Contents

List of Contributors xix

1 Introduction 1
   Hannu Korkeala

2 From Farm to Slaughterhouse 5
   Sirje Jalakas, Terje Elias and Mati Roasto
   2.1 Scope 5
   2.2 Animal health and welfare 6
      2.2.1 Different farming systems 6
      2.2.2 Good practices 7
      2.2.3 Biosecurity measures 8
      2.2.4 Prior to transport 8
   2.3 Transport 10
      2.3.1 Fitness for transport 10
      2.3.2 Means of transport 10
      2.3.3 Transport practices 11
   2.4 Lairage 14
   2.5 Food chain information 14
   Summary 16

3 Ante-Mortem Inspection 19
   Päivi Lahti and Jani Soini
   3.1 Scope 19
   3.2 Introduction 19
   3.3 Identification of animals 21
   3.4 Abnormalities 22
   3.5 Cleanliness of animals 25
## CONTENTS

3.6 Animal welfare 26  
3.6.1 Animal welfare on the farm 26  
3.6.2 Animal welfare in transit 27  
3.6.3 Animal welfare at the slaughterhouse 28  

4 The Slaughter Process 29  
Eero Puolanne and Per Ertbjerg  
4.1 Scope 29  
4.2 General 29  
4.3 Pigs 31  
4.3.1 Moving the animals from the stable to stunning 31  
4.3.2 Stunning 32  
4.3.3 Bleeding 33  
4.3.4 Scalding 33  
4.3.5 Dehairing 34  
4.3.6 Skin removal 34  
4.3.7 Evisceration 35  
4.3.8 Cooling/chilling 35  
4.4 Cattle, horses, sheep and goats 36  
4.4.1 Moving the animals from the stable to stunning 36  
4.4.2 Stunning 38  
4.4.3 Bleeding 39  
4.4.4 Electrical stimulation 39  
4.4.5 Dehiding and opening the carcass 39  
4.4.6 Cooling/chilling 40  
4.5 Poultry 41  
4.5.1 Transport to slaughter 41  
4.5.2 Stunning 41  
4.5.3 Scalding 41  
4.5.4 Plucking 42  
4.5.5 Evisceration 42  
4.5.6 Other poultry 42  
4.5.7 Cooling/chilling 42  
4.6 Treatment of slaughter by-products 43  

5 Animal Welfare – Stunning and Bleeding 47  
Michael Bucher and Peter Scheibl  
5.1 Scope 47  
5.2 Introduction 47  
5.3 Pigs 49  
5.3.1 Electrical stunning 49  
5.3.2 Carbon dioxide stunning 55  
5.3.3 Captive-bolt stunning 58  
5.3.4 Bleeding 60  
5.4 Cattle, sheep and goats 61  
5.4.1 Captive-bolt stunning 61  
5.4.2 Electrical stunning 64  
5.4.3 Bleeding 66
CONTENTS

5.5 Poultry 67
5.5.1 Electrical stunning 67
5.5.2 Gas stunning (controlled atmosphere stunning, CAS) 69
5.5.3 Bleeding 70
5.6 Conclusions 70

6 Post-Mortem Inspection and Related Anatomy 73
Paolo Berardinelli, Rosanna Ianniciello, Valentina Russo and Thimjos Ninios

6.1 Scope 73
6.2 Introduction 73
6.3 Anatomy of the head 74
6.3.1 Skeleton structures and viscera of the cranial cavity 74
6.3.2 Skeleton structures and viscera of the face 74
6.3.3 Lymph nodes of the head 75
6.3.4 Pigs 75
6.3.5 Bovine 78
6.3.6 Small ruminants 84
6.4 Anatomy of viscera 84
6.4.1 Viscera of the oral cavity 84
6.4.2 Viscera of the thoracic cavity 86
6.4.3 Viscera of the abdominal cavity 100
6.4.4 Gastrointestinal tube, mesentery and annexed lymph nodes 107
6.4.5 Viscera of the pelvic cavity 119
6.5 Anatomy of carcass 122
6.5.1 Musculoskeletal apparatus 122
6.5.2 Viscera annexed to the carcass 129
6.5.3 Specific characteristics in pig 132
6.5.4 Specific characteristics in bovine 136
6.5.5 Specific characteristics in small ruminants 143
6.6 Anatomy of poultry 145
6.6.1 Carcass 145
6.6.2 Viscera 145
6.7 Post-mortem inspection 153
6.7.1 Scope of the post-mortem inspection 153
6.7.2 Post-mortem inspection techniques 154
6.7.3 Visual meat inspection 154

7 Risk-Based Meat Inspection 157
Maria Fredriksson-Ahomaa

7.1 Scope 157
7.2 Introduction 157
7.3 Risk-based meat inspection 158
7.4 Visual-only post-mortem meat inspection 159
7.5 Food chain information (FCI) 160
 CONTENTS

7.6 Monitoring of diseases by serology in the slaughterhouse 160
7.7 Conclusions 160

8 Meat Inspection Lesions 163
Jere Lindén, Leena Pohjola, Laila Rossow and Daniele Tognetti
8.1 Scope 163
8.2 Introduction 163
8.3 Bovines 164
8.4 Domestic swine 173
8.5 Small ruminants 184
8.6 Poultry 188

9 Sampling and Laboratory Tests 199
Riikka Laukkanen-Ninios
9.1 Scope 199
9.2 Introduction 199
9.3 Collecting and packaging samples 200
9.4 Boiling test 201
9.5 Measurement of pH 202
9.6 Bacteriological examination of carcasses 203
9.7 Zoonotic agents 204
  9.7.1 Bacteria 204
  9.7.2 Parasites 210
  9.7.3 Transmissible spongiform encephalopathy 212
9.8 Animal diseases 214
9.9 Chemical residues 214
  9.9.1 Detection of chemical residues and contaminants 214
  9.9.2 Detection of antimicrobial residues in carcasses 215
9.10 Process and slaughterhouse environment controls 216

10 Judgment of Meat 219
Thimjos Ninios
10.1 Scope 219
10.2 Meat inspection 219
  10.2.1 Management of risks 220
10.3 Evaluation of the meat 221
  10.3.1 How to evaluate 221
  10.3.2 Conclusion of inspecting activities 222
  10.3.3 Health mark 222
  10.3.4 Examples of evaluation and judgment 222
10.4 Record keeping in meat inspection 223

11 Classification of Carcasses 225
Rosanna Ianniciello, Paolo Berardinelli, Monica Gramenzi and Alessandra Martelli
11.1 Scope 225
11.2 Classification of beef carcasses 225
  11.2.1 Classification grid of the European Union 226
11.2.2 Category 226
11.2.3 Conformation class 229
11.2.4 Class of fat cover 234

11.3 Classification of pig carcasses 234
11.3.1 Steps of the classification 236
11.3.2 Calibration and verification of measurement equipment functionality 236
11.3.3 Presentation of the carcass at the slaughter line weighing station 236
11.3.4 Weighing of the chilled carcass 236
11.3.5 Use of the measuring instrument for the classification 237
11.3.6 Identification of carcasses 238
11.3.7 Classification according to EUROP 238
11.3.8 Labelling 239

11.4 Classification of sheep carcasses 239
11.4.1 Category 239
11.4.2 Conformation class 239
11.4.3 Degree of fat cover 243
11.4.4 Carcasses of lambs of less than 13 kg 244
11.4.5 Labelling 244

11.5 Classification of poultry carcasses 245
11.5.1 Definitions 245
11.5.2 Classification 246

12 Control, Monitoring and Surveillance of Animal Health and Animal Infectious Diseases at the Slaughterhouse 249

Ivar Vågsholm

12.1 Scope 249
12.2 Background 249
12.2.1 An example: UK FMD epidemic 2001 was detected at meat inspection 249
12.2.2 Initial purposes of meat inspection 250

12.3 Evolution of meat inspection 251
12.3.1 Meat inspection and control 251
12.3.2 Meat inspection: a part of MOSS and risk management of the food chain 252
12.3.3 Meat inspection and disease outbreaks or other disruptive events 252

12.4 Additional purposes of meat inspection 254
12.5 Some useful concepts 255
12.5.1 Monitoring and surveillance systems (MOSS) 255
12.5.2 Population of interest, surveillance population and sample 257
12.5.3 Measures of disease occurrence 259
12.5.4 Diagnostic test characteristics 259
12.5.5 Apparent versus true prevalence 261
12.5.6 Parallel and serial interpretation of tests 261

12.6 Quantifying the MOSS of meat inspection 262
12.6.1 Detection fraction 262
## CONTENTS

12.6.2 Input- and output-based standards 262
12.6.3 A problem with meat inspection MOSS 265

12.7 Purposes of MOSS at meat inspection 266
12.7.1 Prevalence estimation 266
12.7.2 Case detection 267
12.7.3 Verify the absence of disease or infectious agent in a region, compartment or nation 268
12.7.4 Detect the emergence of diseases or infectious agents 268
12.7.5 Quantifying sensitivity for detection 270

12.8 EFSA reviews of meat inspection 271
12.9 Summary and conclusions 275

13 Public Health Hazards 277

A. Biological Hazards 277

*Maria Fredriksson-Ahomaa*

13.1 Scope 277

13.2 Bacteria 277
13.2.1 *Bacillus anthracis* and *Bacillus cereus* 278
13.2.2 *Campylobacter* spp. 282
13.2.3 *Clostridium* spp. 285
13.2.4 *Listeria monocytogenes* 287
13.2.5 *Mycobacterium* spp. 289
13.2.6 *Salmonella* spp. 293
13.2.7 *Staphylococcus aureus* 296
13.2.8 Shiga toxin-producing *Escherichia coli* (STEC) 298
13.2.9 Enteropathogenic *Yersinia* spp. 301
13.2.10 Literature and further reading 304

13.3 Viruses 306
13.3.1 Hepatitis E virus (HEV) 308
13.3.2 Influenza A viruses 312
13.3.3 Other viruses 313
13.3.4 Literature and further reading 313

13.4 Parasites 314
13.4.1 *Toxoplasma gondii* 315
13.4.2 *Sarcocystis* spp. 317
13.4.3 *Trichinella* spp. 318
13.4.4 *Taenia* spp. 320
13.4.5 *Echinococcus* spp. 322
13.4.6 Literature and further reading 323

13.5 Prions 323
13.5.1 Properties of prions 324
13.5.2 Human diseases 324
13.5.3 Bovine spongiform encephalopathy 325
13.5.4 Classical scrapie 326
13.5.5 Atypical scrapie 327
13.5.6 Surveillance in animals 328
13.5.7 Literature and further reading 328

13.6 Antimicrobial resistance in meat-borne bacteria 329
CONTENTS

B. Control of Biological Meat-Borne Hazards 334
Sava Buncic
13.7 Scope 334
13.8 Introduction 334
13.9 Hazard identification 335
13.10 Prioritization (ranking) of meat-borne hazards 337
13.11 Carcass meat safety assurance framework 340
13.11.1 Targets to be achieved by slaughterhouses and farms in respect to priority meat-borne hazards 340
13.11.2 Control of meat-borne hazards at the slaughterhouse 343
13.11.3 Control of meat-borne hazards at the farm level 347
13.11.4 Principles of use of food chain information (FCI) including epidemiological indicators (EIs) in the carcass meat safety assurance framework 349

C. Chemical Hazards and their Control 354
Marcello Trevisani, Giuseppe Diegoli and Giorgio Fedrizzi
13.12 Scope 354
13.13 Introduction 354
13.14 Residues of veterinary medicine products 357
13.14.1 Antimicrobials 357
13.14.2 Antiparasitic drugs 360
13.14.3 Antihelmintics 361
13.14.4 Antiprotozoals 363
13.15 Substances having anabolic effects and unauthorized substances 364
13.15.1 Sexual steroids 364
13.15.2 Beta-agonists 368
13.15.3 Drugs used to mask signs and avoid collateral effects of sexual steroids and beta-agonists 369
13.15.4 Benzodiazepines 369
13.15.5 Thyreostats 369
13.15.6 Antibacterial synthetic quinoxaline compounds 370
13.15.7 Non-steroidal anti-inflammatory drugs (NSAIDs) 370
13.15.8 Arsynlic acid 371
13.15.9 Hormone substitutives (or growth hormone, GH) 371
13.16 Residues of feed additives 371
13.17 Environmental pollutants 372
13.17.1 Natural toxins (including mycotoxins and plant toxins) 372
13.17.2 Cadmium 374
13.17.3 Pesticides: plant protection products (PPP) and biocides 375
13.17.4 Industrial wastes, by-products and toxicants released from fires and accidental events 377
13.18 Analytical chemical methods and their validation 382

14 Meat By-Products 385
Miguel Prieto and María Luisa García-López
14.1 Scope 385
14.2 Introduction 385
14.3 Advantages of adequate ABP management 387
14.4 Separation of animal by-products, storage and recommendations on best practices and hygiene requirements 388
14.5 Identification, transport and marking 390
14.6 Processing of by-products and methods of treatment and disposing of ABPs 391
14.6.1 Incineration 391
14.6.2 Composting 392
14.6.3 Anaerobic fermentation 392
14.6.4 Rendering 393
14.6.5 Oleochemical processes 393
14.6.6 Waste water from slaughterhouses 393
14.6.7 Treatment of different categories according to European standards 395
14.7 Materials obtained from animal by-products at the slaughterhouse 395
14.8 Conclusions 398

15 The Conversion of Muscle to Meat 399
Frans Smulders, Peter Hofbauer and Geert H. Geesink
15.1 Scope 399
15.2 Introduction 399
15.3 Muscle structure, composition and function 400
15.4 Post-mortem muscle physiology; rigor mortis and the conversion of muscle to meat 403
15.4.1 Post-mortem muscle pH decline and ultimate pH values of the main meat animal species and major anomalies 404
15.5 Major sensory characteristics of meat 408
15.5.1 Colour of fresh meat 409
15.5.2 Tenderness of meat 411
15.5.3 The water holding of meat 416
15.5.4 The flavour of meat 418
15.6 Concluding remarks 419
Acknowledgements 420

16 Microbial Contamination During Slaughter 423
Claudio Zweifel and Roger Stephan
16.1 Scope 423
16.2 Introduction 423
16.3 Contamination of carcasses 425
16.4 Microbial contamination during slaughter – pig slaughtering as an example 426
16.5 Microbial examinations of red meat carcasses at the end of slaughter 430
16.5.1 Pig and cattle carcasses 431
16.5.2 Sheep carcasses 435
16.6 Conclusions 437

17 Decontamination of Carcasses 439
Claudio Zweifel and Roger Stephan
17.1 Scope 439
17.2 Introduction 439
CONTENTS

17.3 Antibacterial decontamination treatments for carcasses 440
17.3.1 Physical decontamination treatments 440
17.3.2 Chemical decontamination treatments 442
17.3.3 Combinations of decontamination treatments 443
17.3.4 Biological decontamination treatments 444
17.4 Antibacterial activity of decontamination treatments for carcasses 444
17.4.1 Poultry carcasses 444
17.4.2 Bovine hides and carcasses 446
17.4.3 Pig carcasses 449
17.5 Conclusions 451

18 Cleaning and Disinfection 453
Gun Wirtanen and Satu Salo
18.1 Scope 453
18.2 Background to cleaning and disinfection 453
18.3 Cleaning in general 454
18.4 Disinfection in general 454
18.5 Main soil types and their removal 455
18.6 Cleaning procedure 456
18.6.1 Cleaning of processing environment 458
18.6.2 Cleaning of equipment 458
18.6.3 Choosing the cleaning temperature 459
18.6.4 Choosing the cleaning agents 459
18.6.5 Choosing the disinfectants 460
18.6.6 Surface materials with limitations in cleaning and disinfection 463
18.6.7 Efficacy testing of disinfectants against microbes 464
18.6.8 Chemical residue tested with microbes 465
18.6.9 Ultrasound cleaning – an alternative method for utensils and open process lines 465
18.6.10 Corrective action – power cleaning 465
18.6.11 Controlling the cleaning results 466
18.6.12 Interpreting the microbial results – limits for microbes on cleaned surfaces 468
18.6.13 Optimization of cleaning procedures 468
18.7 Improved cleaning possibilities through hygienic design 469
18.8 Concluding remarks 470

19 Pest Control 473
Mirko Rossi and Francesco Andreucci
19.1 Scope 473
19.2 Introduction 473
19.3 Control plan 473
19.4 Identification of the pest and inspection 474
19.5 Control techniques 475
19.6 Monitoring programme 478

20 Working Hygiene 485
Marjatta Rahkio
20.1 Scope 485
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C. HACCP</strong></td>
<td>Robert Savage</td>
<td>540</td>
</tr>
<tr>
<td>23.10</td>
<td>History</td>
<td>540</td>
</tr>
<tr>
<td>23.11</td>
<td>The HACCP principles</td>
<td>542</td>
</tr>
<tr>
<td>23.11.1</td>
<td>Hazard analysis</td>
<td>542</td>
</tr>
<tr>
<td>23.11.2</td>
<td>Critical control points (CCPs)</td>
<td>544</td>
</tr>
<tr>
<td>23.11.3</td>
<td>Critical limits</td>
<td>544</td>
</tr>
<tr>
<td>23.11.4</td>
<td>Monitoring procedures</td>
<td>544</td>
</tr>
<tr>
<td>23.11.5</td>
<td>Corrective actions</td>
<td>546</td>
</tr>
<tr>
<td>23.11.6</td>
<td>Verification and validation</td>
<td>546</td>
</tr>
<tr>
<td>23.11.7</td>
<td>Documentation and recordkeeping</td>
<td>546</td>
</tr>
<tr>
<td>23.12</td>
<td>HACCP at the slaughterhouse</td>
<td>547</td>
</tr>
<tr>
<td>23.12.1</td>
<td>Livestock slaughter</td>
<td>547</td>
</tr>
<tr>
<td>23.12.2</td>
<td>Poultry slaughter</td>
<td>547</td>
</tr>
</tbody>
</table>

### 24 Official Control | 553

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Introduction</td>
<td>553</td>
</tr>
<tr>
<td><strong>Janne Lundén</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>Organization of Official Control</td>
<td>556</td>
</tr>
<tr>
<td><strong>Aivars Bērzinš, Janne Lundén and Hannu Korkeala</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.1</td>
<td>Scope</td>
<td>556</td>
</tr>
<tr>
<td>24.2</td>
<td>Structure of official organization</td>
<td>556</td>
</tr>
<tr>
<td>24.3</td>
<td>Requirements of the official control organization</td>
<td>557</td>
</tr>
<tr>
<td>C.</td>
<td>On-Site Risk-Based Control</td>
<td>562</td>
</tr>
<tr>
<td><strong>Eeva-Riitta Wirta</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.4</td>
<td>Scope</td>
<td>562</td>
</tr>
<tr>
<td>24.5</td>
<td>Introduction</td>
<td>562</td>
</tr>
<tr>
<td>24.6</td>
<td>On-site risk-based control and own-check system</td>
<td>563</td>
</tr>
<tr>
<td>24.7</td>
<td>Verification of the own-check system</td>
<td>563</td>
</tr>
<tr>
<td>24.8</td>
<td>Systematic verification in practice</td>
<td>564</td>
</tr>
<tr>
<td>24.9</td>
<td>Practical views to on-site risk-based control in slaughterhouses</td>
<td>565</td>
</tr>
<tr>
<td>24.9.1</td>
<td>Small scale and large scale slaughterhouses</td>
<td>565</td>
</tr>
<tr>
<td>24.9.2</td>
<td>Slaughter order of animals with different status</td>
<td>566</td>
</tr>
<tr>
<td>24.9.3</td>
<td>Stunning and slaughter operations</td>
<td>566</td>
</tr>
<tr>
<td>24.9.4</td>
<td>Chilling</td>
<td>567</td>
</tr>
<tr>
<td>24.9.5</td>
<td>Sampling by the official veterinarian by on-site risk-based consideration</td>
<td>567</td>
</tr>
<tr>
<td>D.</td>
<td>Control Plan</td>
<td>568</td>
</tr>
<tr>
<td><strong>Tiina Läikkö-Roto</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.10</td>
<td>Scope</td>
<td>568</td>
</tr>
<tr>
<td>24.11</td>
<td>Why planning of official food control is important?</td>
<td>568</td>
</tr>
<tr>
<td>24.12</td>
<td>Planning food control in a slaughterhouse</td>
<td>568</td>
</tr>
<tr>
<td>24.12.1</td>
<td>Planning the frequency of control visits</td>
<td>569</td>
</tr>
<tr>
<td>24.12.2</td>
<td>Planning the content of the controls</td>
<td>569</td>
</tr>
<tr>
<td>24.12.3</td>
<td>Planning the control methods and techniques to be used during control visits</td>
<td>571</td>
</tr>
<tr>
<td>24.12.4</td>
<td>Planning the official sampling for analysis</td>
<td>573</td>
</tr>
</tbody>
</table>
CONTENTS

24.12.5 Evaluating the duration of the control visits 573
24.13 Adjusting the control plan when needed 574

E. Approval of Establishments 575

Risto M. Ruuska

24.14 Scope 575
24.15 Why approve slaughterhouses beforehand? 575
24.16 Approval process 576
24.17 Granting approval 578
24.18 Health mark and identification mark 578
24.19 Listing of establishments 579
24.20 Withdrawal of approval 579

F. Inspection and Sampling 581

Mari Nevas and Janne Lundén

24.21 Scope 581
24.22 Inspection procedures 581
24.23 Challenging task of an inspector 583
24.24 When, what and how to inspect? 584
24.25 Preparing for inspection 584
24.26 Initiating the inspection and interviewing the personnel 585
24.27 Observing the premises and the facilities 586
24.28 Evaluating the surfaces 587
24.29 Observing the hygienic working practices of personnel 588
24.30 Evaluating the adequacy of the sanitation procedures 588
24.31 Inspecting the own-check system 589
24.32 Official veterinarian’s exemplary behaviour 590
24.33 Giving feedback on the inspection 590
24.34 Documentation of official control 590
24.35 How to ensure the efficacy of inspections? 592

G. Enforcement 593

Outi Lepistö, Janne Lundén and Karoliina Kettunen

24.36 Scope 593
24.37 Good governance of enforcement measures 593
  24.37.1 Principle of good governance 593
  24.37.2 The legal principles of administration 594
  24.37.3 The conflict of the basic rights 595
  24.37.4 The principle of publicity 596
  24.37.5 The hearing process 596
  24.37.6 An opportunity to make an appeal 597
  24.37.7 The knowledge and attitudes of authorities 597
  24.37.8 The efficiency of food control norms 598
24.38 Forms and application of enforcement measures in slaughterhouses 598
  24.38.1 Enforcement measures 598
  24.38.2 Gradual and proportional use of enforcement measures 599
  24.38.3 Decision on the enforcement measure 602
  24.38.4 Verifying the outcome of the enforcement 602
  24.38.5 Further procedures and consequences 602
  24.38.6 Urgent measures 603
24.39 To advise or to use enforcement measures? 603
CONTENTS

H. Auditing Official Controls
   Juha Junttila
   24.40 Scope
   24.41 Background
   24.42 Different types of audits
   24.43 Why audit official controls? (What is the added value?)
   24.44 Auditing processes and systems
   24.45 Key principles
   24.46 Auditor qualifications
   24.47 The audit process
   24.48 Concluding remarks

I. Transparency in Official Controls
   Juha Junttila
   24.49 Scope
   24.50 What is transparency?
   24.51 Good governance
   24.52 Objectives of transparency
   24.53 Who needs transparency?
   24.54 Benefits of being transparent
   24.55 Degrees of transparency
   24.56 Obstacles to transparency
   24.57 What does this mean for meat inspection?
   24.58 Concluding remarks

J. Food Frauds
   Niels Obbink, J.M. Frissen and S.B. Post
   24.59 Scope
   24.60 Definition
   24.61 Slaughter chain and food fraud
      24.61.1 Variations in trade
      24.61.2 How fraud takes place
      24.61.3 Trade promotion
   24.62 Criminal acts and behaviour
      24.62.1 Case 1, slaughter in an illegal slaughterhouse
      24.62.2 Case 2, fraud concerning the origin of slaughter animals
      24.62.3 Case 3, illegal slaughter in approved slaughterhouse
   24.63 Organization in The Netherlands to combat food crime
      24.63.1 The tools of enforcement
      24.63.2 The divisions of the Authority
      24.63.3 The legal framework of the IOD
      24.63.4 The IOD structure
      24.63.5 Investigative Powers
   24.64 Conclusion

K. Flexibility and Uniformity of Official Control
   Veli-Mikko Niemi and Janne Lundén
   24.65 Scope
   24.66 Introduction
   24.67 Achieving flexibility by legislation
      24.67.1 Derogations, exemptions and adaptation
CONTENTS

24.67.2 Flexibility and uniformity in official controls 641
24.67.3 Food business operators’ measures 641
24.67.4 Exclusions 642

25 International Trade 643
Henrikka Kontio
25.1 Scope 643
25.2 International trade 643
   25.2.1 Principles of international trade 643
   25.2.2 SPS Committee 644
   25.2.3 International organizations 644
25.3 European Union trade 644
   25.3.1 Intra-community trade 644
   25.3.2 Import 645
   25.3.3 Export 646
   25.3.4 European Union trade agreements 646
   25.3.5 EU Trade Control and Expert System 648
25.4 Exporting procedures 648
   25.4.1 Meeting the export conditions 648
   25.4.2 Export certificates 648
   25.4.3 Certification procedures 649

26 Scientific Risk Assessment – Basis for Food Legislation 651
Riitta Maijala
26.1 Scope 651
26.2 Introduction 651
26.3 Risk analysis standards are set by international organizations 653
26.4 Risk analysis is a decision making process 654
26.5 Risk assessment estimates the level of risk 655
26.6 Other parts of risk analysis: risk management and risk communication 661
26.7 Risk assessments of EFSA impact on EU food safety legislation 662
26.8 Concluding remarks 665

27 Use of Meat Inspection Data 667
Hannu Korkeala and Janne Lundén
27.1 Scope 667
27.2 Use of meat inspection data 667
27.3 Requirements of collection and recording of meat inspection data 671

Index 675