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KEY=ANTIMICROBIAL - CERVANTES NEVEAH

TACKLING ANTIBIOTIC RESISTANCE FROM A FOOD SAFETY PERSPECTIVE IN EUROPE

Antibiotics have revolutionized the treatment of infectious diseases. But their use and misuse have resulted in the development and spread of antibiotic resistance. This is now a significant health problem: each year in the European Union alone, over 25 000 people die from infections caused by antibiotic-resistant bacteria. Antibiotic resistance is also a food safety problem: antibiotic use in food animals -for treatment, disease prevention or growth promotion - allows resistant bacteria and resistance genes to spread from food animals to humans through the food-chain. This publication explores the options for prevention and containment of antibiotic resistance in the food-chain through national coordination and international cooperation, including the regulation and reduction of antibiotic use in food animals, training and capacity building, surveillance of resistance trends and antibiotic usage, promotion of knowledge and research, and advocacy and communication to raise awareness of the issues. This publication is primarily intended for policy-makers and authorities working in the public health, agriculture, food production and veterinary sectors, and offers them ways to take a holistic, intersectoral, multifaceted approach to this growing problem.

FS102109

EU HARMONISED SURVEILLANCE OF ANTIMICROBIAL RESISTANCE (AMR) IN BACTERIA FROM RETAIL MEATS (YEAR 1).

ANTIMICROBIAL RESISTANCE AND FOOD SAFETY

METHODS AND TECHNIQUES

Elsevier *Antimicrobial Resistance and Food Safety: Methods and Techniques* introduces antimicrobial resistant food-borne pathogens, their surveillance and epidemiology, emerging resistance and resistant pathogens. This analysis is followed by a systematic presentation of currently applied methodology and technology, including advanced technologies for detection, intervention, and information technologies. This reference can be used as a practical guide for scientists, food engineers, and regulatory personnel as well as students in food safety, food microbiology, or food science. Includes analysis of all major pathogens of concern Provides many case studies and examples of fundamental research findings Presents recent advances in methodologies and analytical software Demonstrates risk assessment using information technologies in foodborne pathogens

CHANGING THE CULTURE 2019-2024

ONE HEALTH : TACKLING ANTIMICROBIAL RESISTANCE IN NORTHERN IRELAND : A FIVE-YEAR ACTION PLAN

IMPROVING FOOD SAFETY THROUGH A ONE HEALTH APPROACH

WORKSHOP SUMMARY

National Academies Press *Globalization of the food supply has created conditions favorable for the emergence, reemergence, and spread of food-borne pathogens-compounding the challenge of anticipating, detecting, and effectively responding to food-borne threats to health. In the United States, food-borne agents affect 1 out of 6 individuals and cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths each year. This figure likely represents just the tip of the iceberg, because it fails to account for the broad array of food-borne illnesses or for their wide-ranging repercussions for consumers, government, and the food industry-both domestically and internationally. A One Health approach to food safety may hold the promise of harnessing and integrating the expertise and resources from across the spectrum of multiple health domains including the human and veterinary medical and plant pathology communities with those of the wildlife and aquatic health and ecology communities. The IOM's Forum on Microbial Threats hosted a public workshop on December 13 and 14, 2011 that examined issues critical to the protection of the nation's food supply. The workshop explored existing knowledge and unanswered questions on the nature and extent of food-borne threats to health. Participants discussed the globalization of the U.S. food supply and the burden of illness associated with foodborne threats to health; considered the spectrum of food-borne threats as well as illustrative case studies; reviewed existing research, policies, and practices to prevent and mitigate foodborne threats; and, identified opportunities to reduce future threats to the nation's food supply through the use of a "One Health" approach to food safety. Improving Food Safety Through a One Health Approach: Workshop Summary covers the events of the workshop and explains the recommendations for future related workshops.*

THE TRAVEL, FOOD POISONING AND ANTIBIOTIC RESISTANCE STUDY

FINAL REPORT

CHALLENGES TO TACKLING ANTIMICROBIAL RESISTANCE ECONOMIC AND POLICY RESPONSES

ECONOMIC AND POLICY RESPONSES

OECD Publishing *Antimicrobial resistance (AMR) is a biological mechanism whereby a microorganism evolves over time to develop the ability to become resistant to antimicrobial therapies such as antibiotics. The drivers of and potential solutions to AMR are complex, often spanning multiple sectors. The internationally recognized response to AMR advocates for a 'One Health' approach, which requires policies to be developed and implemented across human, animal, and environmental health.*

FOOD SAFETY

THE AGRICULTURAL USE OF ANTIBIOTICS AND ITS IMPLICATIONS FOR HUMAN HEALTH : REPORT TO THE HONORABLE TOM HARKIN, RANKING MINORITY MEMBER, COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY, U.S. SENATE

FOODBORNE ANTIMICROBIAL RESISTANCE

COMPENDIUM OF CODEX STANDARDS

Food & Agriculture Org. *Antimicrobial resistance (AMR) is a serious global health threat and a food safety issue of primary concern. Governments and international organizations have recognized that the issue has to be approached in a multidisciplinary manner, addressing animal, plant and human health as well as the environment under the One Health approach. This publication brings together the three Codex texts, two guidelines and a code of practice, that will support governments in designing and running a successful strategy to tackle foodborne AMR.*

ASSESSMENT OF THE RISKS OF TRANSFERRING ANTIBIOTIC RESISTANCE DETERMINANTS FROM TRANSGENIC PLANTS TO MICRO-ORGANISMS

FOOD SAFETY ECONOMICS

INCENTIVES FOR A SAFER FOOD SUPPLY

Springer *This book examines the economic incentives for food safety in the private marketplace and how public actions have helped shape those incentives. Noted contributors analyze alternative public health protection efforts and the benefits and costs associated with these actions to understand: why an excess of foodborne illness occurs what policies have worked best how regulations have evolved what the path forward to better control of pathogens in the U.S. and the international food supply chain might look like While the first third of the book builds an economic framework, the remaining chapters apply economics to specific food safety issues. Numerous chapters explore economic decision making within individual companies, revealing the trade-offs of the costs of food safety systems to comply with regulations vs. non-compliance which carries costs of possible penalties, reputation damage, legal liability suits, and sales reduction. Pathogen control costs are examined in both the short run and long run. The book's unique application of economic theory to food safety decision making in both the public and private sectors makes it a key resource for food safety professionals in academia, government, industry, and consumer groups around the world. In addition to Benefit/Cost Analysis and economic incentives, other economic concepts are applied to food safety supply chains, such as, principal-agent theory and the economics of information. Authors provide real world examples, from Farm-to-Fork, to showcase these economic concepts throughout the book.*

ADVANCES IN MICROBIAL FOOD SAFETY

7. NEW RESEARCH ON ANTIMICROBIAL RESISTANCE IN FOODBORNE PATHOGENS

Elsevier Inc. *Chapters There are three major aspects of antimicrobial resistance in foodborne pathogens: (1) the resistance to quinolones and cephalosporins in Salmonella enterica, and to quinolones and macrolides in Campylobacter, (2) multidrug-resistant clones of monophasic Salmonella Typhimurium-like organisms, (3) strains of Enterobacteriaceae, in particular Escherichia coli, either exhibiting resistance to beta (β)-lactam antibiotics or producing AmpC β-lactamases. Controlling antibiotic usage in food animals is necessary in order to reduce the incidence of resistant organisms. A single control*

measure is unlikely to limit the transmission of resistance through the food chain. Surveillance of resistance in humans and food animals is vital for measuring the long-term effectiveness of any control measure.

TACKLING ANTIBIOTIC RESISTANCE FROM A FOOD SAFETY PERSPECTIVE IN EUROPE

Antibiotics have revolutionized the treatment of infectious diseases. But their use and misuse have resulted in the development and spread of antibiotic resistance. This is now a significant health problem: each year in the European Union alone, over 25 000 people die from infections caused by antibiotic-resistant bacteria. Antibiotic resistance is also a food safety problem: antibiotic use in food animals--for treatment, disease prevention or growth promotion--allows resistant bacteria and resistance genes to spread from food animals to humans through the food-chain. This publication explores the options for prevention and containment of antibiotic resistance in the food-chain through national coordination and international cooperation, including the regulation and reduction of antibiotic use in food animals, training and capacity building, surveillance of resistance trends and antibiotic usage, promotion of knowledge and research, and advocacy and communication to raise awareness of the issues. This publication is primarily intended for policy-makers and authorities working in the public health, agriculture, food production and veterinary sectors, and offers them ways to take a holistic, intersectoral, multifaceted approach to this growing problem.

POTENTIAL FOR TRANSMISSION OF ANTIMICROBIAL RESISTANCE IN THE FOOD CHAIN

REPORT OF THE SCIENTIFIC COMMITTEE OF THE FOOD SAFETY AUTHORITY OF IRELAND

JOINT FAO/WHO EXPERT MEETING IN COLLABORATION WITH OIE ON FOODBORNE ANTIMICROBIAL RESISTANCE: ROLE OF THE ENVIRONMENT, CROPS AND BIOCIDES

MEETING REPORT

Food & Agriculture Org. Responding to the request from the 39th Session Codex Alimentarius Commission (CAC) and the ad hoc Codex Intergovernmental Task Force on Antimicrobial Resistance (TFAMR) for information about antimicrobial resistance, this report provides scientific advice on the subject derived from a joint "FAO/WHO expert meeting on foodborne antimicrobial resistance: role of environment, crops and biocides" on 11-15 June 2018 in Rome, Italy. There is clear scientific evidence that foods of plant origin may serve as a vehicle of foodborne exposure to antimicrobial-resistant bacteria. Aquaculture products can also carry bacteria that are resistant to medically important antimicrobials. As such, concerted efforts should be made to mitigate their contamination at all stages of the food chain, from production to consumption. Notably, antimicrobials should only be used in crop production according to label guidelines in the context of integrated pest management strategies. To improve food safety, best management practices should be adhered to with respect to the use of human and animal wastes for soil amendment purposes and for the prevention of environmental contamination where aquatic animals are raised for food. Foods of plant and aquatic animal origin food incorporated in to integrated surveillance plans for antimicrobial resistance (AMR) monitoring. Because of the theoretical potential for disinfecting chemical to co-select for AMR, biocides should be used according to manufacturers' recommendations.

PREHARVEST AND POSTHARVEST FOOD SAFETY

CONTEMPORARY ISSUES AND FUTURE DIRECTIONS

John Wiley & Sons While presenting the latest scientific research on the major pathogens associated with meat, poultry, produce, and other foods, Pre-Harvest and Post-Harvest Food Safety: Contemporary Issues and Future Directions goes beyond other professional reference books by identifying the research needed to assure food safety in the future. The editors and authors not only review the current, cutting-edge literature in each of their areas, but provide insights and forward thinking into the development of new and innovative approaches and research strategies. Scientists and researchers from academia, government, and industry have collaborated to examine the high-priority food safety areas recognized by the federal government: pathogen/host interactions; ecology, distribution and spread of foodborne hazards; antibiotic resistance; verification tests; decontamination and prevention strategies; and risk analysis. A worthy new edition to the IFT Press series of food science and technology titles, Pre-Harvest and Post-Harvest Food Safety describes what we now know in food safety and provides a framework and focus for future research to improve diagnostic capabilities and intervention strategies for enteropathogens.

PEER REVIEW OF THE REPORT OF THE EXPERT PANEL ON ANTIBIOTIC RESISTANCE, NEW ZEALAND FOOD SAFETY AUTHORITY

AREVIEW OF THE IMPACT OF THE USE OF ANTIMICROBIALS IN ANIMALS AND PLANTS ON THE DEVELOPMENT OF ANTIMICROBIAL RESISTANCE IN HUMAN BACTERIAL PATHOGENS

MICROBIAL ANTIBIOTIC RESISTANCE

FOOD SAFETY

ANTIMICROBIAL RESISTANCE AND THE UNITED NATIONS SUSTAINABLE DEVELOPMENT COOPERATION FRAMEWORK

GUIDANCE FOR UNITED NATIONS COUNTRY TEAMS

World Health Organization

PHYTOESTROGENS AND HEALTH

The American Oil Chemists Society

FOOD LAW

POLICY & ETHICS

Routledge The international trade in food and the role of the World Trade Organisation are analyzed and the book also contains a section devoted to the issue of Genetically Modified Organisms, in which the legal, ethical and political issues arising in relation to the genetic modification of crops, with regard to both consumer protection and protection of the environment, are examined.

ETHICS AND DRUG RESISTANCE: COLLECTIVE RESPONSIBILITY FOR GLOBAL PUBLIC HEALTH

Springer Nature This Open Access volume provides in-depth analysis of the wide range of ethical issues associated with drug-resistant infectious diseases. Antimicrobial resistance (AMR) is widely recognized to be one of the greatest threats to global public health in coming decades; and it has thus become a major topic of discussion among leading bioethicists and scholars from related disciplines including economics, epidemiology, law, and political theory. Topics covered in this volume include responsible use of antimicrobials; control of multi-resistant hospital-acquired infections; privacy and data collection; antibiotic use in childhood and at the end of life; agricultural and veterinary sources of resistance; resistant HIV, tuberculosis, and malaria; mandatory treatment; and trade-offs between current and future generations. As the first book focused on ethical issues associated with drug resistance, it makes a timely contribution to debates regarding practice and policy that are of crucial importance to global public health in the 21st century.

ANTIMICROBIAL RESISTANCE

AN EMERGING PUBLIC HEALTH ISSUE

Nova Science Pub Incorporated Antimicrobials -- a set of agents which includes antibiotics, synthetic anti-effective drugs, antibacterial agents, and disinfectants -- had had significant beneficial effects on public health, medicine, animal husbandry, agriculture, and food processing. By making many diseases and infections, which were once difficult to treat and often lethal, readily curable, antibiotics have revolutionised human and veterinary medicine. In agricultural use, besides treating specific infections in animals, antibiotics are also given to farm animals to speed their growth, to promote the efficient use of the feed, and to be sprayed on crops as pesticides. The widespread use of antimicrobials, however, is causing some to lose their ability to control disease. The Food and Drug Administration (FDA) approves antimicrobials for human and veterinary use if the manufacturer of the antimicrobial has met all FDA's safety and efficacy requirements. FDA's approval system is not designed to respond to the development of resistant strains, subsequent to approval of the product for human drugs. However, the federal government does run several surveillance programs designed to estimate the scope of the resistance problem, supports research directed at discovering new antibiotics or strategies to circumvent resistance, and promotes voluntary activities on the part of practitioners, consumers, and agricultural producers to reduce the risk. Legislative concerns regarding policies to control antimicrobial resistance focus on whether policy actions should seek to influence the root causes of the problem, encourage new treatments, or address its symptoms. Defining appropriate policy responses is particularly difficult given the complexity of the microbial resistance problem, the lack of data to assess the problems, and the disagreement over the seriousness of the extent of the health threat to resistance. Use of antimicrobials in human medicine, for example, is thought to be the primary source of resistance and some wonder whether the government should regulate such uses. Included in the debate are the uses of antibiotics in the agricultural sector. The conflict there is over how much antibiotic use, both for treating disease and promoting growth, in food-producing animals contributes to resistant strains of bacteria. FDA has proposed a framework in its animal drug approval system to ensure some tracking of resistance development if it takes place.

THE EVOLVING THREAT OF ANTIMICROBIAL RESISTANCE

OPTIONS FOR ACTION

Subject: Antibiotic resistance development is a natural process of adaption leading to a limited lifespan of antibiotics. Unnecessary and inappropriate use of antibiotics favours the emergence and spread of resistant bacteria. A crisis has been building up over decades, so that today common and life-threatening infections are becoming difficult or even impossible to treat. It is time to take much stronger action worldwide to avert an ever increasing health and economic burden. A new WHO publication "The evolving threat of antimicrobial resistance--Options for action" describes examples of policy

activities that have addressed AMR in different parts of the world. The aim is to raise awareness and to stimulate further coordinated efforts

ANTIMICROBIAL RESISTANCE IN BACTERIA FROM LIVESTOCK AND COMPANION ANIMALS

John Wiley & Sons *The global spread of antimicrobial-resistant pathogenic bacteria is a continuing challenge to the health care of humans and domesticated animals. With no new agents on the horizon, it is imperative to use antimicrobial agents wisely to preserve their future efficacy. Led by Editors Stefan Schwarz, Lina Maria Cavaco, and Jianzhong Shen with Frank Møller Aarestrup, an international team of experts in antimicrobial resistance of livestock and companion animals has created this valuable reference for veterinary students and practitioners as well as researchers and decision makers interested in understanding and preventing antimicrobial resistance.*

IMPROVING FOOD SAFETY THROUGH A ONE HEALTH APPROACH

WORKSHOP SUMMARY

National Academies Press *Globalization of the food supply has created conditions favorable for the emergence, reemergence, and spread of food-borne pathogens-compounding the challenge of anticipating, detecting, and effectively responding to food-borne threats to health. In the United States, food-borne agents affect 1 out of 6 individuals and cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths each year. This figure likely represents just the tip of the iceberg, because it fails to account for the broad array of food-borne illnesses or for their wide-ranging repercussions for consumers, government, and the food industry-both domestically and internationally. A One Health approach to food safety may hold the promise of harnessing and integrating the expertise and resources from across the spectrum of multiple health domains including the human and veterinary medical and plant pathology communities with those of the wildlife and aquatic health and ecology communities. The IOM's Forum on Microbial Threats hosted a public workshop on December 13 and 14, 2011 that examined issues critical to the protection of the nation's food supply. The workshop explored existing knowledge and unanswered questions on the nature and extent of food-borne threats to health. Participants discussed the globalization of the U.S. food supply and the burden of illness associated with foodborne threats to health; considered the spectrum of food-borne threats as well as illustrative case studies; reviewed existing research, policies, and practices to prevent and mitigate foodborne threats; and, identified opportunities to reduce future threats to the nation's food supply through the use of a "One Health" approach to food safety. Improving Food Safety Through a One Health Approach: Workshop Summary covers the events of the workshop and explains the recommendations for future related workshops.*

ANTIBIOTIC RESISTANCE FEDERAL AGENCIES NEED TO BETTER FOCUS EFFORTS TO ADDRESS RISK TO HUMANS FROM ANTIBIOTIC USE IN ANIMALS : REPORT TO CONGRESSIONAL REQUESTERS.

DIANE Publishing

SAFETY ASSURANCE DURING FOOD PROCESSING

Wageningen Academic Publishers *Microbial agents (particularly bacteria) represent the greatest risk to public health. The traditional end-product oriented food inspection systems are inadequate for identifying and eliminating the usually symptomless animal carriers of agents causing foodborne infections and intoxications. Modern, risk-based, prevention approaches are the only effective way to reduce the prevalence of these hazards from our foods. As an additional 'safety-valve' microbial decontamination procedures are currently being suggested and its implementation in industrial food processing has, at least in some parts of the world, met with governmental approval. The residues in foods of some non-microbial agents have more recently also caused substantial consumer disquiet. This equally applies to non-conventional foods containing GMO's. In this publication these issues are addressed by invited expert scientists from various disciplines, many of which have key-positions in EU-funded research programmes on these very topics and/or are advisers to international public health bodies. The editors firmly believe that the very nature of the theme, the excellence of the papers and the holistic approach chosen will draw an audience from both an industry and academic background.*

GLOBAL ANTIMICROBIAL RESISTANCE SURVEILLANCE SYSTEM

MANUAL FOR EARLY IMPLEMENTATION

The Global Antimicrobial Resistance Surveillance System (GLASS) is being developed to support the Global Action Plan on Antimicrobial Resistance and should be coordinated within the national action plans of countries. The goal of GLASS is to enable standardized, comparable and validated data on AMR to be collected, analysed and shared with countries, in order to inform decision-making, drive local, national and regional action and provide the evidence base for action and advocacy. GLASS combines patient, laboratory and epidemiological surveillance data to enhance understanding of the extent and impact of AMR on populations. In view of the challenges of collecting all these data, countries should consider gradual implementation of the surveillance standards proposed in this manual on the basis of their priorities and resources. This manual focuses on early implementation of GLASS, comprising surveillance of resistance in common human bacterial pathogens. The intended readership of this publication is national public health professionals and national health authorities responsible for surveillance of antibacterial resistance in humans. This manual describes the GLASS standards and a road map for evolution of the system between 2015 and 2019. Further development of GLASS will be based on the lessons learned during this period.

HAVE BACTERIA WON?

John Wiley & Sons *Today, we are far less likely to die from infection than at any other time in history, but still we worry about epidemics, the menace of antibiotic resistance and modern 'plagues' like Ebola. In this timely new book, eminent bacteriologist Hugh Pennington explores why these fears remain and why they are unfounded. He reports on outright victories (such as smallpox), battles where the enemy is on its last stand (polio), surprise attacks from vegetarian bats (Ebola, SARS) and demented cows (BSE). Qualified optimism, he argues, is the message for the future but the battles will go on forever.*

ANTIMICROBIAL RESISTANCE MULTI-PARTNER TRUST FUND ANNUAL REPORT 2021

Food & Agriculture Org. *Antimicrobial resistance (AMR) is a major global threat to humans, animals, plants, food systems and the environment. Without investment and commitments from countries globally to address this challenge, AMR will continue unabated. The Antimicrobial Resistance Multi-Partner Trust Fund (AMR MPTF) has successfully begun the essential work to address this challenge. With the overall goal of "having reduced levels of AMR and slower development of resistance" in 10 years' time, the AMR MPTF has seen, in 2021, the initial steps towards this goal, with capacity built in 8 countries, and coordinated steppingstones under the global programme. Despite continuous restrictions caused by the coronavirus disease 2019 (COVID-19) pandemic, throughout 2021 collaboration between the Quadripartite organizations - the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) - sustained strong implementation progress at global, regional and country level. Progress against the overarching AMR MPTF results matrix is now being reported for the first time. This was possible through the financial partnership of the Governments of Netherlands, the United Kingdom (using UK aid funding through the Fleming Fund), Sweden (including through the Swedish International Development Cooperation Agency - Sida) as well as Germany (through the German Agency for International Cooperation - GIZ).*

REPORT ON MICROBIAL ANTIBIOTIC RESISTANCE IN RELATION TO FOOD SAFETY

Stationery Office Books (TSO) *Report on Microbial Antibiotic Resistance in Relation to Food Safety*

DRIVERS, DYNAMICS AND EPIDEMIOLOGY OF ANTIMICROBIAL RESISTANCE IN ANIMAL PRODUCTION

Food & Agriculture Org. *It is now accepted that increased antimicrobial resistance (AMR) in bacteria affecting humans and animals in recent decades is primarily influenced by an increase in usage of antimicrobials for a variety of purposes, including therapeutic and non-therapeutic uses in animal production. Antimicrobial resistance is an ancient and naturally occurring phenomenon in bacteria. But the use of antimicrobial drugs - in health care, agriculture or industrial settings - exerts a selection pressure which can favour the survival of resistant strains (or genes) over susceptible ones, leading to a relative increase in resistant bacteria within microbial communities.*

EVALUATION OF FAO'S ROLE AND WORK ON ANTIMICROBIAL RESISTANCE (AMR)

Food & Agriculture Org. *Antimicrobial resistance (AMR) is the ability of microorganisms to fight antimicrobial compounds, reducing the efficacy of treating diseases in humans, animals, and plants. AMR risk is outpacing human population growth, owing to misuse of antimicrobials in large quantities in food systems, and is a serious threat to food security and sustainable development. FAO, with the World Health Organization (WHO), the World Organization for Animal Health (OIE), and the United Nations Environment Programme (UNEP), is supporting countries in developing and implementing their One Health National Action Plans on AMR. The eventual aim is to ensure sustainable use of antimicrobials to minimize AMR risks, in alignment with the Global Action Plan on AMR. The scope of the evaluation covers FAO's entire work on AMR up to early 2020 and its role in the global AMR architecture. It examines FAO's organizational and institutional set-up for AMR work. FAO has a strong mandate to work on AMR, implementing activities in 45 countries and providing far-reaching support on AMR National Action Plans (NAPs). FAO's technical expertise is a key comparative advantage in its work on AMR. It is underpinned by the strong scientific grounding of FAO's work, engendered in its AMR working groups and supported by its collaboration with research centers, universities, and the Tripartite organizations. Nevertheless, the work is relatively recent and, given the long impact pathways, it has had limited results. A comprehensive strategic and programmatic approach would increase the likelihood of achieving results in combating AMR. FAO should prioritize its work in a long-term strategy on AMR that recognizes the seriousness of the threat and is fully integrated into the Organization's Strategic Framework. The strategy should set out FAO's long-term role in combating AMR and that of its divisions and offices, as well as its approach at the country and regional level. FAO should consolidate its work on AMR through a strong programmatic approach with a central coordination and management structure that links with the Regional Offices and is supported by dedicated core funding.*

ANTIMICROBIAL RESISTANCE IN FISH. REASONS, RISKS AND ALTERNATIVE STRATEGIES

GRIN Verlag *Academic Paper from the year 2021 in the subject Biology - Micro- and Molecular Biology, , course: Bachelor of Science in Fisheries, language: English, abstract: This text deals with the antimicrobial resistance in fish as a result of its use in aquaculture, the development and spread of this resistance and the risk associated with the antimicrobial resistant in fish culture. Antimicrobial resistance arises due to the overuse of antimicrobial drugs, most prominently antibiotics and others like antivirals, antifungals, etc. An antibiotic is a substance produced by one microorganism that selectively inhibits the growth of another microorganism and there are different types of it. Its use in aquaculture is accompanied by various factors and increasing use of it has several impacts. As of now, the aquaculture sector is growing rapidly and currently, it accounts for more than half of the fish used for human consumption. Demand for food has been increased since the population of the world is*

growing rapidly so, dependent on aquaculture to provide a safe, reliable, and economic supply of aquatic food has also increased. This increase in production has been accompanied by the intensive use of antibiotics in the aquaculture industry which is leading to the production of antimicrobial-resistant pathogens.

FOOD HYGIENE AND APPLIED FOOD MICROBIOLOGY IN AN ANTHROPOLOGICAL CROSS CULTURAL PERSPECTIVE

Springer The book demonstrates that food safety is a multidisciplinary scientific discipline that is specifically designed to prevent foodborne illness to consumers. It is generally assumed to be an axiom by both nonprofessionals and professionals alike, that the most developed countries, through their intricate and complex standards, formal trainings and inspections, are always capable of providing much safer food items and beverages to consumers as opposed to the lesser developed countries and regions of the world. Clearly, the available data regarding the morbidity and the mortality in different areas of the world confirms that in developing countries, the prevalence and the incidence of presumptive foodborne illness is much greater. However, other factors need to be taken into consideration in this overall picture: First of all, one of the key issues in developing countries appears to be the availability of safe drinking water, a key element in any food safety strategy. Second, the availability of healthcare facilities, care providers, and medicines in different parts of the world makes the consequences of foodborne illness much more important and life threatening in lesser developed countries than in most developed countries. It would be therefore ethnocentric and rather simplistic to state that the margin of improvement in food safety is only directly proportional to the level of development of the society or to the level of complexity of any given national or international standard. Besides standards and regulations, humans as a whole have evolved and adapted different strategies to provide and to ensure food and water safety according to their cultural and historical backgrounds. Our goal is to discuss and to compare these strategies in a cross-cultural and technical approach, according to the realities of different socio-economic, ethnical and social heritages.

MICROBIOLOGY LABORATORY GUIDEBOOK

RESPONSIBLE USE OF ANTIBIOTICS IN AQUACULTURE

Food & Agriculture Org. Antibiotics are drugs of natural or synthetic origin that have the capacity to kill or to inhibit the growth of micro-organisms. Antibiotics that are sufficiently non-toxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of human, animals and plants. They have long been present in the environment and have played a crucial role in the battle between man and microbe. Many bacterial species multiply rapidly enough to double their numbers every 20-30 minutes, so their ability to adapt to changes in the environment and survive unfavourable conditions often results in the development of mutations that enable the species to survive changing external conditions. Another factor contributing to their adaptability is that individual cells do not rely on their own genetic resources. Many, if not all, have access to a large pool of itinerant genes that move from one bacteria cell to another and spread through bacterial populations through a variety of mobile genetic elements, of which plasmids and transposable elements are two examples. The capacity of bacteria to adapt to changes in their environment and thus survive is called resistance. Drug choices for the treatment of common infectious diseases are becoming increasingly limited and expensive and, in some cases, unavailable due to the emergence of drug resistance in bacteria and fungi-resistance that is threatening to reverse much medical progress of the past 50 years. Dissemination of resistant micro-organisms may occur in both hospitals and communities. It is recognized that a major route of transmission of resistant micro-organism from animals to humans is through the food chain. In aquaculture, antibiotics have been used mainly for therapeutic purposes and as prophylactic agents. The contribution to antimicrobial resistance of antibiotics used in aquaculture is reviewed here, using a risk analysis framework. Some recommendations on responsible conduct in this context are proposed, aimed at diminishing the threat of build up of antimicrobial resistance.

ANTIMICROBIALS IN LIVESTOCK 1: REGULATION, SCIENCE, PRACTICE

A EUROPEAN PERSPECTIVE

Springer Nature This first volume in a two-volume work enhances readers' understanding of antimicrobial resistance mechanisms in selected bacterial species that cause diseases in major food producing animals. It provides an overview of the current legislation and policies seeking to regulate the authorisation, manufacturing, distribution and use of veterinary antimicrobials in practice in a way that helps to contain the spread of antimicrobial resistance. The focus is put on Europe, without neglecting the global context. Moreover, attention is paid to various uses of antimicrobials in livestock, considering both their risks and benefits, from the distant past to the present. Growth promotion, prophylaxis, metaphylaxis, diagnostics and treatment are discussed not only with regard to food production and animal health, but also considering the One Health concept, which combines public and animal health with environmental aspects. A summary of various systems for monitoring the use of antimicrobials is provided, as well as an overview of the diseases that European veterinarians most often treat with antimicrobials. In closing, the book addresses the complexity of recent measures that are of key importance for antimicrobial stewardship, e.g. biosecurity, vaccination and other preventive tools including the newest technologies like smart farming. The complete two-volume work provides an extensive review of various aspects related to the use of antimicrobials in veterinary medicine, especially considering major food producing species, their most common infectious diseases and causative pathogens, and mainly focusing on the situation in Europe, without ignoring the global context. While Volume I discusses more general aspects of antibiotic use such as regulatory, laboratory and practical issues from different perspectives, Volume II more specifically discusses medical aspects and the use of antimicrobials in cattle, pigs, poultry and horses, as well as pharmacokinetics and pharmacodynamics, two of the most important factors determining the success of treatment. In both volumes, each chapter confronts the reader with open questions to stimulate further discussions and future research on the topics covered.

ANTIMICROBIAL RESISTANCE

GLOBAL REPORT ON SURVEILLANCE

Summary report published as technical document with reference number: WHO/HSE/PED/AIP/2014.2.