

Methods in Gut Microbial Ecology for Ruminants

Edited by
Harinder P.S. Makkar and
Christopher S. McSweeney



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**Rod I. Mackie, Bryan White, Richard E.
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Methods in Gut Microbial Ecology for Ruminants Harinder P.S. Makkar, Christopher S. McSweeney, 2006-02-23

As a result of various human activities such as increase in human population, decrease in arable land due to soil degradation, urbanization, industrialization, and associated increase in the demand for livestock products, dramatic changes are occurring in the global ruminant livestock sector. These changes include shifts in the size of regional livestock populations and in the types of management and feeding systems under which ruminant livestock are held, and increased demand for a wider range of quality attributes from animal agriculture, not just of the products themselves but also of the methods used in their production. The livestock sector will need to respond to

new challenges of increasing livestock productivity while protecting environment and human health and conserving biodiversity and natural resources. The microorganisms in the digestive tracts of ruminant livestock have a profound influence on the conversion of feed into end products which can impact on the animal and the environment. As the livestock sector grows, particularly in developing countries, there will be an increasing need to understand these processes for better management and use of both feed and other natural resources that underpin the development of sustainable feeding systems. *Advances*

In The Understanding of The Commensal Eukaryota And Viruses Of The Herbivore Gut Joan Elizabeth Edwards, Sumit Singh Dagar, Sandra Kittelmann, Rosalind Ann Gilbert, 2021-04-07 *Sheep Production Adapting to Climate Change* Veerasamy

Sejian, Raghavendra Bhatta, John Gaughan, Pradeep Kumar Malik, S.M.K Naqvi, Rattan Lal, 2017-06-20 This book presents a compilation of the latest findings from reputed researchers around the globe covering in detail climate change and its effects on sheep production. In the current global climate change scenario, information related to its impact on livestock agriculture is lacking. The negative impacts of climate change are already being felt by all livestock species. Further, the mitigation and amelioration strategies that are applicable for one species may not hold true for another. As such concerted research efforts are needed to identify species-specific strategies for mitigation and adaptation. With that goal in mind, this book is the first of its kind to gather comprehensive information pertaining to the impact of climate change on various aspects of sheep production. It also sheds light on the role of sheep with regard to the global greenhouse gas pool. The book highlights the status quo of sheep production from climate change perspectives and projects the significance of adapting future sheep production to the challenges posed by climate change. It addresses in detail the various adaptations, methane mitigation, and amelioration strategies needed to sustain sheep production in the future. In addition, the book presents development plans and policies that will allow the sheep industry to cope with current climate changes and strategies that will lessen future impacts. Bringing together essential information prepared by world-class researchers hailing from different agro-ecological zones, this book offers a unique resource for all researchers, teachers, and students associated with sustaining the sheep production in the face of global change. **Advances in Laminitis, Part I, An Issue of Veterinary Clinics: Equine**

Practice Christopher C. Pollitt, 2010-05-10 Articles include The Anatomy and Physiology of the Lamellar Dermal Epidermal Interface Carbohydrate Alimentary Overload Laminitis Events in the Hindgut Therapeutic Hypothermia cryotherapy to Prevent and Treat Acute Laminitis Acute Laminitis Supportive Medical Therapy First Aid for the Foot Therapeutic and Mechanical Support Serial Venography after Carbohydrate Induced Laminitis Venography and Its Clinical Application in North America Chronic Laminitis Strategic Hoof Wall Resection The Lamellar Wedge of Chronic Laminitis Lysis of the Distal Phalanx in Chronic Laminitis Chronic Laminitis Foot Support Clogs Homecare for the Chronic Laminitis Case The Pharmacological Basis for the Treatment of Developmental and Acute Laminitis and Black Walnut Extract Laminitis An Inflammatory Model Gut Microbiome Modulation in Ruminants: Enhancing Advantages and Minimizing Drawbacks Alejandro Belanche, Amlan Kumar Patra, Diego P. Morgavi, Garret Suen, Charles James Newbold, David R. Yanez-Ruiz, 2021-02-17

Rumen Microbiology: From Evolution to Revolution Anil Kumar Puniya, Rameshwar Singh, Devki Nandan Kamra, 2015-07-11 This book offers an in depth description of different groups of microbes i.e. bacteria protozoa fungi and viruses that exist in the rumen microbial community and offers an overview of rumen microbiology the rumen microbial ecosystem of domesticated ruminants and rumen microbial diversity It provides the latest concepts on rumen microbiology for scholars researchers and teachers of animal and veterinary sciences With this goal in mind throughout the text we focus on specific areas related to the biology and complex interactions of the microbes in rumen integrating significant key issues in each respective area We also discuss rumen manipulation with plant secondary metabolites microbial feed additives utilization of organic acids selective inhibition of harmful rumen microbes and omics approaches to manipulating rumen microbial functions A section on the exploration and exploitation of rumen microbes addresses topics including the current state of knowledge on rumen metagenomics rumen an underutilized niche for industrially important enzymes and ruminal fermentations to produce fuels We next turn our attention to commercial applications of rumen microbial enzymes and to the molecular characterization of euryarchaeal communities within an anaerobic digester A section on intestinal disorders and rumen microbes covers acidosis in cattle urea ammonia metabolism in the rumen and nitrate nitrite toxicity in ruminant diets Last the future prospects of rumen microbiology are examined based on the latest developments in this area In summary the book offers a highly systematic collection of essential content on rumen microbiology **Improving rumen function** Dr Chris McSweeney, Prof. Roderick I. Mackie, 2020-06-23 Reviews advances in understanding the role of different types of rumen microbiota such as archaea anaerobic fungi viruses and the rumen wall microbial community Covers both the way the rumen processes fibre and protein and factors affecting outputs such as energy affecting animal health lipids affecting meat and milk quality and methane emissions affecting environmental impact Comprehensive review of the range of nutritional strategies to optimise rumen function such as the role of pasture silage cereal feed plant secondary compounds and probiotics *Rumen microbiome dynamics and their implications in*

health and environment Robert W Li, Christina D. Moon, Diego P. Morgavi, 2023-07-06 **The Use of Phytogetic Feed Additives to Enhance Productivity and Health in Ruminants** Ahmed E. Kholif, Uchenna Anele, Amlan Kumar Patra, Zora Varadyova, 2021-07-02 *Microbial Ecology of Growing Animals* Wilhelm Holzapfel, Patrick Naughton, 2005-04-19

The complexity of the microbial population of the animal gastro intestinal tract has been recognised long ago. However, thus far, investigations have been limited to a few major groups considered to be dominating and pathogens that are detrimental and may cause diseases and concomitant financial losses in the production animal. Thanks to the latest developments including improved microbiological detection and sampling techniques and the application of molecular tools to monitor the presence of specific strains in the intestine, our knowledge has increased rapidly in recent years. In addition, new approaches towards improving and/or stabilising animal health are addressed with special emphasis on probiotics and also with regard to the use of selected bacterial strains as vehicles for delivery of pharmaceutically active compounds to the mucosa. The book is unique in several respects, not only by its coverage of an extremely wide area in animal gut microbiology but also by the fact that production animals such as fish and reindeer are included. Scope and treatment of the subject matter and the kind of information that can be found in the volume. Colonisation and development, succession and mucosal surface composition of the normal microbial population flora in the healthy animal are addressed, whilst extensive information is given on diverse and dominating bacterial populations of different animal types. Reference is also made to those microbial groups considered to be of special benefit to the health and immune protection of the young animal. The development and application of models of the Gastro Intestinal tract provides a solid basis for studying gut microbial interactions, whilst molecular approaches and the use of molecular tools to monitor the presence of specific strains in the intestine is treated in a comprehensive manner. Wide coverage of different animal types and their gut microbial ecology. Extensive and partly new information on the major microbial groups associated with the animal gastro intestinal tract. The book is unique and partly new information and up-to-date information provided in the chapters as a whole.

Microbial Metabolomics David J. Beale, Konstantinos A. Kouremenos, Enzo A. Palombo, 2016-12-05. This book brings together contributions from global experts who have helped to facilitate the exciting and rapid advances that are taking place in microbial metabolomics. The main application of this field is in clinical and veterinary microbiology, but there is a great potential to apply metabolomics to help to better understand complex biological systems that are dominated by multiple species microbial populations exposed to changing growth and nutritional conditions. In particular, environmental e.g. water, soil, food e.g. microbial spoilage, food pathogens and agricultural and industrial applications are seen as developing areas for microbial metabolomics. As such, the book includes contributions with clinical, environmental and industrial perspectives.

Nutrients in Dairy and Their Implications for Health and Disease Ronald Ross Watson, Robert J Collier, Victor R Preedy, 2017-06-19. *Nutrients in Dairy and Their Implications for Health and Disease* addresses various dairy products and their impact on health. This comprehensive

book is divided into three sections and presents a balanced overview of the health benefits of milk and milk products. Summaries capture the most salient points of each chapter and the importance of milk and its products as functional foods is addressed throughout. Presents various dairy products and their impact on health. Provides information on dairy milk as an important source of micro and macronutrients that impact body functions. Addresses dietary supplements and their incorporation into dairy products.

Climate Change Impact on Livestock: Adaptation and Mitigation Veerasamy Sejian, John Gaughan, Lance Baumgard, Cadaba Prasad, 2015-03-31. This volume addresses in detail both livestock's role in climate change and the impacts of climate change on livestock production and reproduction. Apart from these cardinal principles of climate change and livestock production, this volume also examines the various strategies used to mitigate livestock-related GHG emissions and those which can reduce the impacts of climate change on livestock production and reproduction. Presenting information and case studies collected and analyzed by professionals working in diversified ecological zones, the book explores the influence of climate change on livestock production across the globe. The most significant feature of this book is that it addresses in detail the different adaptation strategies and identifies targets for different stakeholders in connection with climate change and livestock production. Further, it puts forward development plans that will allow the livestock industries to cope with current climate changes and strategies that will mitigate the effects by 2025. Lastly, it provides researchers and policymakers several researchable priorities to help develop economically viable solutions for livestock production with less GHG emissions, promoting a cleaner environment in which human beings and livestock can live in harmony without adverse effects on productivity. Given that livestock production systems are sensitive to climate change and at the same time are themselves a contributor to the phenomenon, climate change has the potential to pose an increasingly formidable challenge to the development of the livestock sector. However, there is a dearth of scientific information on adapting livestock production to the changing climate. As such, well-founded reference material on sustaining livestock production systems under the changing climate scenarios in different agro-ecological zones of the world is essential. By methodically and extensively addressing all aspects of climate change and livestock production, this volume offers a valuable tool for understanding the hidden intricacies of climatic stress and its influence on livestock production.

Engineering Rumen Metabolic Pathways: Where We Are, and Where Are We Heading Emilio M. Ungerfeld, C. James Newbold, 2018-03-13. Ruminants were domesticated in the Middle East about 10,000 years ago and have since become an inseparable part of human diet, society, and culture. Ruminants can transform inedible plant fiber and non-protein nitrogen into meat, milk, wool, and traction, thus allowing human utilization of non-tillable land and industrial by-products. The nutritional flexibility of ruminants is conferred by the rumen's complex microbial community. Driven by rising income and population growth in emergent economies, the global demand for livestock products, including milk and meat from ruminants, has been increasingly growing and is predicted to continue growing in the next few decades. The increase in production

necessary to satisfy this rising demand is putting much pressure on already dwindling natural resources There are also concerns about the emissions of methane and nitrous oxide potent greenhouse gases associated to ruminant production The need to make ruminant production more efficient in the use of natural resources poses a big challenge to ruminant science and within it rumen microbiology Recent years have seen important advances in basic and applied rumen microbiology and biochemistry The knowledge generated has significant implications for the efficiency and sustainability of ruminant production and the quality of ruminant products for human health The present compilation is an update of recent advances in rumen microbiology and ruminant digestion and fermentation including original research reviews and hypothesis and theory articles We hope that the experimental results discussion models and ideas presented herein are useful to foster future research contributing to sustainable ruminant production

Manual of Environmental Microbiology Cindy H. Nakatsu, Robert V. Miller, Suresh D. Pillai, 2020-08-11 The single most comprehensive resource for environmental microbiology Environmental microbiology the study of the roles that microbes play in all planetary environments is one of the most important areas of scientific research The Manual of Environmental Microbiology Fourth Edition provides comprehensive coverage of this critical and growing field Thoroughly updated and revised the Manual is the definitive reference for information on microbes in air water and soil and their impact on human health and welfare Written in accessible clear prose the manual covers four broad areas general methodologies environmental public health microbiology microbial ecology and biodegradation and biotransformation This wealth of information is divided into 18 sections each containing chapters written by acknowledged topical experts from the international community Specifically this new edition of the Manual Contains completely new sections covering microbial risk assessment quality control and microbial source tracking Incorporates a summary of the latest methodologies used to study microorganisms in various environments Synthesizes the latest information on the assessment of microbial presence and microbial activity in natural and artificial environments The Manual of Environmental Microbiology is an essential reference for environmental microbiologists microbial ecologists and environmental engineers as well as those interested in human diseases water and wastewater treatment and biotechnology

Anaerobes in Biotechnology Rajni Hatti-Kaul, Gashaw Mamo, Bo Mattiasson, 2016-11-21 This book review series presents current trends in modern biotechnology The aim is to cover all aspects of this interdisciplinary technology where knowledge methods and expertise are required from chemistry biochemistry microbiology genetics chemical engineering and computer science Volumes are organized topically and provide a comprehensive discussion of developments in the respective field over the past 3 5 years The series also discusses new discoveries and applications Special volumes are dedicated to selected topics which focus on new biotechnological products and new processes for their synthesis and purification In general special volumes are edited by well known guest editors The series editor and publisher will however always be pleased to receive suggestions and supplementary information Manuscripts are accepted in English

Environmental and Agricultural Microbiology Bibhuti Bhusan Mishra, Suraja Kumar Nayak, Swati Mohapatra, Deviprasad Samantaray, 2021-09-22 *Environmental and Agricultural Microbiology* Uniquely reveals the state of the art microbial research advances in the environment and agriculture fields *Environmental and Agricultural Microbiology Applications for Sustainability* is divided into two parts which embody chapters on sustenance and life cycles of microorganisms in various environmental conditions their dispersal interactions with other inhabited communities metabolite production and reclamation Though books pertaining to soil agricultural microbiology environmental biotechnology are available there is a dearth of comprehensive literature on the behavior of microorganisms in the environmental and agricultural realm Part 1 includes bioremediation of agrochemicals by microalgae detoxification of chromium and other heavy metals by microbial biofilm microbial biopolymer technology including polyhydroxyalkanoates PHAs and polyhydroxybutyrates PHB their production degradability behaviors and applications Biosurfactants production and their commercial importance are also systematically represented in this part Part 2 having 9 chapters facilitates imperative ideas on approaches for sustainable agriculture through functional soil microbes next generation crop improvement strategies via rhizosphere microbiome production and implementation of liquid biofertilizers mitigation of methane from livestock chitinases from microbes extremozymes an enzyme from extremophilic microorganism and their relevance in current biotechnology lithobiontic communities and their environmental importance have all been comprehensively elaborated In the era of sustainable energy production biofuel and other bioenergy products play a key role and their production from microbial sources are frontiers for researchers The final chapter unveils the importance of microbes and their consortia for management of solid waste in amalgamation with biotechnology Audience The book will be read by environmental microbiologists biotechnologists chemical and agricultural engineers

In vitro screening of plant resources for extra-nutritional attributes in ruminants: nuclear and related methodologies Philip E. Vercoe, Harinder P.S. Makkar, Anthony C. Schlink, 2009-12-01 The aim of this manual is to provide a comprehensive guide to the methods involved in collecting preparing and screening plants for bioactive properties for manipulating key ruminal fermentation pathways and against gastrointestinal pathogens The manual will better equip the reader with methodological approaches to initiate screening programmes to test for bioactivity in native plants and find natural alternatives to chemicals for manipulating ruminal fermentation and gut health The manual provides isotopic and non isotopic techniques to efficiently screen plants or plant parts for a range of potential bioactives for livestock production Each chapter has been contributed by experts in the field and methods have been presented in a format that is easily reproducible in the laboratory It is hoped that this manual will be of great value to students researchers and those involved in developing efficient and environmentally friendly livestock production systems

Gastrointestinal Microbiology Roderick Mackie, Bryan White, 2012-12-06 Extremely diverse and complicated bacterial and protozoan populations inhabit the rumen and intestinal tract of animals and there is a delicate balance among the

individual populations within this complex microbial community This authoritative edited volume the first in a two volume set reviews the gut environment and the fermentations taking place in animal digestive tracts It is an essential source of reference for microbial ecologists and physiologists medical microbiologists and gastroenterologists biochemists nutritionists veterinarians and animal scientists and wildlife ecologists

Gastrointestinal Microbiology Rod I. Mackie, Bryan White, Richard E. Isaacson, 1997-01-31 Extremely diverse and complicated bacterial and protozoan populations inhabit the rumen and intestinal tract of animals and there is a delicate balance among the individual populations within this complex microbial community This authoritative edited volume the first in a two volume set reviews the gut environment and the fermentations taking place in animal digestive tracts It is an essential source of reference for microbial ecologists and physiologists medical microbiologists and gastroenterologists biochemists nutritionists veterinarians and animal scientists and wildlife ecologists

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