27-28 September 2016
Portugal
Seagriculture
5th international seaweed conference

Seaweed Standards for food and cosmetics

Aveiro, Sept. 27th

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CEVA

Centre d'Etudes et de Valorisation des Algues

Agro-Industrial Technical Institute* for Algae

ITAI
INSTITUT TECHNIQUE AGRO-INDUSTRIEL

**Certification by the French Ministry of Agriculture, 2007-2017*

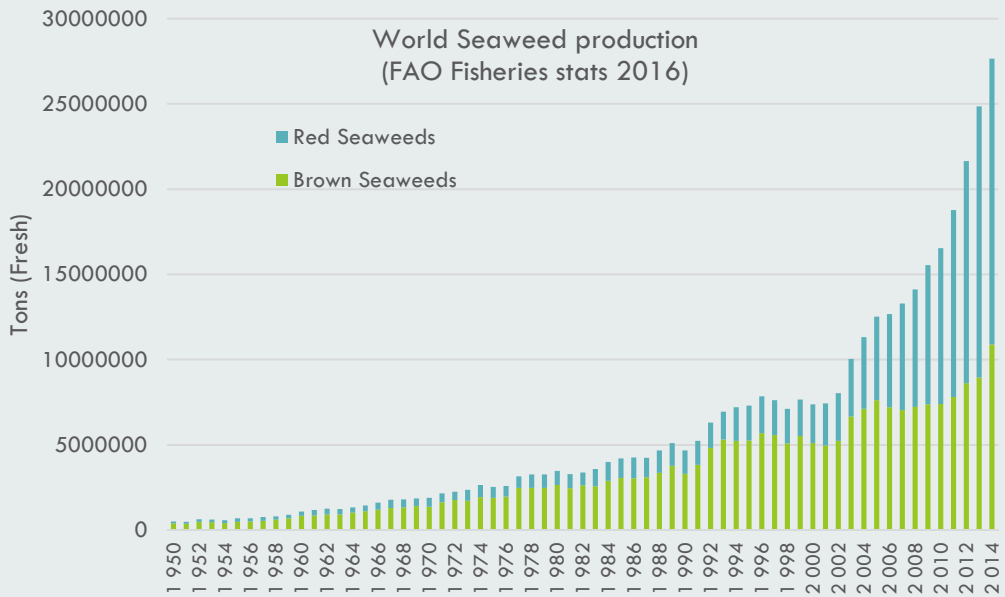
Seaweed production and uses

A contrasted situation depending on geographies

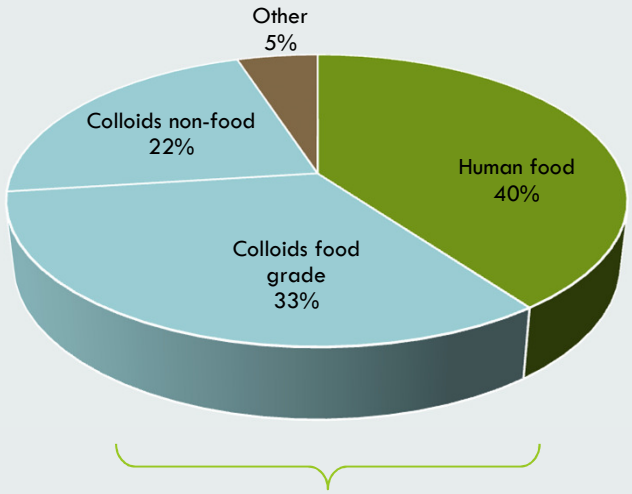
World seaweed production and use (1990-2014)

Production and use characteristics

- Total production: 27 million tons in 2016 (~ $ 6.4 billion)
- A continuous growth based on cultivation
- Leadership : China & Indonesia (79 %)
- World market domination : food



World Use (FAO, 2014)

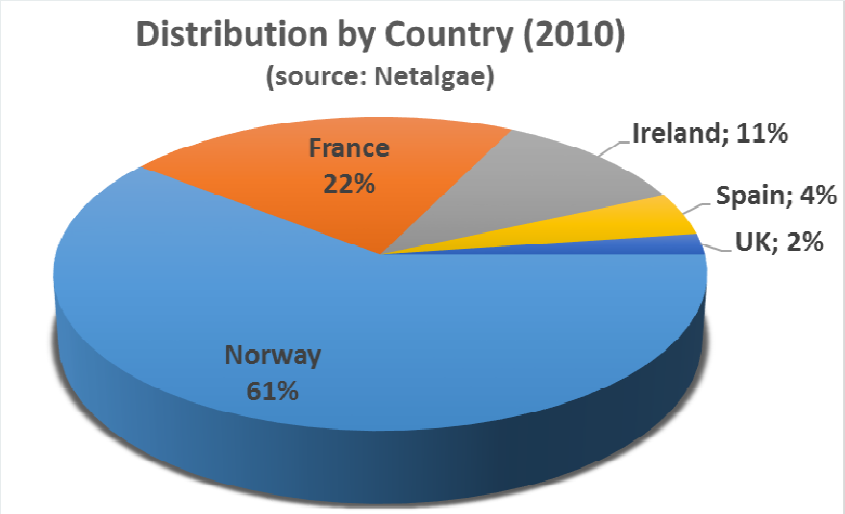


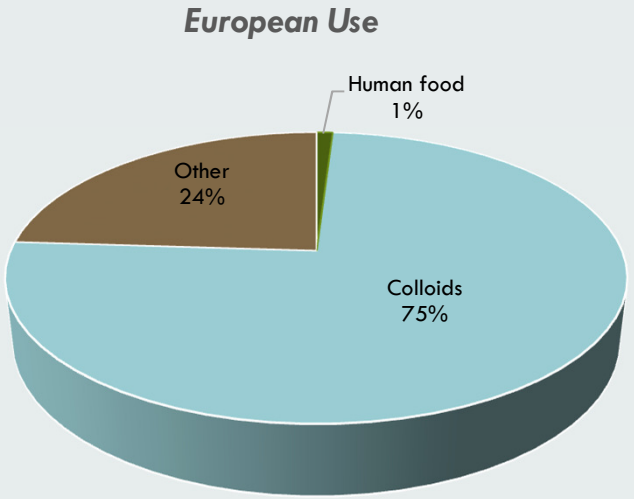
73 % dedicated to food market

European seaweed production and use

Production and use characteristics

- Total production: ~270 kT (~ 1% of world production)
- Mostly wild seaweeds harvesting (99%)
- Largely used for alginates production
- Food uses are still marginal



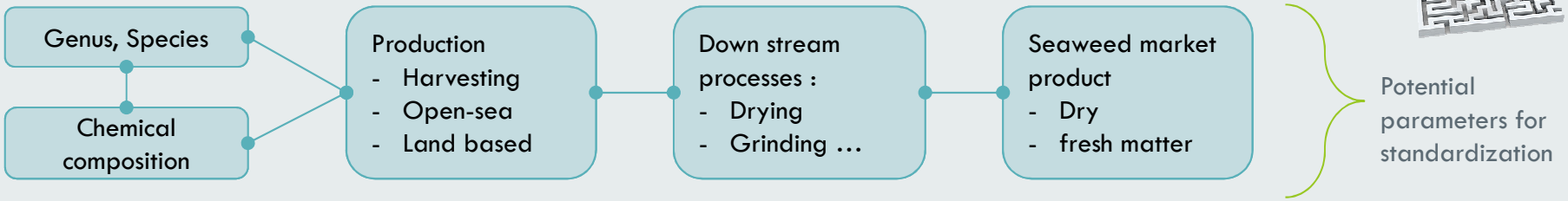


European standardization : current situation

Objectives : Traceability on Seaweed production and algae based product

Standardization = A complex topic…

…depending on production process, seaweed species, downstream process…



Why standardization ?

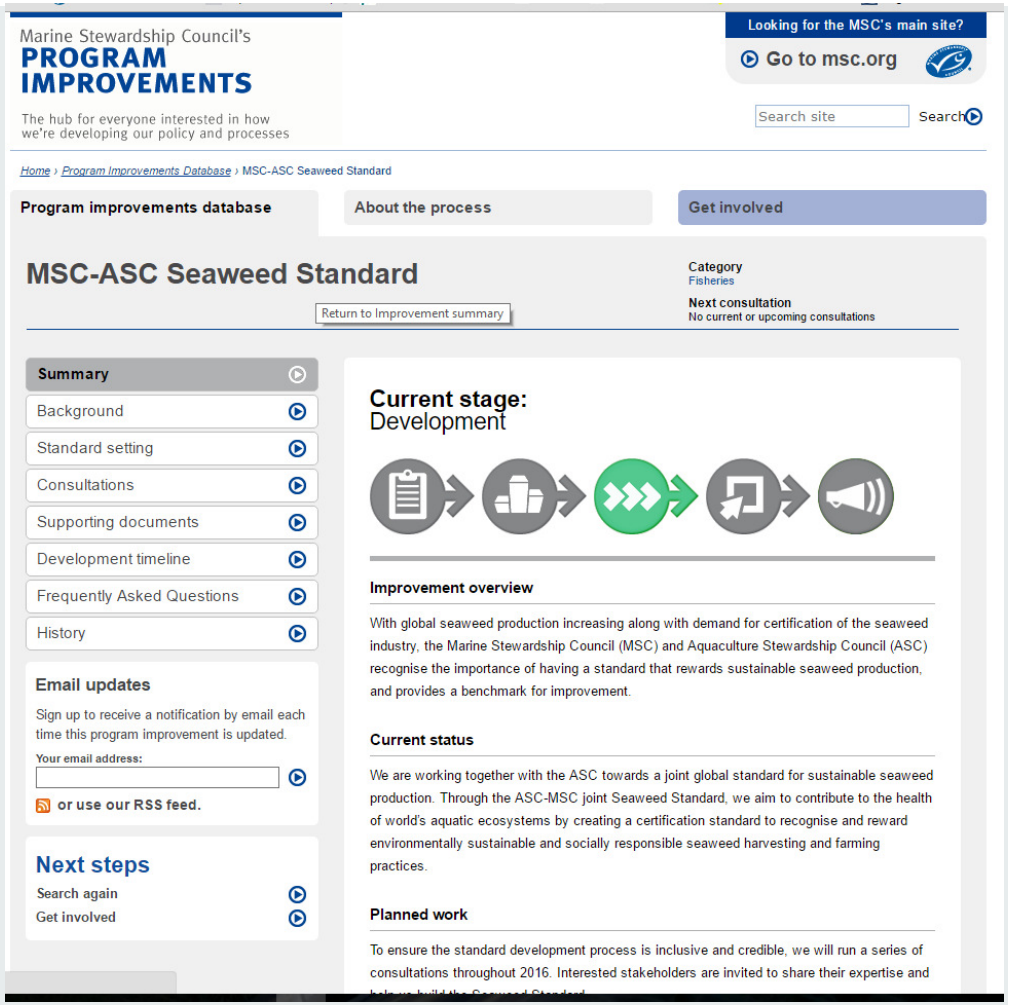
- Valuable resources for coastal communities
- Detrimental effects on biodiversity
- An increasing use of seaweeds requiring traceability and quality

Two main work program driven by :

- Marine stewardship Council and aquaculture stewardship Council
- CEN Working group : CEN/BT WG 218 :

Standardization on seaweed production

- **Marine stewardship Council and aquaculture stewardship Council**
  - Seaweed production : environmentally sustainable & socially responsible
  - Both harvesting and farming practices (land based, open sea)
  - 2016 : Development
  - 2017 : Implementation



https://improvements.msc.org/database/seaweed-standard

Standardization on algae based product

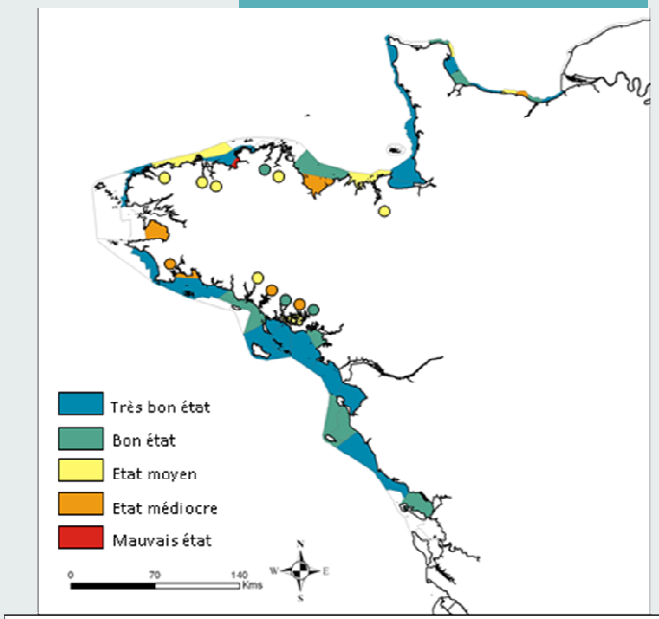
- **CEN technical board: CEN/BT WG 218**
  - Working group on “Algae and algae-based products or intermediates”
  - New standardization request for the development of standards
  - Creation of EU committee, including 20 French actors identified and others
  - Scope :
    - Algal biomass (Microalgae and seaweed, all production)
    - Algal extracts
    - Purified compounds
  - Currently 6 specifications proposed including :
    - Classification of algae
    - Algal processing
    - Chemical composition of product and contaminants
    - Specifications for each market…(food, feed, energy, cosmetics, pharma)
  - Meeting in April 2016 to Finalize work programme

Work in progress …

ECOcert seaweed standards

- **How to produce seaweed with "ECOcert" mention ?**
  - Production (Cultivation or harvest) in Sea water with high ecological quality mention
  - Production in Shellfish farming site with Class A or B (mentioned in Regulation 254/2004)
  - For all new production site dedicated to seaweeds : sea water classification have to be define following shellfish regulation
  - Sustainability requested for all seaweeds production

CEVA : classification for water quality



Standardization for food application

Novel food context and food quality issues

Europe vs French : edible seaweed landscape

- **In Europe :**
  - Seaweed = Novel Food
  - Or Seaweed considered as food if put on market and consumed before May 1997 (as food ingredient or food) m7
  - 2015 : New Novel Food regulation adopted, applicable in 2018 RP9

- **In France :** First EU country with recommendation on seaweed for human consumption (before 1997) RP12
  - 1990: Opinion of the French CSHPF (French Higher Council for Public Health)
    - Authorization of 10 species of macro algae
    - Restrictions on heavy metals and iodine
  - 1992 to 2012 : Progressive extension of the List to 11 new species

2016 : A total of **29 algae** species currently considered **NOT NOVEL** RP13

Dia 12

m7	Quelles sont les MAJ ? mbenoit; 14-9-2016
RP9	Some of the changes: microalgae specifically mentioned as being Novel Food, New process for the recognition of Traditional Food from 3rd countries (e.g. non-Eu seaweeds), generic authroizations Ronan Pierre; 15-9-2016
RP12	Préciser à l'oral que pour beaucoup d'autres pays il s'agit d'un aliment comme les autres Ronan Pierre; 15-9-2016
RP13	En comptant les autorisations françaises + Catalogue Novel Food européen Ronan Pierre; 15-9-2016

Restrictions on heavy metals and iodine

- Currently, French recommendation also defines maximum level of contaminants for all edible seaweed
- **Case of Cd :**
  - EU regulation allows 3 mg/kg for food supplement
  - Drastic conditions for edible seaweed ?
- **Not a regulation…**
  - But these levels are considered a high guarantee of food safety
  - Currently EU needs a standardization based on maximum level of contaminants

	Maximum level (mg/kg dry weight)
Inorganic Arsenic (As)	3
Cadmium (Cd)	0,5 *
Mercury (Hg)	0,1
Lead (Pb)	5
Tin (Sn)	5
Iodine (I)	2 000

Maximal level of heavy metals and iodine authorized in seaweeds (mg/kg dry weight)

* 3 mg/kg for food supplements according to Regulation (CE) N° 629/2008

Meeting in Brussel (EFSA), May 2016
Work in progress …

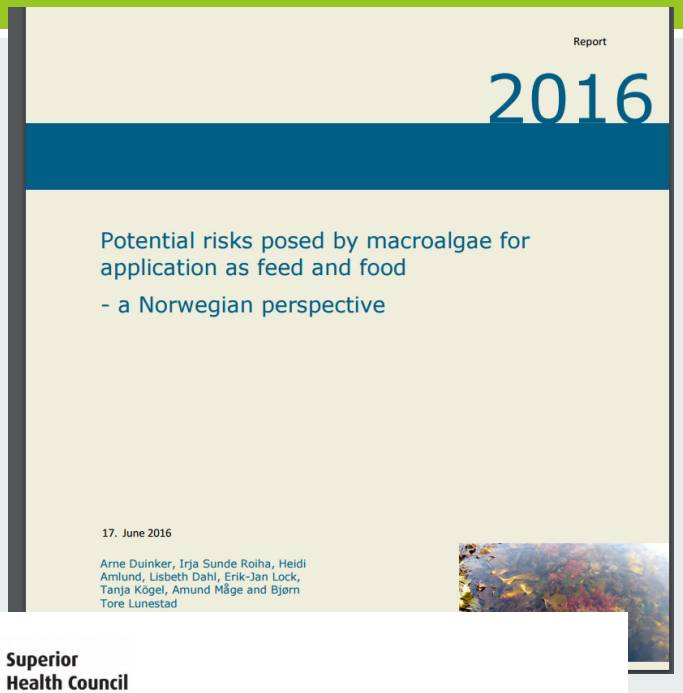
Seaweeds and contaminants

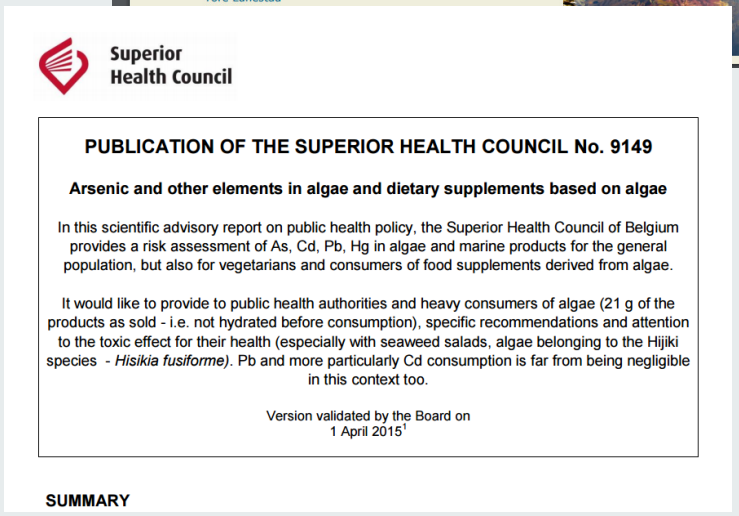
- Sanitary risk regarding heavy metals and iodine for common species

	Main Risk identified	Rank	Maximum level
Saccharina latissima	Iodine	++	2000 ppm
Himanthalia elongata	Cd	-/+	0,5 ppm
Undaria pinnatifida	Cd	-/+	0,5 ppm
Alaria esculenta	Cd	+	0,5 ppm
Fucus vesiculosus	Cd	++	0,5 ppm
Laminaria digitata	As Iodine	++ ++	3 ppm 2000 ppm
Ascophyllum nodusum	As	-/+	40 ppm (As total for feed)

Two recent studies on seaweed contaminants

- Risk assessment from **Norwegian** food safety authority :
  - June 2016 : Report on potential risks posed by macroalgae for food & feed
  - Conclusion : lack of data on most factors of relevance.
- Risk assessment from Superior health council of **Belgium**
  - 2015 : Report on risk assessment of contaminants in algae and marine product
  - Conclusion : risk level for each species described and recommendation for consumer such as :
    - 7 g dried per day of edible seaweed
    - *Sargassum fusiforme*. Prohibited
    - Lack of specific data on contaminants exposure and toxicology





Cosmetics : do we need standards for end products ?

- Seaweed products : no specific regulation (REACH …)
- Few regulation based on sustainability and fair sourcing practices.
- Currently two key aspects for users are :
  - Inventory of Existing Cosmetic RP21 edients in China (IECIC list by CFDA):
    - Public information : **80 "Algae" ingredients** already allowed
    - New seaweed ingredients have to be registered on ingredients list (very complex)
    - New developments limited due to restrictions on the China Market
  - Nagoya Protocol
    - Conservation of biological diversity
    - Sustainable use of its components
    - Fair and equitable sharing of the benefits
- Contaminants : no international regulation on maximum level
- Health Canada Guidance (July 2012)
  - Maximum level in final cosmetics formulation

	Maximum level (mg/kg)
Inorganic Arsenic (As)	3
Cadmium (Cd)	3
Mercury (Hg)	3
Lead (Pb)	10
Antimony (Sb)	5

RP21 la liste a été établie par la CFDA et soumise à consultation publique, mais n'est pas issue de la consultation. Le lobbying pour faire rentrer d'autres ingrédients n'a pas fonctionné

Ronan Pierre; 15-9-2016

Conclusion

- Currently **No EU standardization** on seaweed and seaweed based products (including seaweed extract)
- EU standards only for seaweed colloids registered as additives

- Growth of seaweed production
- Increasing use of seaweeds
- Protect EU seaweed market
- To face to seaweed China market

Many Scientific Projects over the last 10 years

2015-2016

Regulatory CEN working group focus on a standardization for algae industry (Production and Products)

- All fields are concerned about standards (Mainly food)
- Following first discussion : Complex task because of huge disparity
- What is the potential on DNA seaweed standardization ?

m10
m11

Dia 17

m10 http://www.nutraingredients.com/Suppliers2/Aquaculture-Stewardship-Council-sees-potential-in-DNA-seaweed-testing
mbenoit; 14-9-2016

m11 + Travaux récents de DNA Gensea
mbenoit; 14-9-2016

Thank you for your attention

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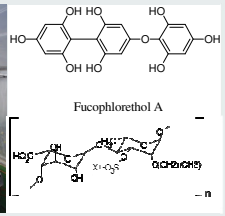



Algues et certification AB

- RÈGLEMENT (CE) No 834/2007 DU CONSEIL du 28 juin 2007 relatif à la production biologique et à l'étiquetage des produits biologiques et abrogeant le règlement (CEE) no 2092/91

- RÈGLEMENT (CE) N° 710/2009 DE LA COMMISSION du 5 août 2009 modifiant le règlement (CE) n° 889/2008 portant modalités d'application du règlement (CE) n° 834/2007 du Conseil en ce qui concerne la production biologique d'animaux d'aquaculture et d'algues marines

- Guide de lecture de l'Institut National des Appellations d'Origine (INAO).
- Guide InterbioBretagne : « Récolte des algues de rive : guide des bonnes pratiques »

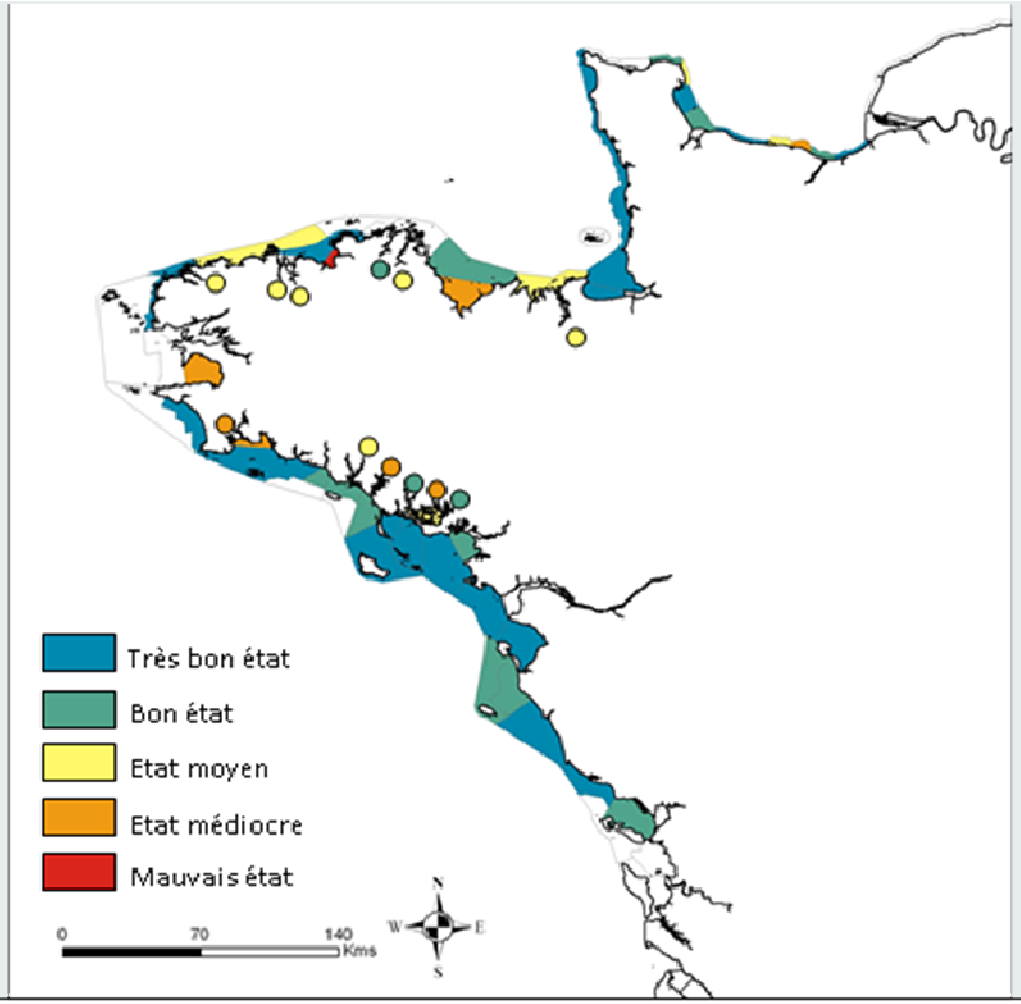
Macroalgues et certification AB

- Zones de récolte
  - Les algues marines peuvent être Bio seulement si elles sont récoltées ou cultivées dans des masses d'eau classées haute qualité écologique (= "bon état écologique" ou "très bon état écologique" et « bon état chimique ») selon la DCE (Directive Cadre Eau - 2000/60
  - Et en zone classée conchylicole A ou B au titre du Règlement 854/2004 pour au moins un groupe de mollusques (bivalves fouisseurs, bivalves non fouisseurs) et ne doit pas être classée C ou D pour un de ces groupes ;
  - Si la zone n'a pas fait l'objet d'un tel classement, l'opérateur doit mettre en place une démarche volontaire du même type que celle aboutissant au classement, sur la base des méthodologies (Zone Hors Classement Sanitaire Conchylicole (ZHCSC)
- Plan de gestion durable

Algues et certification AB

Actions CEVA : classement des masses d'eau DCE

Éléments de qualité biologique « macroalgues opportunistes »



Evaluation de la qualité écologique des masses d'eau sur les années 2006-2011 (ou 2008-2011)

Les MEC sont colorées directement et les MET sont représentées par un cercle coloré en amont de la masse

The French "positive List" built over the year

	Scientific Name	(French) common Name
Brown Seaweeds	- Ascophyllum nodosum (1990)	
	- Fucus vesiculosus + serratus (1990)	
	- Himanthalia elongata (1990)	(Haricot de mer), Sea Spaghetti
	- Undaria pinnatifida (1990)	Wakame
	- Laminaria digitata (1997)	Kombu
	- Laminaria saccharina (1997)	(Kombu Royal), Royal Kombu
	- Laminaria japonica (2009)	Kombu
	- Alaria esculenta (2012)	Atlantic Wakame
Red Seaweeds	- Palmaria palmata (1990)	Dulse
	- Porphyra umbilicalis (1990)	Nori
	- Porphyra tenera, yezoensis, dioica, purpurea, laciniata, leucostica (2009)	,,
	- Chondrus crispus (1990)	Pioca, lichen
	- Gracilaria verrucosa (1990)	Ogonori
	- Lithothamnium calcareum (1996)	Maërl
Green Seaweeds	- Ulva sp.(1990)	Laitue de mer
	- Enteromorpha sp. (1990)	Aonori