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Milk and Beef titles

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IN AGRICULTURAL SCIENCE



MILK

- Summarises current research on the composition and components of milk, pathogenic risks, rumen biology, digestion and ways of optimising nutrition
- Reviews advances in milk quality, measuring and reducing the environmental impact of dairy farming and understanding and improving welfare of dairy cattle
- Discusses the latest research on genetic factors affecting dairy cattle growth, health, herd management and productivity, including how dairy farming can be improved in the developing world

BEEF

- Reviews current research on measuring and optimising quality traits and how breeding, growth and cattle management affects quality attributes and sensory properties
- Summarises the latest research on pathogens affecting beef, best practice in pathogen detection and safety management on the farm
- Discusses methods for ensuring safety in the food chain, from slaughter to consumer handling of fresh beef



"Beef Volume 1 promises to be a valuable resource for the animal science research community."

Professor John Kennelly, University of Alberta, Canada; also president of the Global Federation of Higher Education Associations for Agriculture and the Life Sciences (GCHERA)

Achieving sustainable production of milk - Vol.1

Milk composition, genetics and breeding

Edited by: Nico van Belzen, Director General of the International Dairy Federation (IDF), Belgium

Part 1 The composition and quality of cow's milk

1. Chemical composition of cow's milk: an overview: *Ying Ma, Harbin Institute of Technology, China*
2. The proteins of milk: *Shane V. Crowley, James A. O' Mahony and Patrick F. Fox, University College Cork, Ireland*
3. Bioactive components in cow's milk: *Young W. Park, Fort Valley State University, USA*
4. Understanding and preventing spoilage of cow's milk: *Gisele LaPointe, University of Guelph, Canada*
5. Understanding and measuring the flavour and colour of cow's milk: *Tanoj Singh, CSIRO, Australia*
6. Sensory evaluation of cow's milk: *Stephanie Clark, Iowa State University, USA*
7. Testing the quality of cow's milk: *Frank Welcome, QMPS Cornell University, USA*
8. Ingredients from milk for use in food and non-food products: from commodity to value-added ingredients: *Thom Huppertz and Inge Gazi, NIZO food research, The Netherlands*

Part 2 Genetics and breeding

9. Genetic factors affecting the lipid composition of cow's milk: *Henk Bovenhuis, Wageningen University, The Netherlands*
10. Genetic factors affecting fertility, growth, health and longevity in dairy cattle: *Joel Ira Weller, Agricultural Research Organization, The Volcani Center, Israel*
11. Using genetic selection in the breeding of dairy cattle: *Julius van der Werf, University of New England, Australia and Jennie Pryce, La Trobe University, Australia*
12. Breeding and management strategies to improve the productivity of dairy cattle: *Divakar J Ambrose, University of Alberta, Canada and John P Kastelic, University of Calgary, Canada*
13. Nutritional strategies to improve nitrogen efficiency and milk protein synthesis in dairy cows: *James D. Ferguson, University of Pennsylvania, USA*



Achieving sustainable production of milk - Vol.2

Safety, quality and sustainability

Edited by: Nico van Belzen, Director General of the International Dairy Federation (IDF), Belgium

Part 1 Ensuring the safety and quality of milk on the farm

1. Pathogens affecting raw milk from cows: *Claire Verraes, Sabine Cardoen and Wendie Claeys, Federal Agency for the Safety of the Food Chain; and Lieve Herman, Institute for Agricultural and Fisheries Research, Belgium*
2. Routes for pathogen contamination of cow's milk on the dairy farm: *Mansel Griffiths, University of Guelph, Canada*
3. Detecting pathogens in milk on dairy farms: key issues for developing countries: *Delia Grace, Silvia Alonso, Johanna Lindahl, Sara Ahlberg and Ram Pratim Deka, International Livestock Research Institute, Kenya*
4. Mastitis, cow's milk quality and safety: *Paolo Moroni, Cornell University, USA*
5. Chemical contaminants in milk: *Bernadette O'Brien, Teagasc, Ireland*
6. Detecting and preventing contamination of dairy cattle feed: *Delia Grace, International Livestock Research Institute, Kenya*
7. Minimising the development of antimicrobial resistance on dairy farms: appropriate use of antibiotics for the treatment of mastitis: *Pamela L. Ruegg, University of Wisconsin-Madison, USA*
8. Food safety management systems on dairy farms: *Dr Réjean Bouchard, Formerly Dairy Farmers of Canada, Canada*
9. Developments in milking machinery: *Douglas Reinemann, University of Wisconsin-Madison, USA*

Part 2 Sustainability

10. The environmental impact of dairy farming: an overview: *Norman Scott, Cornell University, USA*
11. Setting environmental targets for dairy farming: *Sophie Bertrand, French Dairy Board (CNIEL), France*
12. Breeding and nutritional strategies to reduce greenhouse gas emissions in dairy farming: *Joanne Knapp, Fox Hollow Consulting LLC, USA*

13. Grassland management to minimise the environmental impact of dairy farming: *Margaret E. Graves and Ralph C. Martin, University of Guelph, Canada*
14. Water and energy management to minimise the environmental impact of dairy farming: *John Upton, Teagasc, Ireland*
15. Managing manure on dairy farms: *Theun Vellinga, Wageningen University, The Netherlands*
16. Ensuring biodiversity in dairy farming: *Ben Tyson, Central Connecticut State University, USA; Liza Storey and Nick Edgar, New Zealand Landcare Trust, New Zealand; Jonathan Draper, Central Connecticut State University, USA; and Christine Unson, Southern Connecticut State University, USA*
17. Organic dairy farming and sustainability: *Veronika Maurer, Research Institute of Organic Agriculture (FiBL), Switzerland*
18. Trends in dairy farming and milk production: the case of the UK and New Zealand: *Alison Bailey, Lincoln University, New Zealand*
19. Assessing the overall impact of dairy farming: *Jeremy Hill, Fonterra Co-operative Group Ltd, New Zealand*

Part 3 Improving quality, safety and sustainability in developing countries

20. Implementing safety, quality and environmental management systems for dairy farming in developing countries: *Richard Baines, Royal Agricultural University, UK*
21. Improving smallholder dairy farming in tropical Asia: *John Moran, Profitable Dairy Systems, Australia*
22. Improving smallholder dairy farming in Africa: *Julie Ojango, International Livestock Research Institute, Kenya*
23. Health and welfare issues in organic dairying: *Gidi Smolders, Wageningen University, The Netherlands*



Achieving sustainable production of milk - Vol.3

Dairy herd management and welfare

Edited by: John Webster, University of Bristol, UK

Part 1 Welfare of dairy cattle

1. Understanding the behaviour of dairy cattle: *Clive Phillips, University of Queensland, Australia*
2. Key issues in the welfare of dairy cattle: *Jan Hultgren, Swedish University of Agricultural Sciences, Sweden*
3. Housing and the welfare of dairy cattle: *Jeffrey Rushen, University of British Columbia, Canada*
4. Genetic selection, milk yield and welfare of dairy cattle: *Jennie Pryce, DEPI-Victoria/La Trobe University, Australia*
5. Ensuring the welfare of culled dairy cows during transport and slaughter: *Carmen Gallo and Ana Strappini, Universidad Austral de Chile, Chile*
6. Ensuring the welfare of lactating cows: *Pilar Sepulveda, University of Southern Chile - Austral, Chile*
7. Ensuring the health and welfare of dairy calves and heifers: *Ken Leslie, University of Guelph, Canada*

Part 2 Nutrition of dairy cattle

8. Rumen microbiology and digestion: *Leluo Guan, University of Alberta, Canada*
9. Biochemical and physiological determinants of feed efficiency in dairy cattle: *John McNamara, Washington State University, USA*
10. Feed evaluation and formulation to maximise nutritional efficiency in dairy cattle: *Pekka Huhtanen, Swedish University of Agricultural Sciences, Sweden*
11. The influence of cow's diet on milk composition and nutritional value: *Vern Osborne, University of Guelph, Canada*
12. Nutrition management of housed dairy cattle in intensive systems: *Michel Wattiaux, University of Wisconsin-Madison, USA*
13. Nutrition management of grazing dairy cattle: *John Roche, Dairy NZ Ltd, New Zealand*
14. The use and abuse of cereals, legumes and crop residues in rations for dairy cattle: *Michael Blummel, International Livestock Research Institute, Ethiopia*
15. Feed supplements for dairy cattle: *Jamie Newbold, University of Wales, Aberystwyth, UK*

Part 3 Health of dairy cattle

16. Prevention and management of disorders of digestion and metabolism: *Gregory Penner, University of Saskatchewan, USA*
17. Management of dairy cows in transition and at calving: *Kenneth Nordlund, University of Wisconsin-Madison, USA*
18. Causes, prevention and management of infertility: *Alexander Evans, University College Dublin, Ireland*
19. Detecting and managing mastitis in dairy herds: *Paolo Moroni, Cornell University, USA*
20. Preventing and managing lameness in dairy cows: *Nick Bell, The Royal Veterinary College, UK*
21. Control of infectious diseases in dairy cattle: *Wendela Wapenaar, University of Nottingham, UK*
22. Prevention and control of parasites in dairy cattle: *Jacqui Matthews, Moredun Research Institute, UK*
23. Genetic variation in immunity and disease resistance in dairy cows and other livestock: *Michael Stear, Karen Fairlie-Clarke, and Nicholas Jonsson, University of Glasgow, UK; Bonnie Mallard, University of Guelph, Canada; and David Groth, Curtin University, Australia*
24. Use and abuse of medicines in dairy health control: *David Barrett, University of Bristol, UK*
25. Dairy herd health management: an overview: *Jonathan Statham, Bishopton Veterinary Group and RAFT Solutions Ltd, UK*



"There can be few people in the world better qualified to edit a new book about nutrition, health and welfare of dairy cattle than John Webster. These have been the passions of a long and distinguished academic career. He has assembled a strong team of authors to provide comprehensive coverage of key topics, as well as the wide range of dairy production systems across developed and developing countries."

Richard Dewhurst, Professor of Ruminant Nutrition and Production Systems, SRUC, Edinburgh, UK

Author Biographies

Milk Volumes 1 & 2

Dr Nico van Belzen is Director-General of the International Dairy Federation (IDF). He has occupied senior roles in both industry and research organisations, both as Head of the Research and Analysis department at the ingredients division of Campina and as Executive Director of the European Branch of the International Life Sciences Institute (ILSI).

Milk Volume 3

Dr John Webster is Emeritus Professor in Animal Husbandry at the University of Bristol, UK. Amongst his many achievements, Professor Webster was recently awarded an honorary degree by the Royal Veterinary College for his research in animal science, as well as the Universities Federation for Animal Welfare (UFAW) Medal for Outstanding Contributions to Animal Welfare. He established the Animal Welfare and Behaviour Group at the University of Bristol, one of the largest and most highly-regarded of its kind in the world, and was a founder member of the Farm Animal Welfare Council which pioneered the Five Freedoms for farm animals.

Beef Volume 1

Dr Gary Acuff is Professor of Food Microbiology and Director of the Center for Food Safety at Texas A&M University, USA and Fellow of the International Association for Food Protection and the American Academy of Microbiology.

Dr James Dickson is Professor in the Department of Animal Science at Iowa State University, USA and Fellow of the International Association for Food Protection and the American Academy of Microbiology.

Beef Volume 2

Dr Michael Dikeman is Emeritus Professor of Meat Science at Kansas State University, USA. He is a past President of the American Meat Science Association and of the Federation of American Societies of Food Animal Sciences (FASFAS – now FASS). His many honours include the American Society of Animal Science Fellow Award and induction into the Meat Industry Hall of Fame for his outstanding contribution to meat science. He is joint Editor-in-Chief of the three-volume Encyclopaedia of Meat Science.

BEEF

Ensuring safety and quality in the production of beef - Vol.1

Safety

Edited by: Gary Acuff, Texas A&M University, USA and James Dickson, Iowa State University, USA

Part 1 Ensuring safety on the farm

1. Pathogens affecting beef: *James E. Wells and Elaine D. Berry, US Meat Animal Research Center, USDA-ARS, USA*
2. Methods for detecting pathogens in the food chain for beef: an overview: *Pina Fratamico, Mick Bosilevac and John Schmidt, USDA-ARS, USA*
3. Methods for detecting pathogens in the food chain for beef: detecting particular pathogens: *Pina Fratamico, Mick Bosilevac and John Schmidt, USDA-ARS, USA*
4. Food safety management on farms producing beef: *Peter Paulsen, Frans J. M. Smulders and Friederike Hilbert, University of Veterinary Medicine, Austria*
5. Ensuring the safety of feed for beef cattle: *Grant Dewell, Iowa State University, USA*
6. Detecting veterinary residues in beef cattle: *Lynn Post, FDA/Texas A&M University, USA*
7. Preventing the development of antimicrobial resistance on farms

producing beef: *Paula Cray, North Carolina State University, USA*

Part 2 Ensuring safety at slaughter

8. Hygienic management of slaughterhouse operations: *Jennifer Martin, Colorado State University, USA*
9. Beef carcass inspection methods: *Dr Bill James, Formerly USDA-FSIS*
10. Maintaining the safety and quality of beef carcass meat: *James Dickson, Iowa State University, USA*
11. Optimizing the microbial shelf-life of fresh beef: *Declan J. Bolton, Teagasc Food Research Centre (Ashtown), Ireland*
12. Educating consumers in the safe handling of beef: *Janet Riley, North American Meat Institute, USA*
13. Traceability systems in the food chain for beef: from farm to slaughter: *Daniel Buskirk, Michigan State University, USA*



Ensuring safety and quality in the production of beef - Vol.2

Quality

Edited by: Michael Dikeman, Kansas State University, USA

Part 1 Breeding and growth

1. Biological types of cattle: carcass and meat quality: *M. A. Price, University of Alberta, Canada*
2. Traditional animal breeding of cattle to improve carcass composition and meat quality: *Matt Spangler, University of Nebraska, USA*
3. Muscle fibre types and beef quality: *Thierry Astruc, INRA, France*
4. Factors affecting fat content and distribution of fat in cattle and carcasses: *Stephen B. Smith, Texas A&M University, USA*

Part 2 Management of cattle

5. Nutritional management of cattle, with emphasis on 'finishing' systems on either pasture, high forage or high grain diets: *Chris Richards, Oklahoma State University, USA*
6. Effects of metabolic modifiers on growth, carcass composition, marbling, and tenderness: *Brad Johnson, Texas Tech University, USA*
7. Understanding the effects of handling, transportation, lairage and slaughter of cattle: *Mike Cockram - University of Prince Edward Island, Canada*
8. The effects of carcass chilling and electrical stimulation on visual beef quality and palatability: *Phillip E. Strydom, Agricultural Research Council and University of Stellenbosch, South Africa*

Part 3 Quality traits

9. Beef colour development and variation: *Ranjith Ramanathan, Oklahoma State University, USA and Richard A. Mancini, University of Connecticut, USA*

10. Beef carcass grading and classification: *Michael E. Dikeman, Kansas State University, USA*
11. Branded beef programs, including natural and organic: *Dustin Boler, University of Illinois, USA*
12. Ageing, physical and chemical methods for improving tenderness and palatability of beef: *D. L. Hopkins, NSW Department of Primary Industries, Centre for Red Meat and Sheep Development, Australia*
13. Factors affecting flavour development in beef: *Chris R. Kerth, Texas A&M University, USA*
14. Packaging systems for beef retailers and their effects on visual quality and palatability: *J. W. S. Yancey, University of Arkansas, USA*
15. Measuring and assessing beef quality and sensory traits for retailers and consumers: *Derek A. Griffing and Christy L. Bratcher, Auburn University, USA*
16. Role of beef in human nutrition and health: *Chunbao Li, Nanjing Agricultural University, China*

Part 4 Emerging trends

17. Future of DNA technology for improving beef quality – marbling, tenderness, and flavour: *Elly Ana Navajas, Instituto Nacional de Investigación Agropecuaria, Uruguay*
18. The sustainability and 'carbon footprints' of conventional and alternative beef production systems: *Jude L. Capper, Livestock Sustainability Consultancy, UK*
19. Controversies involving fat content of beef and human health: *Penny Kris-Etherton, Pennsylvania State University, USA*



"Professor Dikeman appears to again have assembled an absolutely outstanding cast of experts to develop a foundational text dealing with beef quality. Beef Volume 2 will no doubt serve as an extremely important reference to students and industry. Congratulations to Professor Dikeman and all of the authors on a marvellous effort!"

Professor Keith Belk, Colorado State University, USA

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climate•SMART•publishing IN AGRICULTURAL SCIENCE

What is 'climate-smart-publishing' and how is Burleigh Dodds Science Publishing achieving it?

Let's start with 'climate-smart'. It is widely recognised that agriculture is a significant contributor to global warming and climate change. It has been estimated that agriculture is responsible for 10-12% of greenhouse gas emissions. This figure rises as high as 24% if forestry and other land use is included, taking into account such factors as deforestation to clear land for more crops and livestock.

Agriculture needs to reduce its environmental impact and adapt to current climate change whilst still feeding a growing population i.e. become more 'climate-smart'. Burleigh Dodds Science Publishing is playing its part in achieving this by bringing together key research on making the production of the world's most important crops and livestock products more sustainable. Our aim is to build a foundation of knowledge on which researchers can build to meet the challenge of climate-smart agriculture.

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In these ways we are using 'smart-publishing' to help achieve 'climate-smart' agriculture.



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