

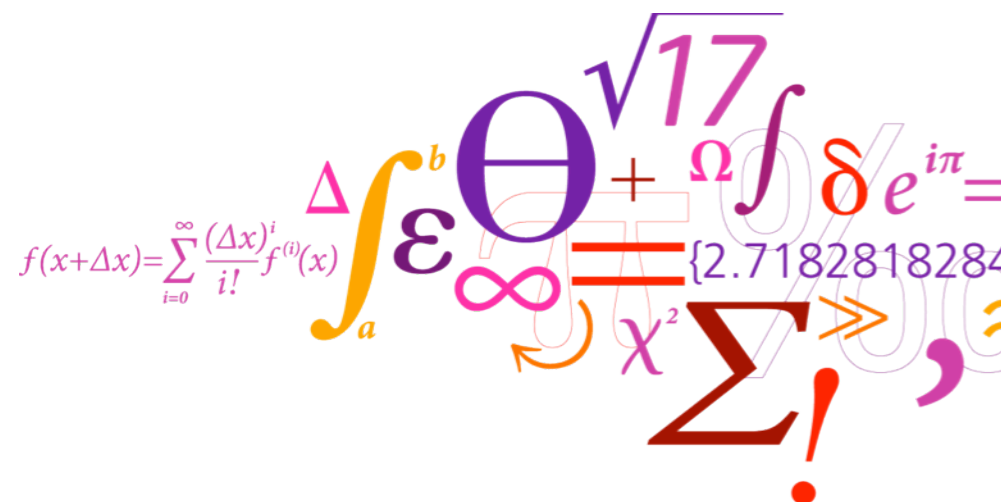
Six priorities proposed for marine biotechnology in Denmark

Torger Børresen, Ph.D.

Research Director

Division of Industrial Food Research

torg@food.dtu.dk





**Denmark seen
from
EUMETSAT**



The Ocean

- an unexploited resource

A survey on Danish possibilities within marine biotechnology and other exploitation of the ocean's resources

Authors: Henrik Jarlbæk and Torger Børresen

Method:

Interviews with research groups at
six universities,
two research institutes and
four industrial companies

Steering group:

Universities, companies,
industry associations and
Ministry of Food, Agriculture and Fisheries

Report published April 2010

Danish industry associations and companies



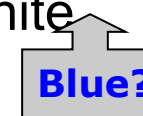


www.danskbiotek.dk



DANSK BIOTEK (The Danish Association of Biotechnology Industries) works to improve conditions for biotechnological research and production in Denmark, and to further the common interests of members, nationally and internationally.

DANSK BIOTEK represents the biotechnological industry within drug development, industry and foods (red, white and green biotechnology) and spans all areas of research, development and production.



The six priorities

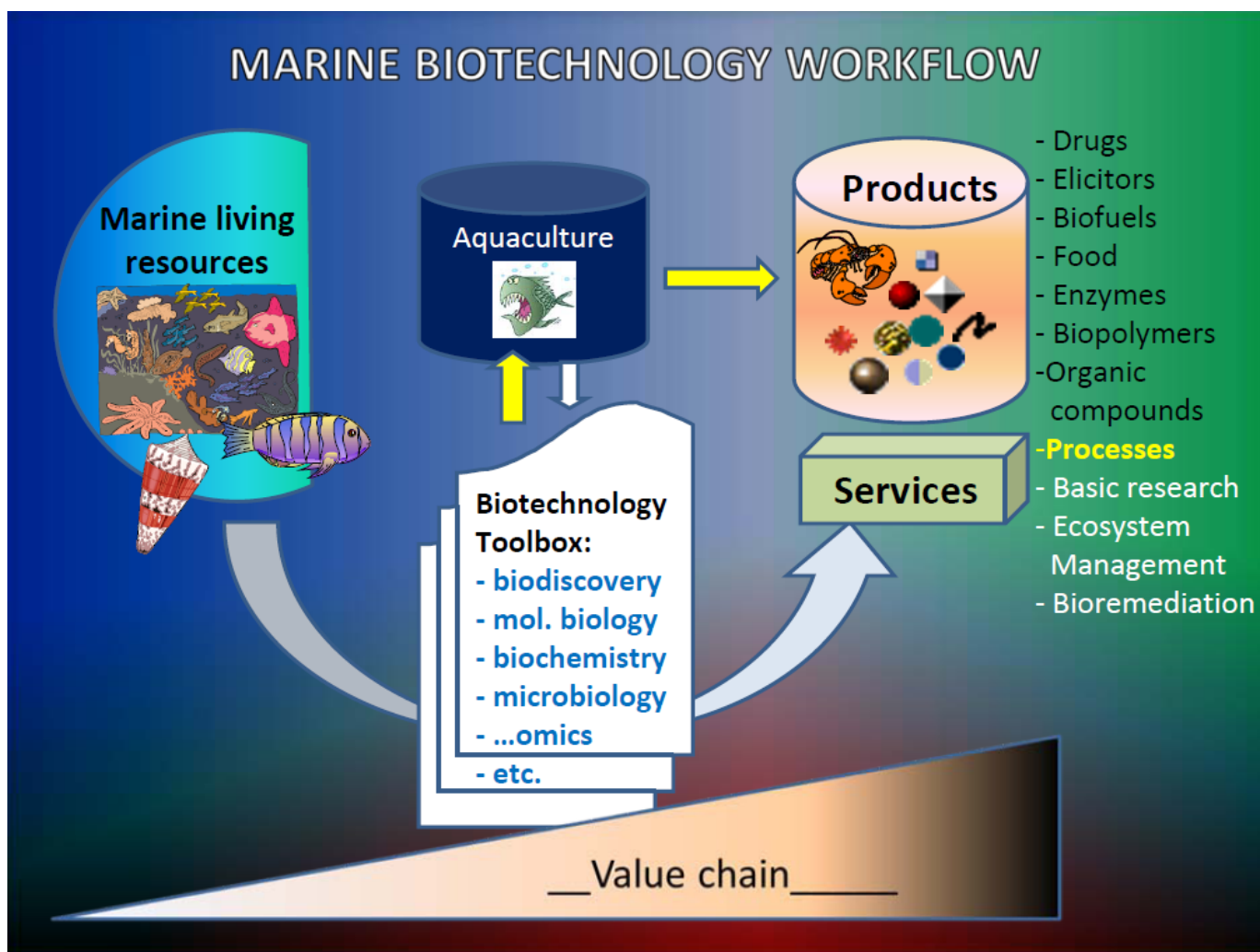
- Increased exploitation of marine biomass - algae
- New farming operations – molecular aquaculture
- Healthy diet – marine lipids, proteins, peptides, micronutrients
- Discovery of new compounds, materials and biological activities
- Extraction of valuable biochemical components
- Biofilm – from ships over the food industry to the interior of the human body

Increased exploitation of marine biomass

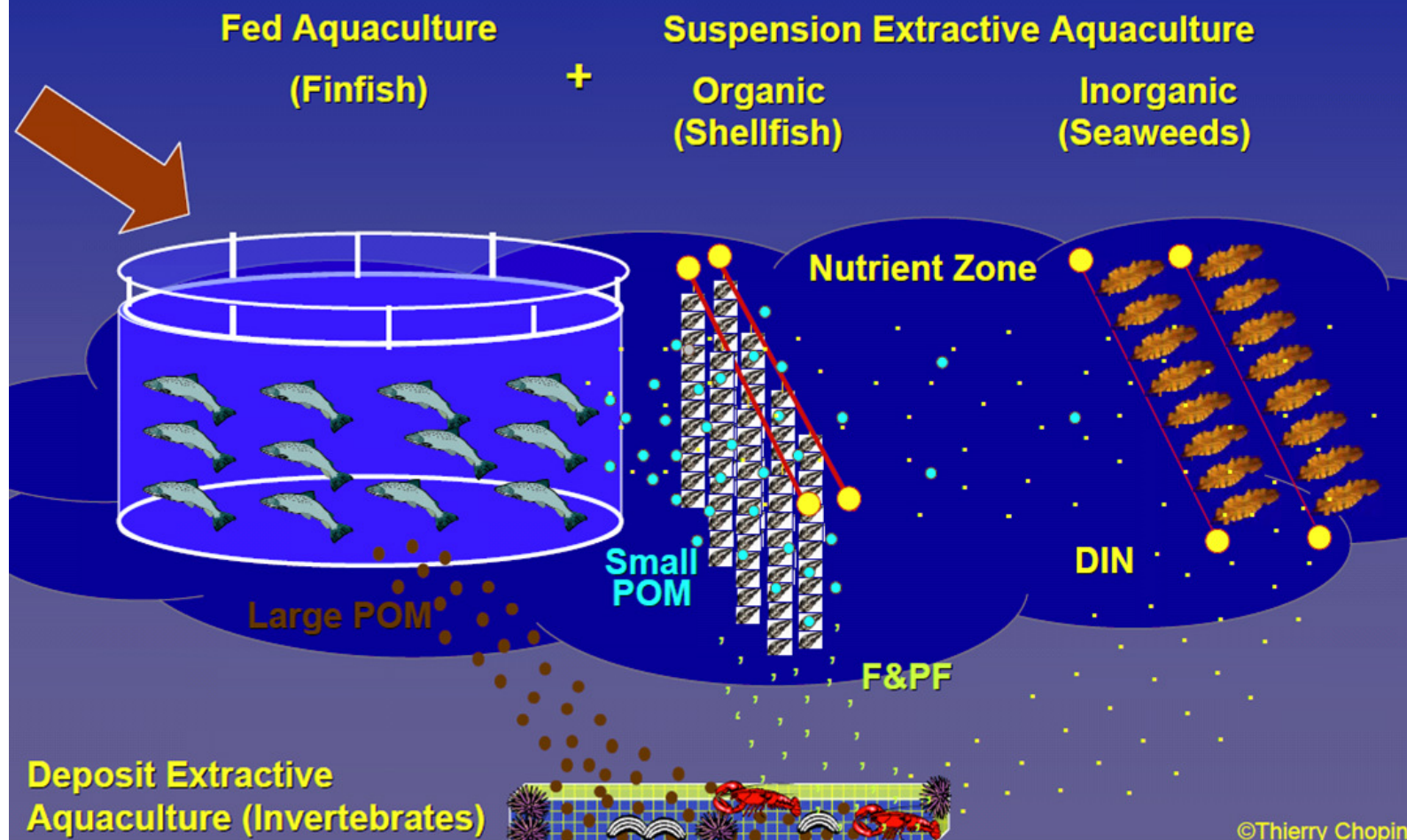
- Improved utilisation of resources from fisheries
 - By-catch for high value products – no discard
 - Transfer from fishmeal and oil to food and pharmaceuticals
 - Better use of waste fractions
- New resources such as sea cucumbers, sea urchins, etc.
- New utilisation of macroalgae
 - Antioxidants
 - Components for the pharmaceutical industry



New farming operations – molecular aquaculture



Integrated Multi-Trophic Aquaculture (IMTA)

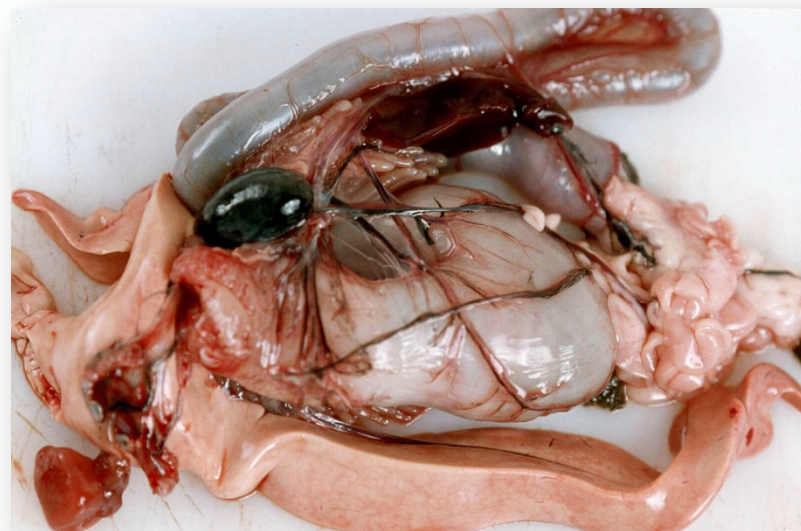


Healthy diet

– marine lipids, proteins, peptides, micronutrients

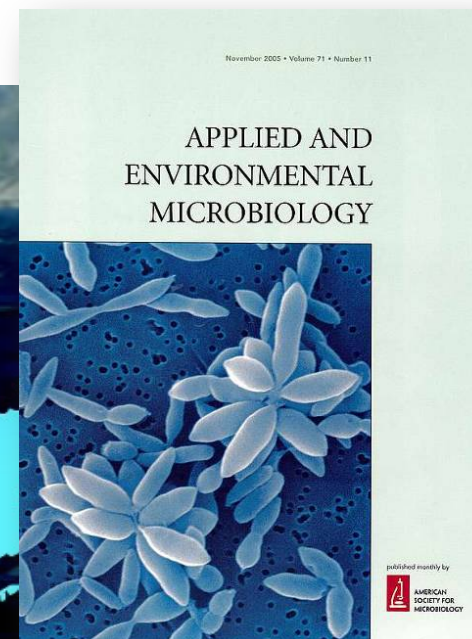
- Lipids
 - Omega 3 fatty acids
 - Phospholipids
- Proteins
 - Collagens
 - Histones, protamines
 - Enzymes
 - Peptides with anticancer or ACE inhibiting effects
- Non-protein nitrogen fractions
 - Taurin

From waste to value



Discovery of new compounds, materials and biological activities

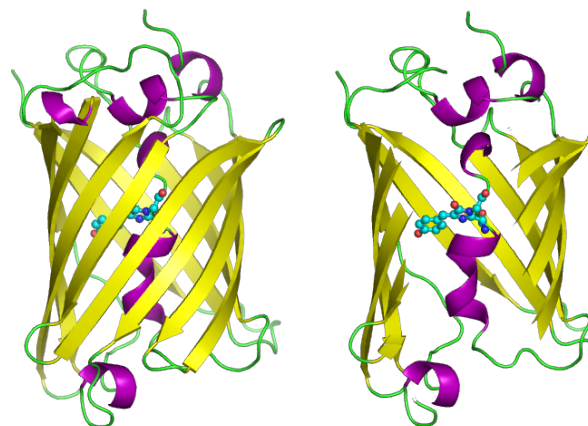
The Galathea 3 expedition



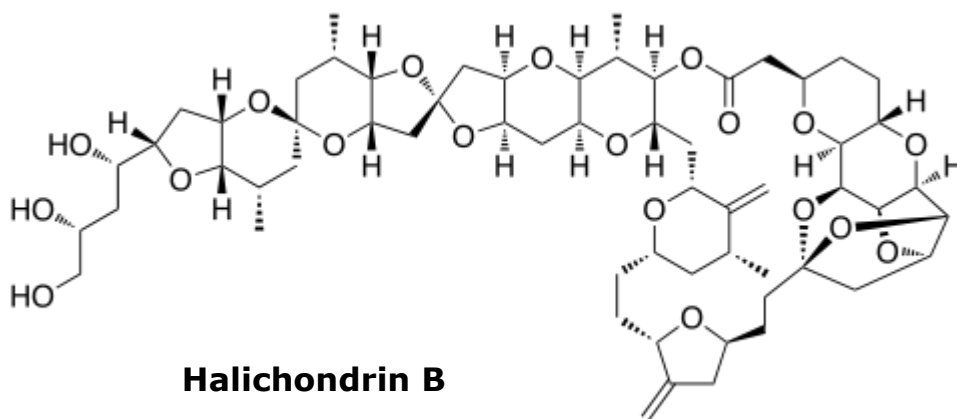
Extraction of valuable biochemical components

Examples of applications:

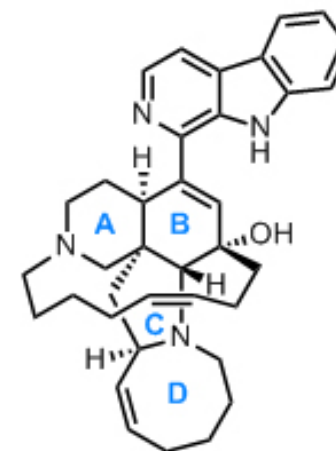
- Pigments
- Antioxidants
- Pharmaceutical use



Green fluorescent protein

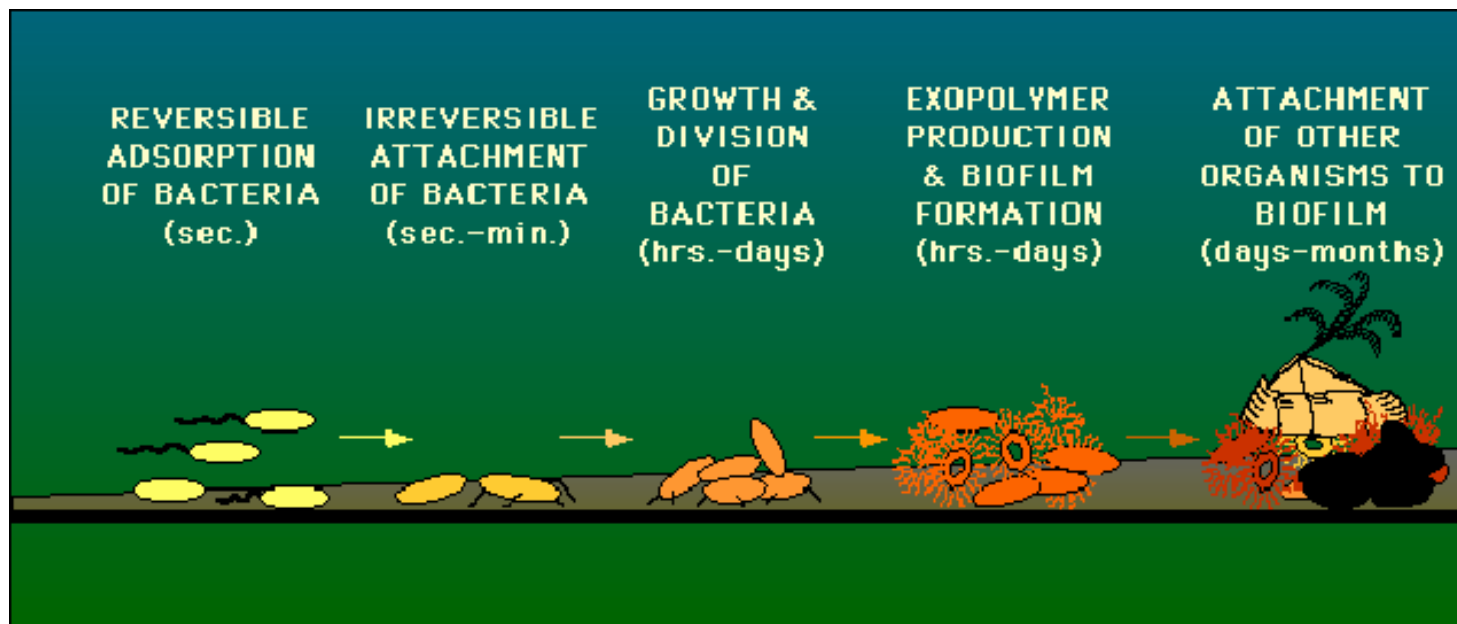


Halichondrin B



Manzamine A

Biofilm – from ships over the food industry to the interior of the human body



www.textbookofbacteriology.net

Cause problems in

- Submerged surfaces (ship hulls)
- In industry (inside pipes and at surfaces)
- In the human body (inside blood vessels)

Perspectives for realising the priorities

- Establishing clusters of researchers from
 - Marine biology
 - Microbiology
 - Biochemistry
 - Organic chemistry
 - Food processing technology
- Establish new concepts for collaboration between universities/research institutes and industry
- Include participation of end users (market pull)
- Participate in Marine Biotechnology ERA NET