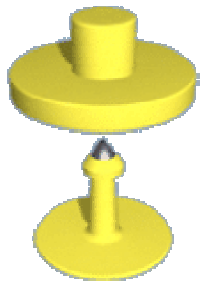
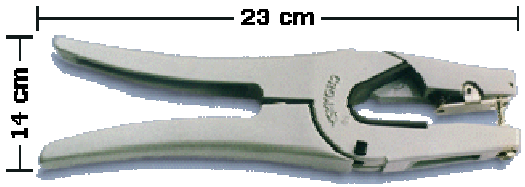
TRACEABILITY “PIG TO HAM” IN IBERIAN PORK

LIFE ANIMAL IDENTIFICATION

- RFID tags (125 kHz, 800-900 MHz) are placed on the back of the ear when born
- Very reliable system, only 5% of electronic tags is lost







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TRACEABILITY “PIG TO HAM” IN IBERIAN PORK

OTHER OPTIONS FINALLY NOT USED

- **Stomach tag**

- **Subcutaneous microchip (ear and axil)**

- **Intraperitoneal microchip**

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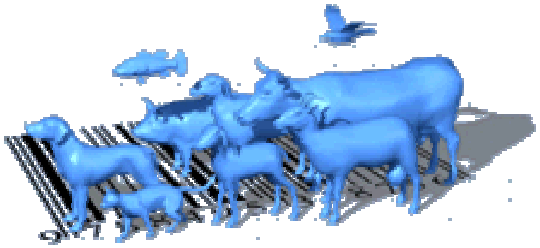
TRACEABILITY “PIG TO HAM” IN IBERIAN PORK

IDENTIFICATION OF Pharmaceutical products, FEED, LOCATIONS,...

- With the rest of the elements than need identification: feed products, locations (farm areas inside, farm fields outside), pharmaceutical products, workers, final products,..., bar code systems EAN 128 are used.



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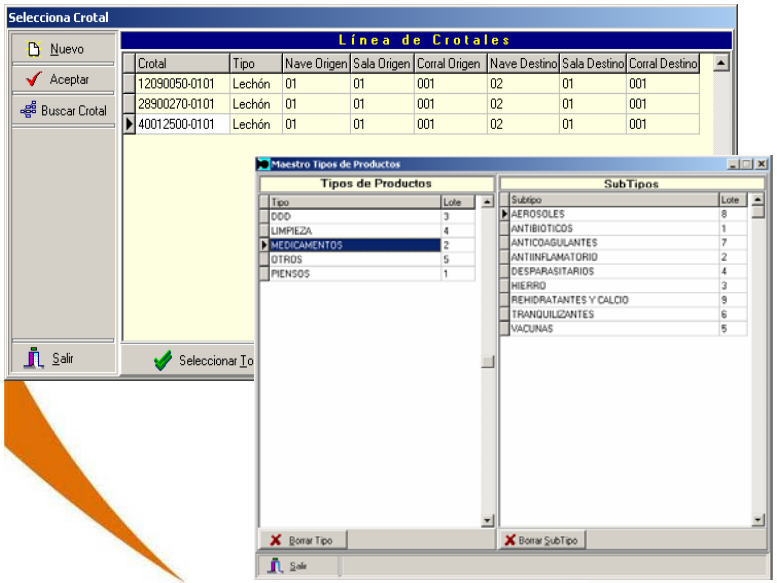
TRACEABILITY “PIG TO HAM” IN IBERIAN PORK

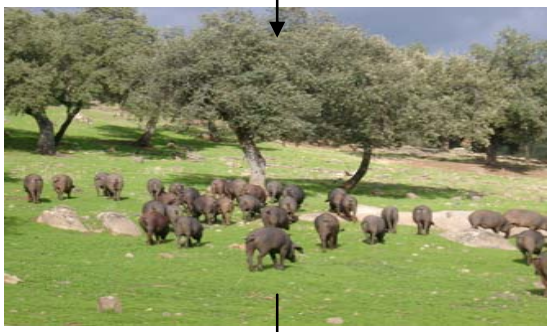
FLOW DIAGRAM OF THE PRODUCTION PROCESS

5 software packages for traceability data developed in collaboration with partners: AZTI, MEGASOFT and INGENET



In farms until 100 kg. (10 months)

In the fields until 140 kg. (acorns and grass)



Iberian ham: 425 days

Iberian ‘paleta’: 300 days

Iberian loin: 80 days

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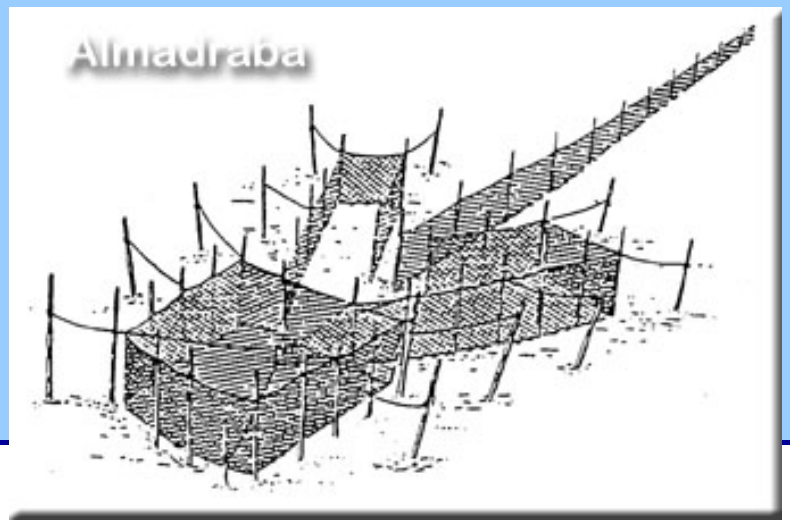
Traceability experiences in the fish sector

Traceability in the fish sector

1. DEVELOPMENT OF TRACEABILITY AND LABELLING SYSTEMS FOR ALMADRABA TUNA FISHING

- Almadraba (Stationary uncovered pound net): a labyrinth
- that intercept the migratory movements of fish.
- 5 almadrabas working (Spain)
- Traceability system based in Tracefish standard.
- Partners: AZTI and MEGASOFT.



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Traceability in the fish sector

ALMADRABA TUNA (Stationary uncovered pound net)

The fish arrive directly from the almadrabas and to the ultra-freezing plant, fish are classified, headed, gutted, cut in four loins, ultra-freezed at -70ºC, stored and dispatched to Japan in RIFER containers.

PROCESS FLOW

Fish catching

Loins extraction and freezing at -70ºC

Japan exportation in RIFER containers

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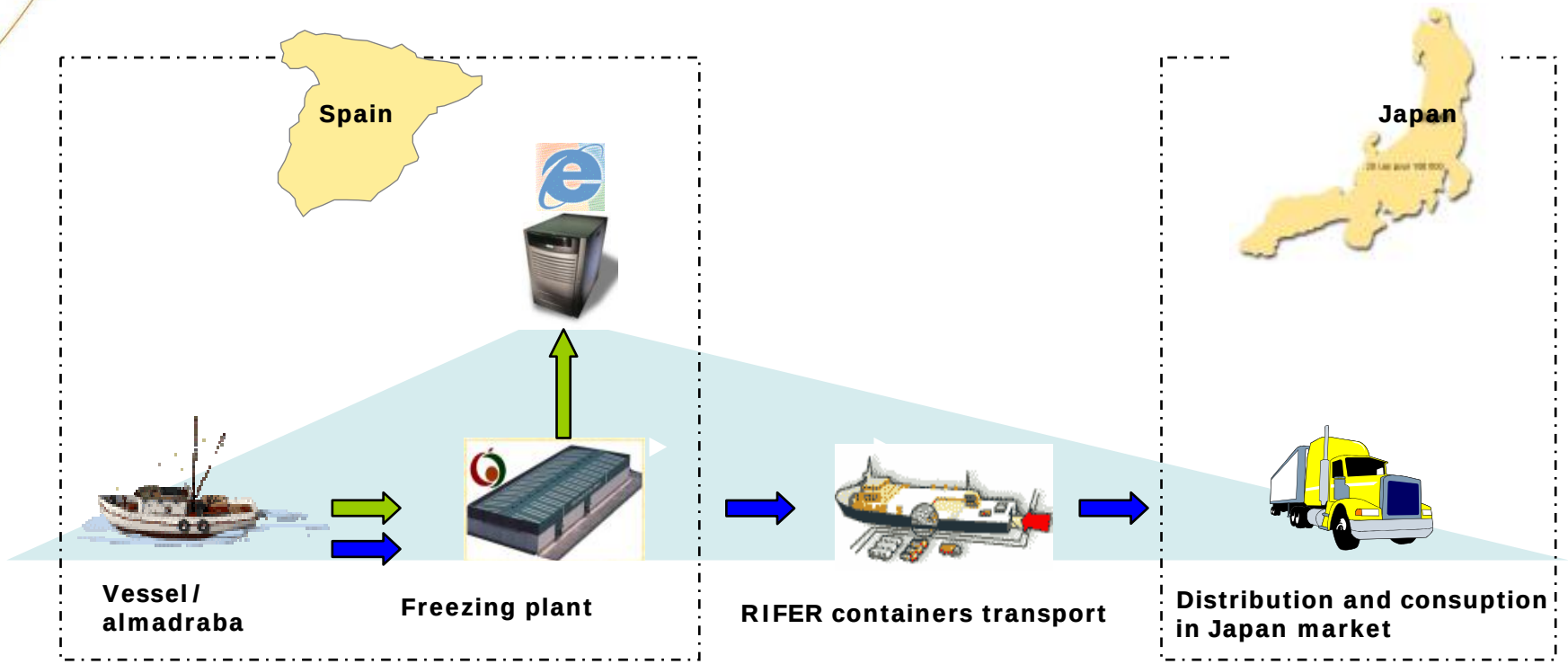
Traceability in the fish sector

INFORMATION FLOW



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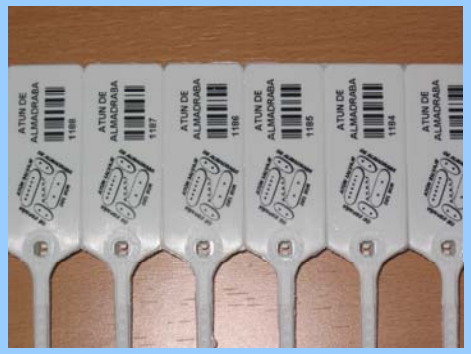
Traceability in the fish sector

ALMADRABA TUNA

PRODUCT IDENTIFICATION

- The product identification system is based on nylon labels with a control number, in bar code format (cost efficiency, no metallic components required)
- The label is bracket type (0,02€)
- Nylon is the only plastic material that resists temperatures of -70ºC



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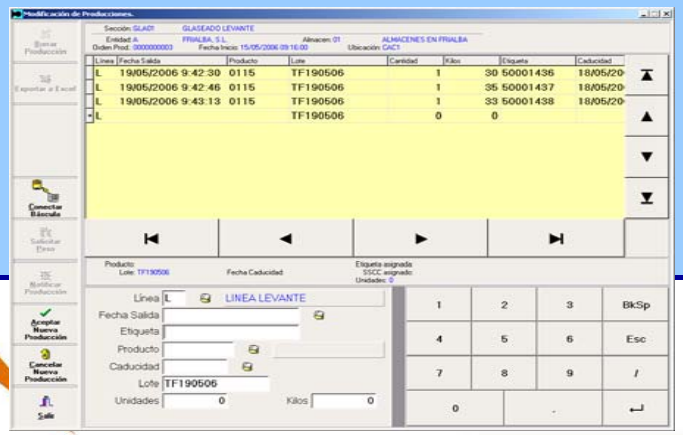
Traceability in the fish sector

ALMADRABA TUNA

DATA CAPTURE AND REGISTRATION

- The lot number is defined by the almadraba name and the production date.
- Traceable information is registered in a specific software: weight (automatic), Tª (fish, freezer, cold cabinets), QC records, day of processing, almadraba name
- The product is identified with the nylon label, after freezing.
- Traceable information is related to the product by the control number using a PDA (handheld) or a bar code reader.



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Traceability in the fish sector

ALMADRABA TUNA

CONCLUSIONS

The developed traceability system fulfils both the Japanese and European legislation and the client specifications.

The software which manages the traceable information has been designed, developed and implemented. The efficiency of the system has been validated.

Clients and authorities can have direct access to certain information levels.

A specific label with automatic capture of data has been developed.

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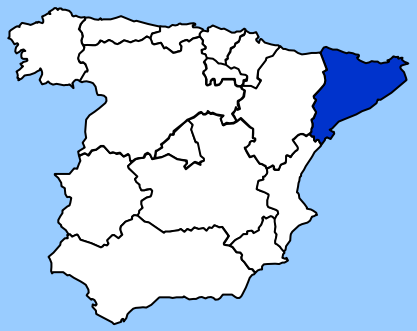
Traceability in the fish sector

2. DEVELOPMENT OF TRACEABILITY AND LABELLING SYSTEMS FOR MEDITERRANEAN FRESH FISH

- Mediterranean fresh fish pelagic (purse seiners) and demersal (trawling) in Catalunya
- Giropesca: a Mediterranean auction association (5 auctions).
- Traceability system based in Tracefish standard.



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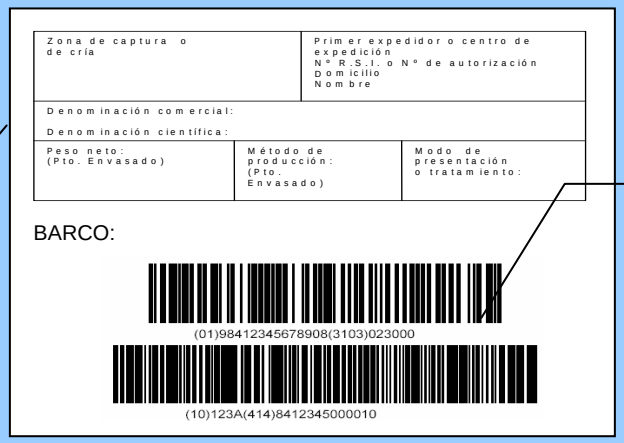
Traceability in the fish sector

2. DEVELOPMENT OF INTERNAL TRACEABILITY AND LABELLING SYSTEMS FOR MEDITERRANEAN FRESH FISH

- **Auctions already have an administration and sales software.**
- **Legally required information and additional traceability information has been integrated in the same label.**

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
Businness ID

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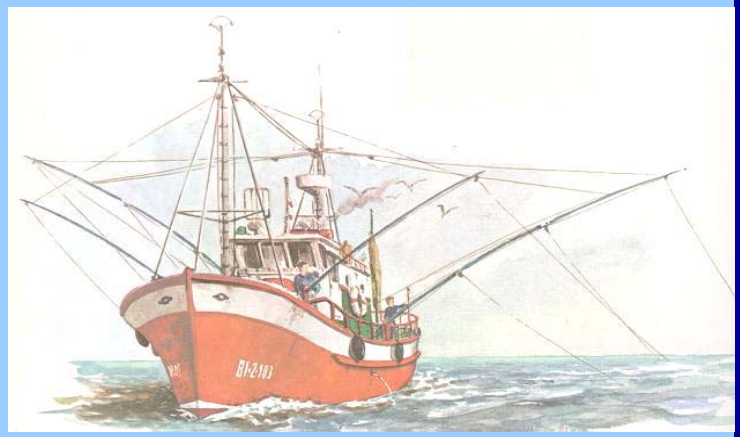
Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

- **Pilot test took place in a fish chain integrated by 2 vessels, 1 auction and 1 wholesaler.**
- **Traceability software for auctions and wholesalers constructed**
- **Identification of fish pallets by RFID tags.**
- **Partners: AZTI, INGENET and OMRON.**



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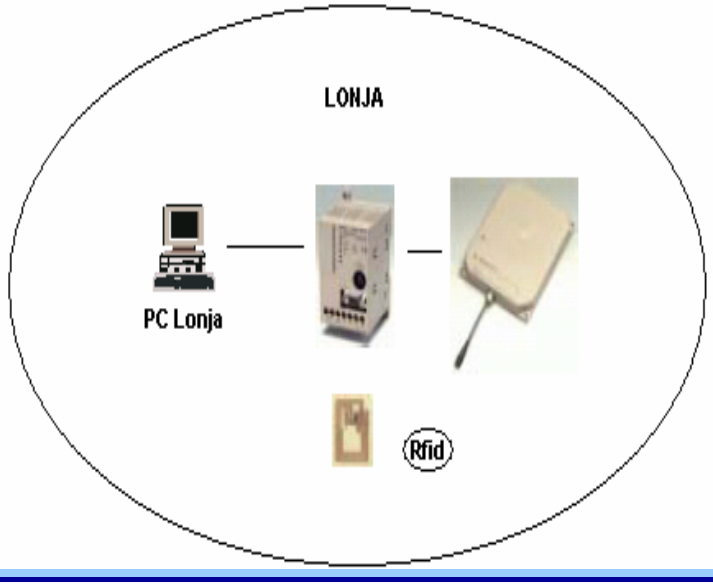
Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

Auction:

The tag incorporated at the pallet is charged by an antenna situated on the weight.



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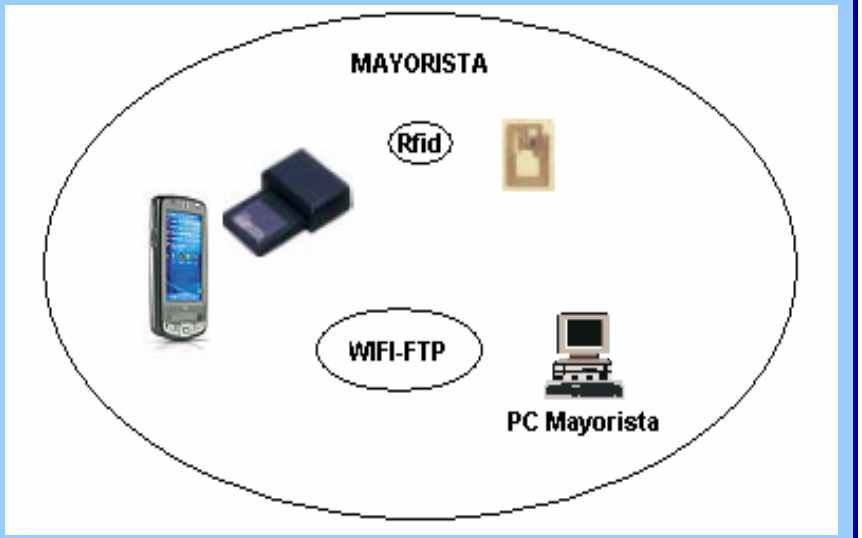
Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

Wholesaler:

The information from the tag is read via iPaq and allows to generate a file in the management system of the wholesaler.



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Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

Trial equipment:

- ✓ HP iPAQ series hx2400 (pocket PC) with two expansion slots.
- ✓ READ WRITE ANTENNA: OMRON V720S – HMF01. Communication Frequency 13.56 Mhz. Serial Nº 01023 (in one of the slots of the HP iPAQ).
- ✓ Smart Label (RFID tag): OMRON V720-D52P01 (fixed to the fish pallets).
- ✓ READ WRITE ANTENNA: OMRON V720S-H01. Serial Nº: 1149904 (fixed to the fish platform scale)
- ✓ ID CONTROLLER: OMRON V720S-CD1D (between the READ WRITE ANTENNA OMRON V720S-H01 and the auction PC)

Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

Trial conclusions

- When the number of boxes for identification is too big, it's more feasible to use the tag to identify the pallets, instead of the boxes.
- The distance needed for reading-recording the tag is too short (25 cm). For the tags to be routinely used in the fish sector, we estimate that the reading-recording distance has to be of 1 meter minimum.
- The used tag (smart label) is adequately water-proof and resists the high temperature during the automatic washing cycle of the fish boxes. Nevertheless, the tag doesn't have the shape nor the appropriate size for a regular use in fish boxes or pallets. The best way to fix the tag would have been to integrate it by injection into the plastic of the boxes or pallets.
- The HP iPAC used during the trial worked adequately, but it's too fragile for the continued use in the fish sector.

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Traceability in the fish sector

3. PILOT TEST FOR INSHORE FISHERIES (mackerel) CAPTURED IN THE ATLANTIC

GENERAL CONCLUSIONS:

Auctions and wholesalers consider the system useful from a cost/benefit point of view, practical, reliable and easy to implement.

The chips have good response to the cleaning and disinfection cycles. The reader distance have to be improved.

The relevant information should be transmitted through the rest of the fish chain till reaching the consumer to ensure that the effort during the first stages would not be lost.

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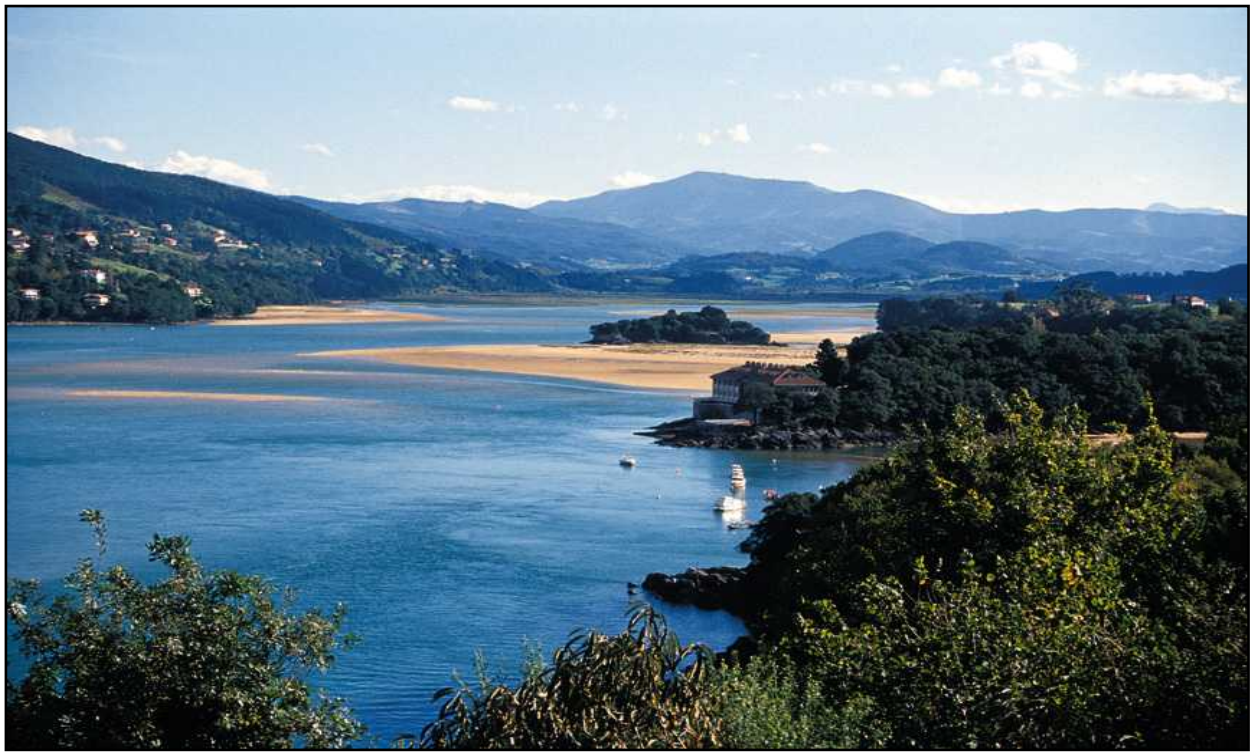
Thank you for your attention!
Eskerrik asko zure arretagatik!



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