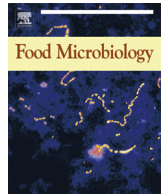




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Animal production, animal health and food safety: Gaps and challenges in the chilean industry

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ABSTRACT

This paper summarizes the gaps and challenges related to animal production, health, and food safety as discussed by a panel at the 1st International Symposium of Food Safety (ISFS) in Santiago, Chile, in December 2016. Participating representatives of academia, industry, and government and statements from the audience confirmed that food safety is essential for increasing food security. First, panelists identified the need for a science-based regulatory framework to implement effective regulations. Second, they highlighted the importance of a risk analysis framework to quantify the risk of the potential for antimicrobial resistance associated with the use of antimicrobials, and the need of studies to evaluate foodborne prevention/control strategies. Third, the challenges of filling the gaps between industry and academia were addressed, including examples of successful collaboration, opportunities, and weakness identified by industry. Finally, challenges in animal food production included issues related to changing consumer preferences, animal welfare, the use of antimicrobials, and sustainable animal production. The symposium provided a regional platform to share experiences from the implementation of methods and approaches for food safety. The roundtable successfully explored the future science and technology challenges that are of strategic importance for Chile and the region in animal health and food safety.

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1. Introduction

A panel discussion was held at the 1st International Symposium of Food Safety (ISFS) conference in Santiago (Chile) in December 2016. The main topic of the ISFS was the identification of new tools to prevent and detect foodborne pathogens from farm to fork. This short communication describes the key messages resulting from this discussion panel, specifically gaps and challenges for: 1) the role of animal health and food safety regulations in animal

production, 2) the use of antimicrobials in animal food production, 3) enhancing collaboration between the animal food industry and academia, and 4) challenges in animal food production in the 21st century. All these aspects reflected the gaps and challenges from a Chilean context, but there was agreement that much of this discussion would be relevant for other developing countries in the region. The authors of this manuscript were members of the panel or facilitators thereof.

2. Animal production in Chile

Chile has a unique geography occupying a narrow strip along the Pacific coast of South America whose width at maximum reaches

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only 420 km (km) and extends from the Atacama Desert in the north to Patagonian rangeland in the south (4300 km). Most of the agricultural activity occurs in the depression between the Andes and lower Coastal range running parallel the Pacific Ocean, including Mediterranean and temperate climates (FAO, 2006a). Such a landscape creates natural barriers to disease transmission, although coastal wetlands with migratory birds present a risk for disease introduction (Altizer et al., 2011). Livestock farming is concentrated in the South plains and Patagonia, the regions rich in grasslands and pasture (Oenema et al., 2014). The husbandry is largely pastoral, with low livestock densities and dispersed herds, which also reduces the risks of disease spread. Confined poultry, pig meat and dairy intensive systems exist in the central zone and intensive dairying is also present in the southern regions (OECD, 2017). The livestock sector generates 37% of Chilean agricultural output (OECD, 2016) and total livestock production more than doubled between 1990 and 2013 and rose by almost 60% in *per capita* terms (FAOSTAT, 2017). The sector's exposure to trade over this period increased considerably, both on export and import sides. Chile became a net overall exporter of livestock products in the 2000s, but returned to net imports in the 2010s with a broadening negative balance (ODEPA, 2017). Chile has traditionally been an exporter of sheep meat and wool and has also considerably increased net exports of pig meat and poultry meat since the early 2000s. These exports are destined to markets with different consumption characteristics and sanitary requirements – from large emerging markets such as China and Russia, to North America and the European Union. Chile is a net importer of beef and in 2015–16 it was also net importing dairy products. A good sanitary status is thus important for Chile to both minimize domestic market risks and to ensure stable access to export markets. Around two-thirds of agricultural establishments in Chile undertake some livestock activity (OECD, 2017). The cattle and sheep sub-sectors have a distinctly dualistic farm structure with most of the herds concentrated in a small number of large operations, and numerous small establishments existing alongside. For example, almost 70% of the total sheep number is concentrated in units with 500 ha and more, but which represent only 2% of all holdings that keep sheep, while units below 50 ha constitute around 80% of such holdings. The presence of many small livestock holders in these industries makes them important as a constituency to be targeted by animal disease policy. The dualistic farm structure is also observed in poultry and pig production. However, the ownership and organization of these industries differ significantly from the bovine and sheep sectors: the numerous pig and poultry establishments are typically parts of integrated businesses that are owned and managed by the same operators (OECD, 2017). Today, Chile enjoys a favorable animal health situation, thanks to geographic conditions impeding disease transmission and decades of successful work on disease eradication (OECD, 2017).

3. Role of animal health and food safety regulations in animal production

Often initiated by the industry and discussed by academia, animal health and food safety policies are ultimately established by governments to put into place a system of controls that cooperatively aim to assure that food safety standards are met (Breckenridge et al., 2011). In this context, regulations and standards are a fundamental part of the food control system, *i.e.*, the integration of a mandatory regulatory approach with preventive and educational strategies that ensures food safety from farm to table (WHO and FAO, 2003). The modern idea of food control places direct responsibility for ensuring food safety on all operators in the food chain (WHO, 2012). The main challenge identified by the

panelists is to develop and implement policies that effectively ensure a safe and secure food supply alongside competitive livestock, poultry, swine, and aquaculture sectors in a developing country such as Chile. These pressures are particularly acute for smallholder producers given the increasing concentration and intensification of agriculture, livestock, and aquaculture (FAO, 2005, 2009; Oenema et al., 2014). Moreover, for countries that export, such as Chile, this is further complicated by differing regulations among importing countries.

An important gap identified in the roundtable was the lack of an established science-based regulatory framework for regulatory science, which refers broadly to the scientific and technical foundations upon which regulations are based in various industries – particularly those involving health or food safety (FDA, 2010). Specifically, the discipline of regulatory science is defined as the development of new tools, standards and approaches to assess the safety, efficacy, quality and performance of regulated products (FDA, 2010). Recent breakthroughs in science and technology, ranging from genomics to nanotechnology, have the potential to transform the ability to prevent, diagnose, and treat animal diseases (including zoonotic and foodborne diseases) (Wang et al., 2016). For these advances to be fully realized, regulators must play a growing part in facilitating the integration of scientific, public health, and legal frameworks (Breckenridge et al., 2011). In Chile, an important aspect associated with the current legislation is the lack of scientific knowledge by politicians and the nonexistence of scientific advisory boards (or commissions), often resulting in rules that are not scientifically sound for some husbandry practices and/or animal health management. Panelists emphasized that when certain foreign policies or norms are implemented to the national industry, they establish sample sizes, sampling intervals or diagnostic techniques for monitoring a hazard in which no technical consideration is given *e.g.*, the expected prevalence or other important demographic determinants.

One panelist referred to the Code of Federal Regulation (CFR¹) of the United States. The CFR is the codification of the general and permanent rules and regulations (sometimes called administrative law) published in the Federal Register by the executive departments and agencies of the federal government of the United States. In brief, authorities publish rules that establish or modify the way they regulate items such as food, drugs, and biologics. The establishment of a “bullet-proof” regulation relies primarily on a qualitative risk analysis (FDA, 2006). This is followed by a period of public input and carefully considers these comments when it draws up a final rule. The authority gathers public comments mainly through two channels: proposed rules and petitions (FDA, 2014).

The panel agreed that a regulation in animal health and food safety should be constructed in norms or guidelines that are driven or actualized by science and with demonstrated capabilities to protect public and animal health. The establishment of effective food safety systems is pivotal in ensuring the safety of national food supplies, and food products for regional and international trade. Decisions on animal disease interventions should be made in the context of the general state of the economy and at all levels, from farms to the government. Therefore, socio-economic analysis needs to be part of animal health policy development. The implementation of animal health policies requires strong incentives or controls in the field, and if veterinary interventions are provided at a cost that is proportionate to the risk and the economic impact of disease, there are no conflicts with the economic (or social) interests of producers or farmers. However, interventions can become ‘unecological’ for official veterinary services as well as for individual

¹ <http://www.ecfr.gov/>.

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