1 Processed Cheese and Analogues: An Overview (A.Y. Tamime).

1.1 Historical background.

1.2 Diversity of products.

1.2.1 Terminology and/or nomenclature.

1.2.2 Classification.

1.3 Patterns of production.

1.4 Principles of manufacturing stages.

1.4.1 Natural cheeses.

1.4.2 Formulation of a balanced mix.

1.4.3 Emulsifying salts.

1.4.4 Addition of miscellaneous additives.

1.4.5 Heat treatment.

1.4.6 Homogenisation.

1.4.7 Filling machines and packaging materials.

1.5 Conclusions.

References.

2 Current Legislation on Processed Cheese and Related Products (M. Hickey).

2.1 Introduction and background.

2.2 Definitions and standards of identity.

2.2.1 Background and evolution.

2.2.2 Legislation in the European Union (EU).

2.2.3 Legislation in the UK.

2.2.4 Legislation in the Republic of Ireland.

2.2.5 Legislation in Germany.

2.2.6 Legislation in the Netherlands.
2.2.7 Legislation in France.
2.2.8 Legislation in Denmark.
2.2.9 Legislation in Sweden.
2.2.10 Legislation in Spain.
2.2.11 Legislation in Italy.
2.2.12 Legislation in the Czech Republic.
2.2.13 Legislation in Hungary.
2.2.14 Legislation in the USA.
2.2.15 Legislation in Canada.
2.2.16 Legislation in Australia and New Zealand.
2.2.17 Legislation in Japan.
2.2.18 Legislation in Mercosur/Mercosul.
2.2.19 Legislation in Chile.
2.2.20 Legislation in some Middle Eastern countries.
2.2.21 Codex Alimentarius standards.

3.1 Definition of processed cheese products: an introduction.

3.2 Overview of manufacture.
3.2.1 Background.
3.2.2 Manufacture.

3.3 Microstructure of PCPs.
3.4 Principles of processed cheese manufacture.

3.4.1 Destabilisation and dehydration of milk during the manufacture of natural cheese.

3.4.2 Characteristics of protein in natural cheeses.

3.4.3 Effects of heating/shearing cheese (protein).

3.4.4 The interaction of emulsifying salt with cheese protein during processing.

3.5 Effects of natural cheese characteristics on PCPs.

3.5.1 Calcium content.

3.5.2 pH.

3.5.3 Degree of maturity and intact casein content.

3.6 Effects of processing conditions.

3.6.1 Time.

3.6.2 Temperature.

3.6.3 Shear.

3.7 Conclusions.

References.


4.1 Introduction.

4.2 Main types of emulsifying salts.

4.2.1 Citrate.

4.2.2 Phosphate-based.

4.2.3 Other types of emulsifying salts.

4.3 Properties and roles of emulsifying salts used in processed cheese.

4.3.1 Calcium binding/ion exchange.

4.3.2 pH adjustment, buffering and titration behaviour.
4.3.3 Casein dispersion, protein hydration and fat emulsification.

4.3.4 Creaming and structure formation during cooling and storage.

4.3.5 Antimicrobial activity

4.3.6 Crystal formation and other properties of emulsifying salts.

4.4 Selection of emulsifying salt.

4.5 Conclusion.

References.

5 Flavours and Flavourants, Colours and Pigment

5.1 Introduction.

5.2 Types of processed cheese.

5.3 Raw material.

5.4 Flavour.

5.4.1 Natural flavourants.

5.4.2 Chemical flavourants.

5.4.3 Flavour changes.

5.5 Colours.

5.5.1 Natural colours.

5.5.2 Colour decay and changes.

5.5.3 Process colours.

5.6 Sensory attributes of processed cheese.

5.7 Conclusion.

References.

6 Manufacturing Practices of Processed Cheese

6.1 Introduction.
6.2 Some historical background.
6.3 Processed cheese and products.
6.4 Key steps in processing.
6.4.1 Selection of ingredients.
6.4.2 Emulsifying salts.
6.4.3 Preservatives.
6.4.4 Formulation of the cheese blend.
6.4.5 Grinding/shredding.
6.4.6 Heating/cooking.
6.4.7 Miscellaneous processing steps.
6.4.8 Packaging.
6.4.9 Rate of cooling and storage.
6.5 Changes in processed cheese during its shelf-life.
6.6 Conclusions.
References.

7 Processed Cheese Plants and Equipment: A Practical Overview (S. Dixon).

7.1 Introduction.
7.2 Unit operations.
7.2.1 Weighing the ingredients to be processed.
7.2.2 Initial size reduction.
7.2.3 Grinding.
7.2.4 Blending the ingredients to form a standardised cheese mix or blend.
7.2.5 Transferring the standardised cheese blend to a cooking system.
7.2.6 Direct steam injection into the cooking systems.
7.2.7 Filtering the molten cheese.
7.3 Processing plant for the manufacture of processed cheese slices.

7.4 Conclusions.

8 Packaging Materials and Equipment (E.M. Buys and J.F. Mostert).

8.1 Introduction.

8.2 Packaging materials.

8.2.1 General specifications.

8.2.2 Functions of a package.

8.2.3 Types of packaging materials.

8.2.4 Hygiene of packaging material.

8.2.5 Shelf-life and interactions with packaging materials.

8.3 Packaging equipment.

8.3.1 Background.

8.3.2 Portions/wedges.

8.3.3 Blocks.

8.3.4 Sausage shape.

8.3.5 Metal cans.

8.3.6 Tubs, jars, cups and plastic containers.

8.3.7 Collapsible tubes.

8.3.8 Packs with external decoration.

8.3.9 Slices.

8.4 Conclusion.

9 Production of Analogue Cheeses (E.D. O'Riordan, E. Duggan, M. O'Sullivan and N. Noronha).

9.1 Introduction.

9.2 Definition and legislation.
9.3 Applications and advantages of analogue cheese products.

9.4 Manufacture of analogue cheese.

9.4.1 General principles and manufacturing protocol.

9.4.2 Key ingredients used in the production of analogue cheese products.

9.4.3 Formulation.

9.4.4 Processing equipment.

9.5 Factors influencing analogue cheese functionality.

9.5.1 Hydration of protein: impact on cheese functionality.

9.5.2 Effect of compositional change on analogue cheese functionality.

9.6 Developments in analogue cheese.

9.6.1 Protein replacement.

9.6.2 Fat replacement.

9.6.3 Microwave expansion of analogue cheese.

9.7 Future of analogue cheese.

References.


10.1 Introduction.

10.2 HACCP.

10.2.1 Background.

10.2.2 Implementation (theoretical approach).

10.2.3 Implementation (practical approach).

10.2.4 Verification of HACCP.

10.2.5 Monitoring the processing plant.

10.3 Examination of raw materials.
10.3.1 Natural cheeses.
10.3.2 Butter and fat of plant origin.
10.3.3 Dairy powders.
10.3.4 Natural flavouring ingredients.
10.3.5 Emulsifying salts.
10.3.6 Miscellaneous additives.
10.3.7 Water/steam.
10.3.8 Sampling for quality appraisal of the retail product.
10.4 Analysis of chemical composition.
10.5 Microbiological quality and safety of the product.
10.5.1 Introduction and microbiological techniques.
10.5.2 Microbiological safety of the product.
10.5.3 Preliminary treatment of natural cheese milk and effect of certain additives.
10.5.4 Hygienic production/facility: HACCP.
10.5.5 Bacteriological examination.
10.6 Assessment of physical characteristics.
10.6.1 Unmelted characteristics.
10.6.2 Melting characteristics.
10.7 Assessment of the microstructure.
10.7.1 Background.
10.7.2 Some aspects affecting microstructure formation.
10.7.3 Cryo-SEM description of processed cheese microstructure.
10.7.4 Faults in processed cheese products.
10.7.5 Product development.
10.7.6 Application of confocal scanning laser microscopy as a quality control tool in processed cheese manufacture.

10.8 Sensory profiling of processed cheese.

10.8.1 Elements of sensory assessment.

10.8.2 Assessor selection.

10.8.3 Acclimatisation and confirmation.

10.8.4 Sensory vocabulary.

10.8.5 Tasting protocol.

10.8.6 Analysis and interpretation of data.

10.9 Conclusions.

10.10 Acknowledgements.

References.

Appendix: Example of a product quality information as a result of using a HACCP system.