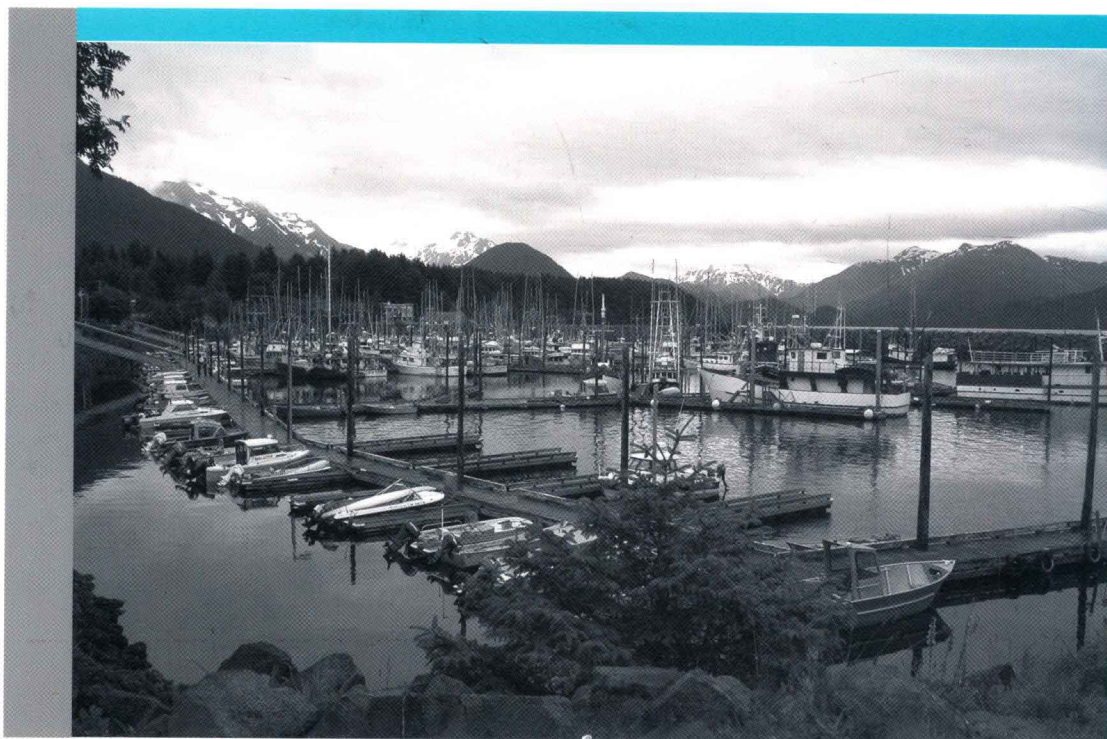


# Second International Congress on Seafood Technology on Sustainable, Innovative and Healthy Seafood

FAO/The University of Alaska

10–13 May 2010

Anchorage, the United States of America



UNIVERSITY  
of ALASKA  
*Many Traditions One Alaska*



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Edited by

**John Ryder**

FAO Fisheries and Aquaculture Department  
Rome, Italy

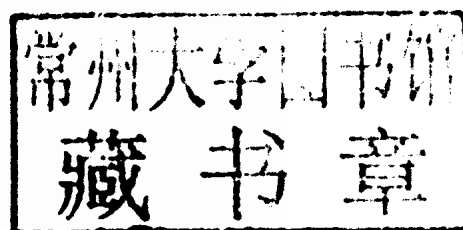
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# Preparation of this document

These proceedings contain the submitted manuscripts from the Second International Congress on Seafood Technology on Sustainable, Innovative and Healthy Seafood held in Anchorage, the United States of America, from 10 to 13 May 2010. All papers have been reproduced as submitted.

The University of Alaska organized the meeting in collaboration with the FAO Fisheries and Aquaculture Department, and the congress was hosted by The University of Alaska and held at the Hotel Captain Cook in Anchorage.

# Abstract

These proceedings contain the manuscripts from the Second International Congress on Seafood Technology on Sustainable, Innovative and Healthy Seafood held in Anchorage, the United States of America from 10 to 13 May 2010. The University of Alaska organized the meeting in collaboration with the FAO Fisheries and Aquaculture Department.

The congress reviewed developments related to:

- international seafood trade;
- consumer trends, consumption and health benefits;
- regulations for market access in international trade;
- recent trends in certification in the seafood sector;
- value-added products and new technologies;
- packaging;
- seafood quality and safety;
- education at college/university level;
- economics; and
- fishmeal and fish oil.

The meeting included a range of views regarding the opportunities and the recent developments in sustainable, innovative and healthy seafood. These included thoughts from government officials, business representatives and academia and highlighted that the seafood industry is in a position to take advantage of the many positive aspects that consumption of seafood offers to consumers, while recognizing that there are still challenges ahead to realize fully the potential that seafood can achieve in international and national trade and in meeting consumer expectations.

**Ryder, J.; Ababouch, L.; Balaban, M.**

*Second International Congress on Seafood Technology on Sustainable, Innovative and Healthy Seafood.*

FAO/The University of Alaska. 10–13 May 2010, Anchorage, the United States of America.

FAO Fisheries and Aquaculture Proceedings. No. 22. Rome, FAO. 2012. 238 pp.

# Foreword

Fisheries and aquaculture, as food production industries, have been advancing rapidly in recent decades. Fish is now the most internationally traded food product, with some 37 percent by volume being traded across national borders. This can be traced to the fact that fish is now a popular food commodity with a positive health image and that it generally carries low tariffs. Aquaculture has become a major success story, with more than 250 species in production, and now globally furnishes some 48 percent (2008) of all fish for human consumption. To help boost the demand for fishery products is the increasingly strong evidence with regard to the positive health effects of fish consumption, despite the fact that some fish can carry various contaminants, such as polychlorinated biphenyls (PCBs), dioxins and mercury.

In the last few decades, there have been significant developments in food processing technology that have opened up various new possibilities for more value-added products, longer shelf-life, and more secure distribution of fresh food, to name only a few. This is particularly important for fish and fishery products because of their inherent short shelf-life and their highly oxidative polyunsaturated lipids. Thus, fish are not only some of the most perishable of protein foods of animal origin, but also the sheer number of the very diverse species that are commercially utilized makes fish a very challenging raw material when it comes to processing and distribution.

In recent decades, developing countries have achieved remarkable results in supplying the international market with fish and fishery products. Despite the stringent technical and hygienic demands of the major importers, they now supply more than 50 percent of all imports. FAO has, through various programmes over the years, been heavily involved in assisting developing countries in meeting these demands, not the least of which is the now the internationally accepted Hazard Analysis and Critical Control Point (HACCP) approach. In the past, FAO has convened various conferences and congresses on seafood technology. More recently, an International Congress on Seafood Technology was held from 18 to 21 May 2008 by the Faculty of Fisheries of Ege University in Turkey. FAO joined forces with the co-organizers of that congress, i.e. the University of Alaska, to organize this Second International Congress on Seafood Technology.

The main objective of this Congress was to review the best available knowledge in the main technological fields relating to seafood processing, shelf-life extension and distribution. The most significant progress made in the last 10–15 years in the various fields of seafood processing was reviewed by commissioned papers, in line with the objectives of the FAO Code of Conduct for Responsible Fisheries, Article 11, which relates to post-harvest practices and trade.



# Acknowledgements

The Second International Congress on Seafood Technology on Sustainable, Innovative and Healthy Seafood was held in Anchorage, the United States of America, from 10 to 13 May 2010. It was organized by the University of Alaska in collaboration with the FAO Fisheries and Aquaculture Department in Rome, Italy.

The Organizing Committee consisted of:

- Lahsen Ababouch, Food and Agriculture Organization of the United Nations, Rome, Italy.
- Murat Balaban, University of Alaska, United States of America.
- Sukran Cakli, Ege University, Turkey.
- Paula Cullenberg, Alaska SeaGrant Marine Advisory Program, United States of America.
- Kevin O'Sullivan, Office of Fisheries Development for the State of Alaska, United States of America.
- Randy Rice, Alaska Seafood Marketing Institute, United States of America.
- Hart Schwarzenbach, Peter Pan Seafoods, United States of America.
- Grimur Valdimarsson, Food and Agriculture Organization of the United Nations, Rome, Italy.

The task of the Scientific Committee was to select speakers for the individual papers and to ensure that the quality of these is in conformity with expected standards. The composition of the Scientific Committee was as follows:

- Lahsen Ababouch, Food and Agriculture Organization of the United Nations, Rome, Italy.
- Murat Balaban, University of Alaska, United States of America.
- Takashi Hirata, Kyoto University, Japan.
- Hordur Kristinsson, University of Florida, United States of America.
- Chengchiu Liu, Shanghai Ocean University, China.
- Grimur Valdimarsson, Food and Agriculture Organization of the United Nations, Rome, Italy.

The Congress was funded by the Regular Programme of FAO through a Letter of Agreement with the University of Alaska.

The object of the symposium was to bring together leading experts on seafood trade-related issues in order to identify the opportunities and challenges that lie ahead in the sector.

Thanks are extended to all those who made presentations and chaired sessions, with special thanks to those who prepared papers for publication in these proceedings.

Appreciation is also extended to Gloria Lorient of FAO Fisheries and Aquaculture Department for the layout design of this publication.

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# Welcome address

Dear Colleagues,

On behalf of the Organizing Committee, we are pleased to welcome you to the Second International Congress on Seafood Technology being held from 10 to 13 May 2010 in Anchorage, Alaska, United States of America.

Building on the success of the First Congress in 2008, the 2010 Congress will address state-of-the-art information and innovation regarding handling, processing, preservation, storage and transportation of seafood. World experts will present on key issues addressing the seafood industry such as products and health, safety and quality, integrated traceability, novel products and technologies, education, research and innovation.

The high level panel of guest speakers and the organization of the Congress around key themes will enable you to capture the breakthrough advances of the last decades and envision the broad opportunities and possibilities that exist for more value-added products, longer shelf-life, and more secure distribution of seafood.

In addition, the most recent research results will be presented in concurrent sessions, and in poster sessions during the Congress. This will be an excellent opportunity to interact, network, and exchange information, ideas and business opportunities because this Congress has brought together not only scientists, technologists, seafood processors, but also importers and exporters of seafood, business developers, government administrators responsible for policy development, NGOs and other interested parties from around the globe.

We believe it is most opportune to hold this Seafood Congress in Alaska. The state has been the shining example of sustainable policies, practices, and science-based decision-making for decades and has a long experience and leadership in seafood processing and exporting, clean technologies, value addition, research, and teaching.

We welcome you to the 2nd International Congress on Seafood Technology.

Murat Balaban, Ph.D.  
Director and Professor  
Fishery Industrial Technology Center  
School of Fisheries and Ocean Sciences  
University of Alaska Fairbanks

Grimur Valdimarsson, Ph.D.  
Director  
Fish Products and Industry Division  
Fisheries and Aquaculture Department  
Food and Agriculture Organization of  
the United Nations



# Programme

## Monday, 10 May 2010

- 08:00 – 17:00 Registration Desk Open
- 09:00 – 09:15 Opening Ceremony
- 09:15 – 09:45 Global fish production, utilization and trade. *Lahsen Ababouch*
- 09:45 – 10:15 Consumer perspectives and expectations. *Jonathan Banks*
- 10:15 – 10:30 Break / Poster Showcase
- 10:30 – 11:00 Advances in the development and use of fish processing equipment. *Sveinn Margeirsson*
- 11:00 – 11:30 Developments in automation of processing equipment. *Kristinn Andersen*
- 11:30 – 12:00 Heat treated fishery products. *V. Venugopal*
- 12:00 – 13:30 Lunch
- 13:30 – 14:00 Processing molluscs, shellfish and cephalopods. *Irineu Batista*
- 14:00 – 14:30 Vacuum packaging and modified atmosphere. *Jerry Stillinger*
- 14:30 – 15:00 Sashimi and Sushi products. *Yoko Murata*
- 15:00 – 15:10 Break / Poster Showcase
- 15:10 – 15:40 Seafood consumption and health benefits. *Linda Chaves*
- 15:40 – 16:00 Marine oils and related products. *Schuichi Abe*
- 16:00 – 16:20 Application of short path distillation to produce human grade Pollock oil. *Alexandra Olivera*
- 16:30 – 18:30 Welcome Reception and Poster Showcase

## Tuesday, 11 May 2010

- 07:30 – 17:00 Registration Desk Open
- 07:30 – 08:30 Poster Showcase
- 08:30 – 09:00 Consumer perceptions of the risks and benefits of farmed fish and fish farmer in Europe. *Anne Katrin Schlag*
- 09:00 – 09:30 Alternatives to antibiotics in aquaculture. *Iddya Karunasagar*
- 09:30 – 10:00 Farmed fish welfare during slaughter and automation of selected unit operations in subsequent processing line. *Ulf Erikson*
- 10:00 – 10:30 Break / Poster Showcase
- 10:30 – 11:00 Market based standards and certification schemes. *Melanie Siggs*
- 11:00 – 12:00 Education and training in seafood science and technology. *Murat Balaban*
- 12:00 – 13:30 Lunch / Poster Showcase Open
- 13:30 – 14:00 The EU regulatory perspective of seafood safety. *Alan Reilly*
- 14:00 – 14:30 Regulatory perspective: US FDA safety requirements. *Tim Hansen*
- 14:30 – 15:00 Bioactive substances from fish waste. *Se-Kwon Kim*
- 15:00 – 15:20 Break / Poster Showcase
- 15:20 – 15:40 Utilization of Alaska fish processing by-products. *Peter Bechtel*
- 15:40 – 16:00 Fish protein hydrolysates as novel ingredients for cryoprotection of frozen fish. *E.C.Y. Li-Chan*
- 16:00 – 16:20 Bioactive peptides derived from aquatic sources. *H. Kristinsson*
- 16:20 – 17:00 Final Chance to Visit Posters

**Wednesday, 12 May 2010**

07:30 – 17:00	Registration Desk
08:30 – 09:00	Economics of value addition for fish and fishery products. <i>Gunnar Knapp</i>
09:00 – 09:30	Future of fish meal and fish oil technology. <i>Jonathan Shepherd</i>
09:30 – 10:00	Surimi, state of the technology. <i>Tyre Lanier</i>
10:00 – 10:20	Break
10:20 – 10:50	Functional Benefits of Marine Phospholipids. <i>K. Takahashi</i>
10:50 – 11:10	Optimization of extraction, nanostructure and physical properties of channel catfish skin gelatin. <i>Yifen Wang</i>
11:10 – 11:30	Extraction and characterization of collagen from skin, bone and muscle of a trash fish, leatherjacket. <i>R.J. Shakila</i>
11:30 – 11:50	Comparison of phospholipids and DHA containing molecular species from the liver of marine and river fish. <i>Chengchu Liu</i>
11:50 – 12:10	Traceability technology solution overview. <i>Paul Lavery</i>
12:10 – 12:30	Closing session

**Breakouts****Session I****Session II**

13:30 – 13:50	Traceability of fish and fish products in Egypt. <i>Necla Demir</i>	Contribution of polyphenols and flavonoids to antioxidative capabilities of ethanol extracts from 20 species of marine algae. <i>Chengchu Liu</i>
13:50 – 14:10	Seafood authenticity testing systems using PCR -RFLP and bioanalyzer technology. <i>Lenore Kelly</i>	Reducing the fat content of fried seafood. <i>Angee Hunt</i>
14:10 – 14:30	Rapid and reliable detection of <i>Salmonella enterocolitica</i> serovarshin shrimp by multiplex PCR assay. <i>Geevaretnam Jeyasekaran</i>	Determining quality changes of salted anchovies produced from previously frozen raw material for a year. <i>Sevim Kose</i>
14:30 – 14:50	Microbial risk assessment and process standardization for partially processed value added fish. <i>DD Namburidir</i>	Effects of chitosan coatings incorporated with garlic oil on quality characteristics of shrimp. <i>Emine Asik</i>
14:50 – 15:10	Break	Break
15:10 – 15:30	Antilisterial properties of liquid smokes applied to seafood products. <i>Naim Montazeri</i>	Fat quality variations monitoring in covered Kilka with sodium alginate. <i>Mina Seifzadeh</i>
15:30 – 15:50	Effects of individual quick freezing on salmonella recovery and texture of shrimp. <i>Kathleen Rajkowski</i>	Production of salted cod from farmed and wild cod. <i>Cristol Solberg</i>
15:50 – 16:10	Biogenic amine content of traditional fish products of European and Turkish origin. <i>Sevim Kose</i>	Proposed mechanisms of water holding in cooked surimi gels. <i>Tyre Lanier</i>
16:10 – 16:30	Break	
16:30 – 17:30	Closing ceremony and announcement of next ICST	

**Thursday, 13 May 2010**

Various	Optional Tours
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**PAPERS PRESENTED AT THE  
CONGRESS**

