

**ANIMAL HEALTH, ANIMAL WELFARE, PRE-HARVEST FOOD
SAFETY AND PROTECTING THE ENVIRONMENT AS KEY
ELEMENTS OF ANIMAL PRODUCTION**

Thomas Blaha

*University of Veterinary Medicine Hannover, Field Station of Epidemiology, Buescheler Str.9, D-49456 Bakum,
Germany*

**Key words: changing conditions for food production, globalization, Codex Alimentarius,
“from farm to fork”, risk assessment and risk-based decisions**

Introduction

For centuries, in most countries of the world self-sufficiency of the national food production was seen as an ultimate goal to be independent of the food supply of other countries. To reach this goal, most nations subsidized agricultural food production at least in the way that overproduction was always paid for by the government, just to prevent that the production base was reduced. Thus, farmers in most countries of the world have never really experienced the volatility of the market: everything they produced was bought by somebody (overproduction mostly by the state). However, during the last two decades, dramatic changes in the political and economic system we live in have had and still have considerable impacts on the society's and the consumers' view on food and on the way food, especially food of animal origin, is produced. The major events that had and still have an indirect or direct impact on the production of food with or from animals are:

The brake-down of the communistic block in the late 80's and early 90's, with free-market principles replacing plan-economy prescriptions, which initiated the globalization of almost all economies;

The creation of the WTO (World Trade Organization) replacing the GATT negotiations in 1994 leading to a growing liberalization of the trade with food and raw materials for food including animals and animal products, which led to the fact that food retailers and grocery chains can theoretically buy any food from anywhere in the world, and national food supplies are not any longer something that retailers are dependent on. It also led to the fact that food producers/processors and retailers buy not any longer on the basis of only a low price, but also on the basis of quality and food safety criteria that a supplier can guarantee or not;

The reorganization of the EU food safety approach with the EU White Book on Food Safety (2000), the Basic EU-Directive on the Principles for Food Safety (EG No.: 178/2002), and the so called “Hygiene Package” (EG No 852 to 854/2004), which will have, starting in

January, 2006, a drastic impact on the primary production, especially on animal production in terms of the demand for a complete information flow along the food chain (forth and back); The enlargement of the EU on May 1, 2004 with 10 new EU members, which may mean potential trading restrictions for countries with still existing notifiable diseases and/or food safety deficiencies such as the lack of trichinella monitoring or salmonella reduction programmes.

These political and economic developments and the fact that the consumers in the industrialized countries are more and more demanding **food to be not only economical, but also healthy, tasty, and safe, while at the same time respecting animal welfare and the environment**, are the two major determinants of rather drastic changes occurring in agriculture throughout the world. It is quite obvious that, apart from the discussion about GMO's (genetically manipulated organisms) in plant production, animal production has to cope with the most demanding changes that are not only challenges for the animal producers, but also for the veterinary sciences. In the following, these challenges are analyzed and conclusions for the future work of the veterinary profession are drawn.

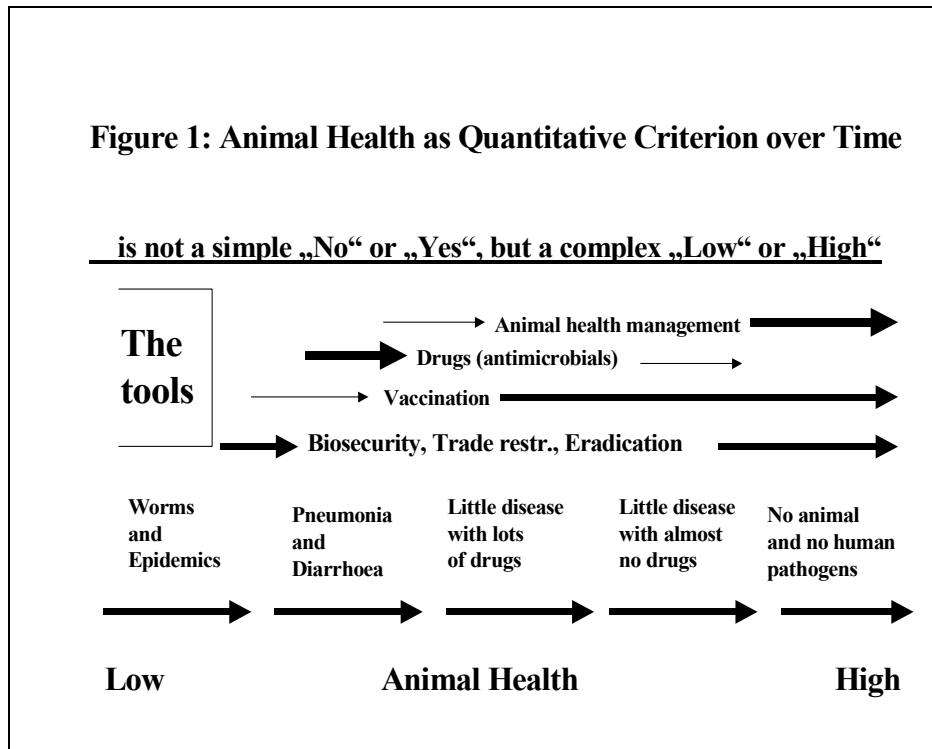
The Liberalization of the Global Trade with Food

The current quantity-oriented food production (agricultural bulk-commodity supply of agricultural raw products into the food production chain) that guarantees the nutrient supply for a nation is changing into an international quality-oriented food system (vertical supply chains for the production of identity preserved food). The main driver of this development was and is without doubt the never-ending chain of food safety break-downs: *Salmonella* Enteritidis in eggs, BSE in the UK, *E. coli* O157:H7, the emergence of *Salmonella* Typhimurium DT104, the dioxin scandal in Belgium, and the BSE-scares in several continental European countries, especially in Germany. These events led to an increasing demand for transparency, traceability, and quality management in the entire food production chain, including the agricultural primary production.

Animal Health in the Light of the Changing World of Animal Production

In the past, disease transmission from farm to farm was a permanent threat to the animals' health, and ecto- and endo-parasites were quasi unavoidable. The constant animal trading, mostly through animal markets and/or animal dealers led to a constant exchange of viruses, bacteria and parasites. The prevailing diseases were the highly contagious epidemic (notifiable) mono-pathogen diseases (left part of Fig. 1).

In the large herd and flock intensive farming structure, the disease transmission between farms is, due to the possibility to apply biosecurity measures, of minor importance. Ecto-and endo-parasites are, as well as the mono-pathogen epidemic diseases well under control (as long as the basic biosecurity rules are complied with). The prevailing diseases in large herds and flocks are the endemic, multi-pathogen and multi-factorial diseases that “take advantage” of the multiple animal passages that opportunistic pathogens need to produce ongoing disease in confined animal populations (middle part of Fig. 1).



The future of animal health lies in the highest possible health status, with e.g. specific-pathogen free herds (these need not to be the classical SPF herds produced via sectio cesarea, but herds that are free from certain causative agents (right part of Fig. 1).

As Figure 1 clearly shows, drugs are not the future tools to produce healthy animals, but health management via implementing the highest possible animal hygiene status.

The EU-Directive 178/2002, the Zoonoses Directives and Animal Well Being

The majority of today’s food safety concerns have their origin in the production stages prior to slaughter and processing, the so-called “pre-harvest” stages, i.e. mainly the agricultural primary production. Examples for pre-harvest food safety issues, which stem from non-defined and non-standardized agricultural production procedures, are: latent infections such as E. coli O157:H7 in cattle, Salmonella in pigs, poultry and cattle, feed contamination with dioxin or TSE prions. Furthermore, the use of antimicrobials in food animals is an emerging

concern, which additionally draws the attention of the public to the production practices in livestock production.

Therefore, the EU Commission issued in 2002 the Basic Directive “EG 178/2002”, which followed the intentions of the EU White Book on Food Safety (2000) and is in congruence with the rules of the Codex Alimentarius (FAO, WHO and O.I.E.). The major principles of the new food safety approach are:

The primary production (feed and animal production) has to be included into the food safety system as so-called “stable to table concept”;

Process control gets priority over end product control: HACCP, GMP = Good Management Practice, GVP = Good Veterinary Practice, and QM-Systems;

The responsibility for the safety of the produced food products has to be taken by the producers at any production stage including the agricultural production;

Self-controls at all stages of the food production chain carried out by the producers themselves are mandatory;

The governmental control of the food chain changes to mainly taking over the state control of the self-controls of the producers;

Along this line, the EU issued in 2003 two EU-Directives dealing with the control of the zoonoses, mainly the food-borne zoonoses (Brucellosis, Tuberculosis, Trichinellosis, Echinokokkosis, Salmonellosis, Campylobacteriosis, Verotoxin-forming E. coli, and Listeriosis): the directive for monitoring and surveillance of these zoonoses (EG 99/2003) and the directive for controlling these zoonoses (EG 2160/2003).

All this means that there is an urgent need to develop pre-harvest food safety procedures that are to be added to the existing harvest and post-harvest food safety and food hygiene measures. In the context of these considerations, pre-harvest food safety can be defined as:

Pre-harvest food safety is the complex of measures that needs to be taken at farm level (farm supply and on-farm procedures) that aim at preventing and/or minimizing the amount of food-borne health risks to humans carried into the food chain via animals and animal products.

Quality Management and Assurance as Tools for Coping with the Changes

The major tools for adopting standardized production procedures at farm level that address animal health, food safety, animal well being and environmental stewardship is the implementation of on-farm measures based on the principles of HACCP (Hazard Analysis Critical Control Points) and on the principles of quality management (QM-Systems) and

certification programs (Quality Assurance) such as ISO 9000:2000, of which the concept of pre-harvest food safety is a core element.

The need to improve the production standards of food animal production as response to the consumers' and the society's expectations has been realized and addressed for at least 10 years in most countries with an developed pork production, especially in countries that export pork (Denmark, The Netherlands, Belgium, the USA and Canada). These countries have, in slightly different ways, developed standards for swine production that are driven by the producer associations (the Canadian Pork Quality Assurance System, and the PQA System of the U.S. National Pork Producer Council), or by industry associations (the Danish Quality Management System for pork, the Quality Assurance System of the UK Meat and Livestock Council, the Dutch Produktschap voor Vee and Vlees with its renowned IKB-program = Integrale Keten Beheersing, and the German QM-System for food from feed to retail = the "QS-System"), or with laws or ordinances issued by governments that set the basic standards as in the European Union with the "Zoonoses Directives", or in Germany with the "Schweinehaltungshygiene-Verordnung".

Conclusions

It can also be expected that the organizational pattern of animal production will change considerably during the next decade following the development in poultry production. Trade with food of animal origin will be dominated by vertically integrated supply chains which are market leaders for certain products and compete with other supply chains. Horizontal competition between single companies will be substituted by a competition of vertically integrated production systems. This will not only add to the quality and safety of the pork but can also reduce the risk of the introduction and dissemination of infectious diseases as the flow of material and information can be documented and controlled. This will necessarily have far reaching impacts on the future role of veterinarians. Animal health, pre-harvest food safety, animal well being with prophylaxis and prevention (in other words: animal hygiene) will form the centre of the activities of the food animal veterinarian instead of treating diseases. The main target is pathogen-free production systems which can be best achieved by a continuous monitoring not only of single herds but of complete production systems and production regions.