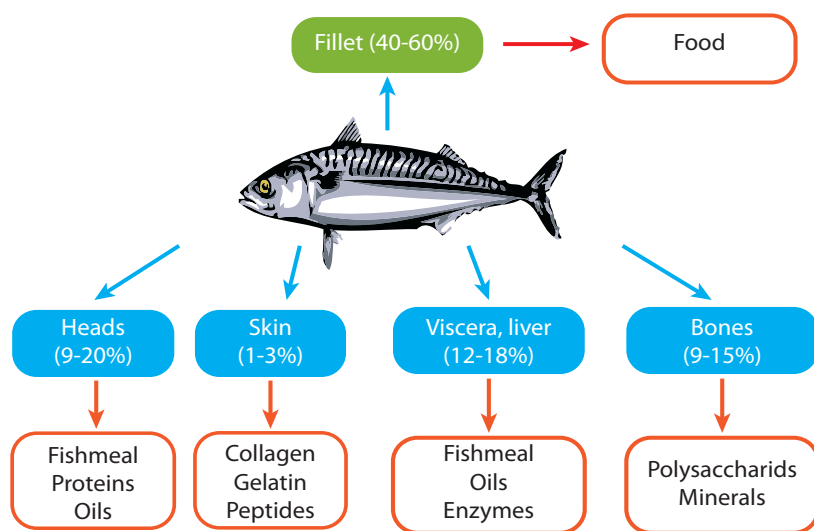


BIOTECMAR

Valorisation biotechnologique des produits et coproduits marins

Adding value to marine by-products: a safe bet!



The process of marine products yields around 40 to 60 % by-products. 96% of the latter are used in the animal feed industry as fish meal, oil, hydrolysates or frozen mix.

How to increase the added value for the remaining fish, seaweed, crustacean and other by-products?

Skin, guts, bones and flesh residues have to be considered as by-products from which many bioactive molecules (collagen, pigments, etc.) can be extracted for animal feed, human food, cosmetic and pharmaceutic industries (with antioxidant, antistress, anti hypertensive activities, etc.).

In 4 countries bordering the Atlantic Ocean (France, Spain, Ireland and Portugal), 8 research institutes together with 4 technology transfer centres collaborated closely for 3 years to develop added value for marine products and by-products with the following aims:

- Identify **bottlenecks** in the use of by-products and study potential developments through **value chains**.
- Create an **Atlantic network** developing links between scientists, producers, processors and consumers of marine products.
- Reinforce the **technological transfer towards SMEs** through training, hands-on practicals, workshops, conferences, etc.
- Help companies (Micro and SMEs, etc.) bordering the Atlantic space to **take over modern technologies** and contribute to **diversify activities** derived from marine biomass.

THE PARTNERS

■ 8 research institutes

Université de Bretagne Occidentale-UEB® (France)
IPIMAR - INRB (Portugal)
CSIC - IIM (Spain)
ISC - Martin Ryan Institute (Ireland)
MNHN - Station biologie marine Concarneau (France)
Université de Nantes (France)
Université de La Rochelle (France)
IFREMER Nantes (France)

■ 4 technology transfer centres

Technopole Quimper-Cornouaille (France)
CETMAR (Spain)
Indigo Rock Marine Research (Ireland)
N.E.T. Novas Empresas Tecnologias (Portugal)

INTERREG IV B Atlantic Area n° 2008-1/032

Aims and results

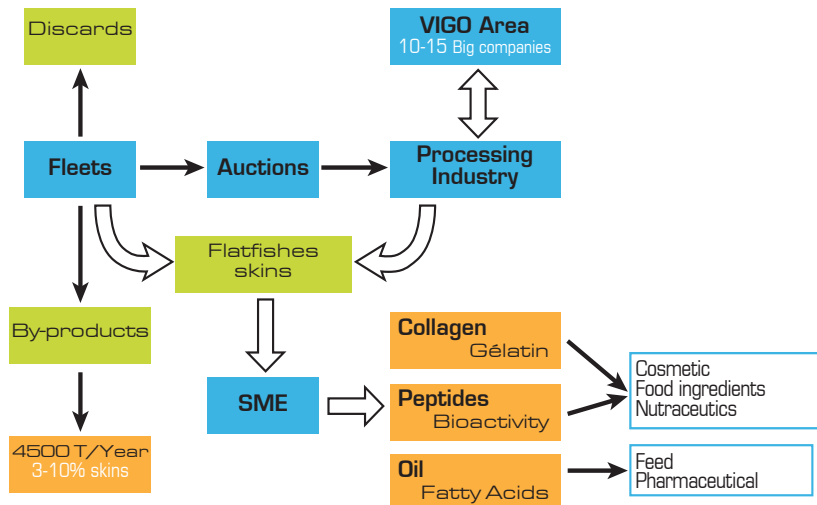
Several studies have been carried out, including the cartography of available biomass, the feasibility study of an on-line co-products marketplace, the establishment of a stakeholder network, and technology transfers towards businesses through training and practical demonstration actions (pilot actions).

State of the art to identify and overcome bottlenecks in the valorisation of marine by-products.

- Cartography of the available biomass on the Atlantic coast
- Identification of 16 value chains
- Establishment of 5 feasibility studies: fish collagen hydrolysate, pigments from crustacean co-products, stock from mussels cooking process, red seaweed pigments, hydrolysate from sardines

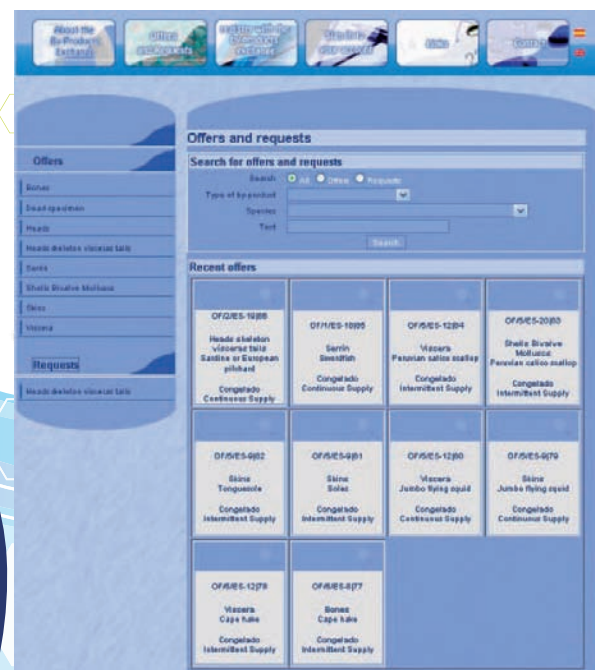
Find those data at www.biotechmar.eu

Example of value chain: collagen, peptides and oil production from flat fish skins



On-line marketplace for marine by-products: when supply meets demand

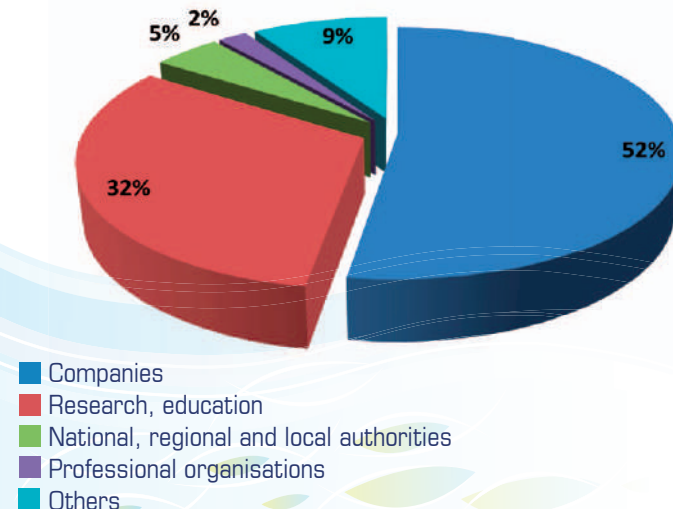
Access the on-line marketplace site at webs.cetmar.org/bolsasubproductos/



Stakeholders network in order to facilitate interactions between professionals on a national and european scale. Developement of a database: Suppliers and processors, research institutes and technology transfer, etc.

Connect to the network at www.biotechmar.eu

Biotechmar network: 306 members from 250 structures (France : 48%, Spain : 21%, Portugal : 11% , Ireland : 9%)



Pilot actions carried out in the 4 partner countries, to demonstrate technical feasibility of value chains.

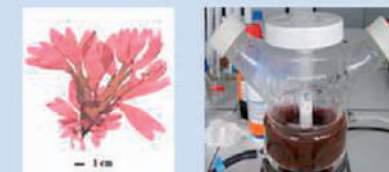
Examples of pilot actions

- Aroma extraction from mussel cooking juices
- Proteins, pigments, chitin/chitosan hydrolysates from crustacean by-products
- Proteolysis from flat fish skin: oil and active peptides extraction
- R-Phycoerythrin extraction from the red seaweed *Palmaria palmata*
- Mycosporins extraction from the invasive red seaweed *Solieria chordalis*
- Phenolic compounds extraction from the brown seaweed *Sargassum muticum*

Find the the pilots actions posters at www.biotechmar.eu

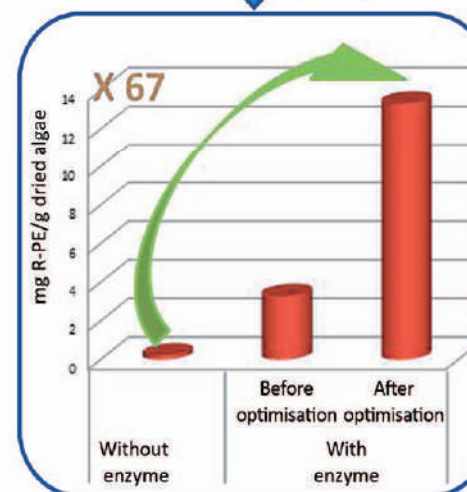
R-Phycoerythrin extraction from the red seaweed by enzymatic process

Hydrolyse

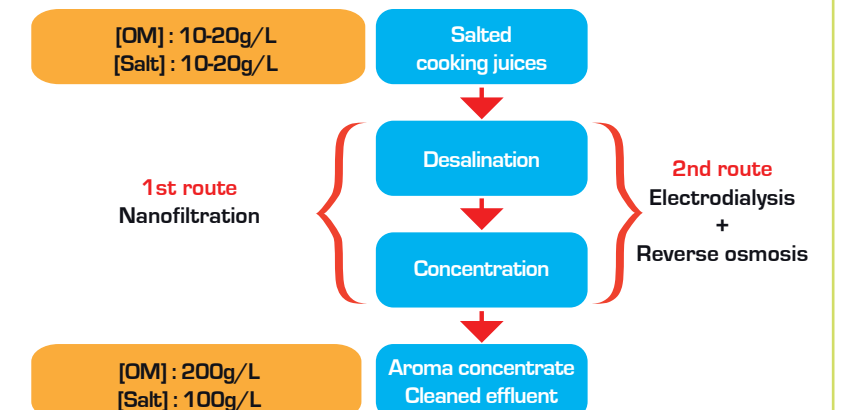


Cutted *Palmaria palmata* thalli
Acetate buffer pH 5, 50 mM
Xylanase
(EC.3.2.1.8, T. longibrachiatum)

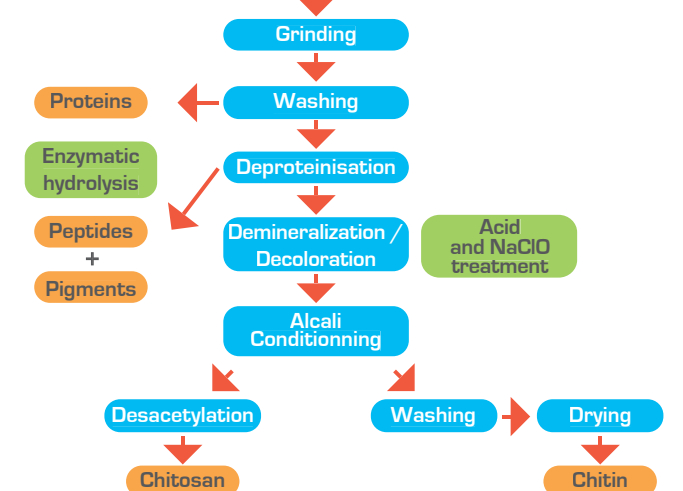
Optimisation du rendement d'extraction
(mg R-PE/g algue sèche)



Comparison of process for aroma extraction from mussel cooking stock



Proteins, pigments and chitin/chitosan hydrolysate from crustacean





Training and technology transfer to stimulate know-how exchanges between academical research and businesses.

23 events organised: training sessions, hands-on practicals and demonstrations including:

- 1 international symposium on marine biotechnology (Concarneau, FR)
- symposiums, seminars and workshops : assessment of marine by-product sourcing, biotechnological valorisation of marine-by-products, use of seaweeds and microalgae, setting-up of biotechnological companies
- training sessions: among the **THEMES DISCUSSED:** membrane and enzymatic process for the production of peptides or bioactive compounds from seaweed, extrusion, marine lipid and ingredients characterisation, techno-functional properties, regulation and legislation on marine new ingredients, creativity, risk assessment associated to innovation, monitoring tools, intellectual property and patents

628 participants from 317 structures attended BIOTECMAR events

Country	Participants	Structures
France	294	149
Ireland	62	45
Portugal	82	46
Spain	185	77

Access the diaporamas of all the sessions at www.biotecmar.eu

Results and benefit for the micro and SMEs

BIOTECMAR: an opportunity to reinforce R&D capacity, innovate, create new product line, diversify activities, etc.

Training sessions

- Audience targeted: Industry stakeholders and researchers
- Sessions tailored to enable meeting and exchanges
- Sessions chaired by experts and specialists
- Adapted pedagogy
- Diversity and complementarity of the discussion themes

Technology transfer towards businesses

- Through identification of 16 values chains (adding value to fish skin, seaweed and crustacean by-products)
- Through development of 5 market studies
- Through technical feasibility demonstration of 9 pilot actions

Key figures



Contacts:

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■ BIOTECMAR Network

306 members (250 structures)

■ 23 events organised

■ 628 participants

(53% from industry and 23% from research)

■ 4 final workshops

Ireland : 08-09-2011

(23 participants)

Spain : 22-09-2011

(68 participants)

Portugal : 6-10-2011

(35 participants)

France : 14-10-2011

(95 participants)