I MICROBIAL FOOD HAZARDS.

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1.2 Statistical Estimates.

1.3 Impact of Representative Foodborne Pathogens.

1.4 National Microbial Baseline Surveys.

1.5 Global Marketplace.

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2.1 Introduction.

2.2 Aeromonas.

2.3 Arcobacter.

2.4 Bacillus cereus.

2.5 Brucella.

2.6 Campylobacter.

2.7 Clostridium botulinum.

2.8 Clostridium perfringens.

2.9 Escherichia coli.

2.10 Listeria.

2.11 Plesiomonas shigelloides.

2.12 Salmonella.

2.13 Shigella.

2.14 Staphylococcus aureus.

2.15 Vibrio.
2.16 Yersinia.
2.17 Mycotoxins and Fungi.
2.18 Cryptosporidium.
2.19 Cyclospora.
2.20 Entamoeba.
2.21 Giardia.
2.22 Anisakis simplex.
2.23 Ascaris.
2.24 Diphyllobothrium latum.
2.25 Taenia.
2.26 Trichinella spiralis.
2.27 Hepatitis A and E Viruses.
2.28 Norovirus.

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3.2 History of Illness Caused by (E). sakazakii.
3.3 Infant Susceptibility.
3.4 Novel Prevention Strategies.
3.5 Infant Formula Processing.
3.6 Biochemical Characterization and Taxonomy.
3.7 Environmental Sources of (E). sakazakii.
3.8 Resistance and Virulence Factors of (E). sakazakii.
3.9 Current Isolation and Detection Techniques.

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4.1 Introduction.

4.2 Transmissible Spongiform Encephalopathies.

4.3 Nature of the Illness Caused.

4.4 Pathogenesis.

4.5 Characteristics of the Agent.

4.6 Epidemiology.

4.7 PrPSc Detection.

4.8 Physical Means of Destruction of the Organism.

4.9 Prevention and Control Measures.

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5.2 Emergence of H5N1 Avian Influenza.

5.3 Epidemiology of Human H5N1 Infection.

5.4 Clinical Presentation and Laboratory Diagnosis.

5.5 Food Safety Considerations.

5.6 Global Response.

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6.2 Enterohemorrhagic *Escherichia coli* O157:H7 in Beef.
6.3 *Salmonella* in Beef.
6.4 *Listeria* in Beef.
6.5 *Campylobacter* in Beef.
6.6 Control of Foodborne Pathogens in Beef.
6.7 Conclusions.

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7.1 Introduction.
7.2 Microflora of Raw Milk.
7.3 Public Health Concerns from Dairy Products.
7.4 Milk and Cream.
7.5 Cheese and Fermented Dairy Products.
7.6 Ice Cream.
7.7 Butter.
7.8 Milk Powder.
7.9 Detection of Microorganisms in Milk.
7.10 Novel Processing Methods.
7.11 Global Trade and Regulations.

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8.1 Introduction.
8.2 Characteristics of Foodborne Illness.
8.3 Approaches to Maintaining Product Quality and Reducing the Number of Microorganisms.

8.4 Conclusions.

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9.2 Microflora of Shell Eggs.

9.3 Significance of the Detection of *Salmonella*.

9.4 Eggborne Outbreaks of Human Salmonellosis.

9.5 Thermal Processing of Egg Products.

9.6 Potentially Hazardous Egg Products in the Home.

9.7 Control.

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10.1 Introduction.

10.2 Normal Flora of Raw Pork.

10.3 Spoilage.

10.4 Pathogens of Concern.

10.5 Risk of Contamination During Processing.

10.6 Survival and Growth of Pathogens and Spoilage Organisms in Pork Products.

10.7 Indicator Microorganisms.

10.8 Maintaining Product Quality and Reducing the Number of Microorganisms.

10.9 Microbiological Methods for Detection and Quantification.

10.10 Regulations.

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11.2 Normal Flora of Fish and Shellfish.

11.3 Microbial Hazards and Preventive Measures.

11.4 Spoilage.

11.5 Seafood Processing and Food Safety.

11.6 Product Quality and Microorganism Reduction Methods.

11.7 Microbiological Methods for Detection and Quantification of Seafood Pathogens.

11.8 Food Safety Challenges for Aquaculture and the Commercial Fishing Industry.

11.9 Effects of Climate on Waterborne and Foodborne Seafood Pathogens.

11.10 Conclusions.

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12.2 Normal Microflora of Fresh Produce.

12.3 Spoilage of Fresh Produce.

12.4 Human Pathogens Associated with Produce.

12.5 Factors that Influence Survival and Growth of Organisms.

12.6 Microbiological Methods for Detection and Quantification.

12.7 Indicator Microorganisms.

12.8 Sources of Produce Contamination.

12.9 Maintaining Produce Quality and Reducing the Number of Microorganisms.

12.10 Regulations.
12.11 Conclusions.

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13.4 Pathogens.

13.5 Maintaining Product Quality and Reducing Microbial Numbers.

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14.2 History of Canned Foods.

14.3 Categories of Canned Foods.

14.4 Safety of Canned Foods.

14.5 Microbial Spoilage of Canned Foods.

14.6 History of Frozen Foods.

14.7 Principles of Frozen Food Preservation.

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16.2 Use of Spices and Herbs in Foods.

16.3 Antimicrobial Effects.

16.4 Contamination of Spices and Herbs.

16.5 Recalls and Outbreaks.

16.6 Control Procedures.

16.7 Conclusions.

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17.1 Introduction.

17.2 Mayonnaise.

17.3 Salad Dressings and Sauces.

17.4 Acidic Condiments.

17.5 Salads, Sandwiches, and Other Ready-to-Eat Foods Containing Mayonnaise
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18.4 Pathogens in Confectionery Products.

18.5 Sources of Contamination.

18.6 Factors that Influence Survival and Growth of Pathogens and Spoilage Organisms.

18.7 Maintaining Product Quality and Reducing Microbial Numbers.

18.8 Microbiological Methods for Detection and Quantification.

18.9 Regulations.

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19.1 Introduction.

19.2 Risk Assessment Framework.

19.3 Risk Assessment Analytical Tools.

19.4 Qualitative vs. Quantitative Risk Assessments.

19.5 Types of Risk Assessment.

19.6 Predictive Microbiology.


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20.1 Introduction.

20.2 Personnel.

20.3 Buildings and Facilities.

20.4 Sanitation.

20.5 Pest Control.

20.6 Equipment.
20.7 Operations.
20.8 Warehousing and Distribution.
20.9 Sanitation Standard Operating Procedures.

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21.2 Food Sanitation.
21.3 Food Regulations.
21.4 Sanitation Programs.
21.5 Sanitation Program Development.
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21.7 Educational and Training Resources.

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22.3 Conclusions.

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23.2 Thermal vs. Nonthermal Technology.
23.3 Establishment of Specifications for Preservation.
23.4 Technologies Based on Thermal Effects.
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23.6 Conclusions.

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24.2 Traditional Physical Methods of Food Preservation.

24.3 Food Antimicrobials.

24.4 Preservatives from Biological Sources.

24.5 Hurdle Technology.

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25.3 Conclusions.

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26.2 General Quantification Methods.

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27.5 Logistics, Resources, and Applicability.

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28.2 Laboratory Accreditation.

28.3 Proficiency Testing.

28.4 Global Perspectives.

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29.2 The Need for Protective Food Security Programs.

29.3 Vulnerability Assessment.

29.4 Emergency Response and Product Recovery.

29.5 Prevention as the First Line of Defense.

29.6 Development of a Food Security Plan Based on HACCP Principles.

29.7 Evaluating Security Risks and Identifying Hazards.

29.8 Managing Risk: Preventive Measures.

29.9 Security Strategies.

Appendix: An Example.

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30.1 Introduction.
30.2 Applications of Predictive Microbiology in the Food Industry.

30.3 Models.

30.4 Tools in Predictive Microbiology.

30.5 Databases to Support Predictive Microbiology.

30.6 Conclusions.

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31.2 Genetically Modified Foods in the World Market.

31.3 Potential of GMOs to Increase Food Safety.

31.4 Increased Safety of GMOs for the Environment and Human Health.

31.5 Food Safety Issues and Public Concerns Regarding GMOs.

31.6 Conclusions.

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