Preface.

Contributors.

1 Seafood quality, safety, and health applications: an overview *(Cesarettin Alasalvar, Fereidoon Shahidi, Kazuo Miyashita, and Udaya Wanasundara)*

1.1 Introduction.

1.2 Seafood quality.

1.3 Seafood safety.

1.4 Health applications of seafood.

1.5 Conclusions.

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2 Practical evaluation of fish quality by objective, subjective, and statistical testing *(Cesarettin Alasalvar, John M. Grigor, and Zulfiqur Ali)*

2.1 Introduction.

2.2 Methods used for fish freshness and quality assessment: from source to the consumer.

2.3 Potential use of micro- and nanotechnologies.

2.4 Conclusions.

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3 Sensory evaluation of fish freshness and eating qualities *(David P. Green)*.

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3.2 Methods for sensory evaluation of fish.

3.3 Pre-harvest factors affecting freshness.

3.4 Post-harvest factors affecting freshness.

3.5 Environmental taints.

3.6 Extending freshness and shelf-life in fish.

3.7 Conclusions.
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4 Sensometric and chemometric approaches to seafood flavour (Kae Morita and Tetsuo Aishima).

4.1 Introduction.

4.2 Sensometric approach to seafood flavour.

4.3 Chemometric approach to seafood flavour.

4.4 Conclusions.

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5 Instrumental analysis of seafood flavour (Hun Kim and Keith R. Cadwallader).

5.1 Introduction.

5.2 Isolation of volatile flavour compounds.

5.3 Instrumental analysis of volatile flavour compounds.

5.4 Conclusions.

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6 Quality assessment of aquatic foods by machine vision, electronic nose, and electronic tongue (Figen Korel and Murat Ö. Balaban).

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6.2 Visual quality.

6.3 Smell-related quality.

6.4 Taste-related quality.

6.5 Combination of machine vision system and electronic nose.

6.6 Conclusions.

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7 Effects of nutrition and aquaculture practices on fish quality (Kriton Grigorakis).

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7.3 Effect of feeding and aquaculture practices on quality characteristics.

7.4 Conclusions.

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8 Lipid oxidation, odour, and colour of fish flesh (Jeong-Ho Sohn and Toshiaki Ohshima).

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8.2 Quantitative determination methodology of total lipid hydroperoxides by a flow injection analysis system.

8.3 Lipid oxidation in ordinary and dark muscle of fish.

8.4 Effects of bleeding and perfusion of yellowtail on post-mortem lipid oxidation of ordinary and dark muscles.

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9 Blackening of crustaceans during storage: mechanism and prevention (Kohsuke Adachi and Takashi Hirata).

9.1 Introduction.

9.2 Phylogenetic position of prawns: the relation of PO and Hc.

9.3 Biosynthetic pathway of melanin.

9.4 Significance of melanisation in arthropods: pre-harvest and post-harvest.

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9.6 The relationship of PO and melanogenesis in prawns.

9.7 Hemocyanin and its enzymatic activation.

9.8 The relationship of frozen storage and blackening.

9.9 Prevention of melanosis in prawns.

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10 Quality of freshwater products (Masaki Kaneniwa).
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10.4 Enzymatic hydrolysis of lipid in the muscle of freshwater fish.
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11 Texture measurements in fish and fish products (Zulema Coppes-Petricorena)

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13 Fish mince: cryostabilization and product formulation (Chong M. Lee).
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13.4 Formulation of fish mince-based products in relation to ingredients and sensory quality.

13.5 Conclusions.

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14 New trends in species identification of fishery products (Hartmut Rehbein).

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14.5 Detection of allergenic fish and shellfish.

14.6 Determination of origin and stock assignment of fish.

14.7 Data bases.

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15 An emerging powerful technique: NMR applications on quality assessments of fish and related products (Somer Bekiroglu).

15.1 Introduction.

15.2 Low-field (time-domain) NMR applications.

15.3 High-field NMR applications.

15.4 Projections on MRI applications.

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16 Food-borne pathogens in seafood and their control (*Dominic Kasujja Bagenda and Koji Yamazaki*).

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16.2 Major food-borne pathogens related to seafood.

16.3 Current trends in control of seafood-borne pathogens.

16.4 Conclusions.

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17 Novel approaches in seafood preservation techniques (*Fatih Özogul, Yesim Özogul, and Esmeray Kuley Boga*).

17.1 Introduction.

17.2 Seafood preservation techniques.

17.3 Conclusions.

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18 Essential oils: natural antimicrobials for fish preservation (*Barakat S.M. Mahmoud and Kazuo Miyashita*).

18.1 Introduction.

18.2 Essential oils.

18.3 Application of essential oils to fish preservation.

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19 Rapid methods for the identification of seafood micro-organisms (*Brian H. Himelbloom, Alexandra C.M. Oliveira, and Thombathu S. Shetty*).

19.1 Introduction.

19.2 Non-molecular (phenotyping).

19.3 Molecular (genotyping).

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20 Using predictive models for the shelf-life and safety of seafood (Graham C. Fletcher).

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21 Mathematical modelling of shrimp cooking (Ferruh Erdogdu and Murat Ö. Balaban)

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22 Transgenic/transgenic modified fish (Jenn-Kan Lu, Jen-Leih Wu, and Meng-Tsan Chiang).

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22.2 Methodology of gene transfer in fish.

22.3 Food safety of transgenic fish.
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23 Molecular detection of pathogens in seafood *(Iddy Karunasagar and Indrani Karunasagar)*.

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23.2 Probe hybridisation methods.

23.3 Nucleic acid amplification methods.

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24 DNA-based detection of commercial fish species *(Rosalee S. Rasmussen and Michael T. Morrissey)*

24.1 Introduction.

24.2 DNA-based methods and gene targets.

24.3 Major collaborative efforts.

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25 Seafoods and environmental contaminants *(Beraat Özelik, Ümran Uygun, and Banu Bayram)*.

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25.5 Risk assessment and regulations.

25.6 Policies to reduce exposure to PEPs.

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26 Oxidation and stability of food-grade fish oil: role of antioxidants (Weerasinghe M. Indrasena and Colin J. Barrow).

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26.2 Process of oxidation.

26.3 Factors affecting the rate of lipid oxidation.

26.4 Food-grade fish oil.

26.5 Control of lipid oxidation and improvement of the stability of fish oil.

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27 Global legislation for fish safety and quality (Ioannis S. Arvanitoyannis and Persefoni Tserkezou).

27.1 Introduction.

27.2 Global legislation in fish and fishery products.

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28.1 Introduction.

28.2 Salmon.

28.3 Surimi.

28.4 Crabs.

28.5 Conclusions.

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PART III HEALTH APPLICATIONS OF SEAFOOD.
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29.2 Nutritional value.

29.3 Effect of cooking on nutritional value.

29.4 Health benefits of seafood.

29.4.5 Cancer.

29.4.6 Other effects.

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30 A new approach to the functional improvement of fish meat proteins (Hiroki Saeki).

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30.2 Reaction between fish meat protein and reducing sugars through the Maillard reaction.

30.3 Suppression of protein denaturation at the Maillard reaction by controlling the reaction humidity.

30.4 Water solubilisation of fish Mf protein by glycosylation.

30.5 Molecular mechanism of water solubilisation by glycosylation.

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30.7 Complex utilisation of under-utilised marine bioresources using the glycosylation system.

30.8 Food safety check of fish meat protein conjugated with AO.

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31 Value addition to seafood processing discards (Sachindra M. Nakkarike, Bhaskar Narayan, Masashi Hosokawa, and Kazuo Miyashita).

31.1 Introduction.
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31.3 Protein hydrolysate and bioactive peptides from seafood discards.
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31.5 Chitin and chitosan from crustacean discards.
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32 Role of marine foods in prevention of obesity (Shigeru Nakajima).
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33 Microencapsulation, nanoencapsulation, edible film, and coating applications in seafood processing (Subramaniam Sathivel and Don Kramer).
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33.2 Application of microencapsulation technology in fish oil.
33.3 Nanoencapsulated fish oil.
33.4 Edible film and coating applications in seafood.
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34 Fish oil extraction, purification, and its properties (Subramaniam Sathivel).
34.1 Introduction.
34.2 Extraction.
34.3 Fish oil properties.
34.4 Conclusions.
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35 Nutraceutical quality of shellfish (Bonnie Sun Pan).

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35.2 Chemical compositions.

35.3 Functional activities.

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35.5 Conclusions.

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36 Marine oils and other marine nutraceuticals (Fereidoon Shahidi and Cesarettin Alasalvar).

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36.9 Other nutraceuticals from marine resources.

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37 Nutraceuticals and bioactives from marine algae (S.P.J. Namal Senanayake, Naseer Ahmed, and Jaouad Fichtali).

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37.5.1 Characteristics of microalgal oils.

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38 Preparative and industrial-scale isolation and purification of omega-3 polyunsaturated fatty acids from marine sources (Udaya Wanasundara).

38.1 Introduction.

38.2 Concentration methods of n-3 PUFA.

38.3 Conclusions.

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39 Marine oil processing and application in food products (Fereidoon Shahidi).

39.1 Introduction.

39.2 Marine oil processing.

39.3 Enriched omega-3 oils.

39.4 Application of the omega-3 fatty acids/oils.

39.5 Conclusions.

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40 Bioactive peptides from seafood and their health effects (Anusha G.P. Samaranayaka and Eunice C.Y. Li-Chan).

40.1 Introduction.

40.2 Sources of bioactive peptides from seafood.

40.3 Potential health benefits of bioactive peptides derived from seafood.

40.4 Current and future applications.

40.5 Conclusions.
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41 Antioxidative properties of fish protein hydrolysates (Sivakumar Raghavan, Hordur G. Kristinsson, Gudjon Thorkelsson, and Ragnar Johannsson).

41.1 Introduction.

41.2 FPH as food antioxidants.

41.3 Sensory attributes of FPH.

41.4 Physiological and bioactive properties of FPH.

41.5 Conclusions.

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42 Functional and nutraceutical ingredients from marine macroalgae (Tao Wang, Guorún Ólafsdóttir, Rósa Jónsdóttir, Hordur G. Kristinsson, and Ragnar Johannsson).

42.1 Introduction.

42.2 Functional and nutraceutical properties of polyphenols from marine algae.

42.3 Functional and nutraceutical properties of sulphated polysaccharides from marine algae.

42.4 Functional and nutraceutical properties of fucoxanthin from marine algae.

42.5 Functional and nutraceutical properties of sterols from marine algae.

42.6 Functional and nutraceutical properties of bioactive peptides from marine algae.

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43 Seafood enzymes and their potential industrial application (Swapna C. Hathwar, Amit K. Rai, Sachindra M. Nakkarike, and Bhaskar Narayan).

43.1 Introduction.

43.2 Types of seafood enzymes and their applications.

43.3 Conclusions.

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