5TH INTERNATIONAL CONFERENCE ON Responsible Use of Antibiotics in Animals LIVE
Towards Sustainable Solutions
7-9 JUNE 2021
VIRTUAL CONFERENCE

ROADMAP
Rethinking Of Antimicrobial Decision-systems in the Management of Animal Production

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA
DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRO-ALIMENTARI

Impacts on production performances and costs from the development of antibiotic-free poultry farming, a case study in Italy

Frédérique Pasquali, Massimo Canali, Cecilia Crippa, Lucia Gambi, Maurizio Aragrande, Gerardo Manfreda, Caetano Luiz Beber
Alma Mater Studiorum - University of Bologna - mail to: massimo.canali2@unibo.it

Background

In recent years, the European Union and its Member States have undertaken many initiatives to support a more prudent use of antimicrobials (AMs) in livestock farming and both consumer demand and production of antibiotic- (AB) free poultry meat have been rising. In Italy, broiler production is concentrated by few big companies that integrate, through production contracts, intensive poultry farms with other upstream and downstream supply-chain activities: they supply farmers with most of the inputs (i.e., chicks, feed, medicines, and technical and animal health assistance) and uptakes the related costs. Contract farms might be either conventional or AB-free: both may produce broilers without using AMs, but, in general, AB-free farms are associated to higher welfare and biosecurity standards as well as precision animal farming. In case of bacteriosis spreading, the whole flock is treated with ABs and the AB-free label is removed from the affected batches. In order to evaluate the potential of further development of the AB-free poultry production and its economic sustainability, this study compared specific zootechnical and economic parameters of AB-free and conventional broiler farms in Italy.

Methods

Based on the database of an integrated poultry company and interviews to farmers and veterinarians, 2011-2020 data (only 8-month data in 2020) on production costs and performances were collected from a group of conventional and AB-free contract farms producing more than 20 million broilers per year altogether. Performance data included feed conversion rates and mortality. Cost data were expressed in € per kg of liveweight comprehensive of cost of chicks, feed, contract farming (i.e., farm work, facilities and utilities) and medication. The last included vaccines, pharmaceutical, feed additives and disinfectants.

Results

AB-free production started in 2017 with a share of 4% of the total production of the investigated company and increased to 33% in 2020 (**Figure 1**). Taking as reference values the means of the years 2011-2013 calculated for the different indicators in conventional farms, we observed that:

- a significantly improved feed conversion rate was registered (the feed/meat ratio decreased of about 7%) in both conventional and AB-free farms, suggesting no consequence for feed efficiency from the increasing AB-free production (**Figure 2**).
- the decrease in total mortality in the AB-free farms resulted considerably more important compared to conventional farms (-41% and -17% respectively in 2020 with respect to the reference values). This suggests optimized husbandry conditions probably associated to a higher attention to the quality of chicks in the AB-free production (**Figure 3**).
- the total costs per kg of liveweight are similar in both productions (**Figure 4**) as well as the cost supported for medical inputs. However, costs of medications are differently distributed: the expenditure quota for pharmaceuticals is much higher in the conventional farms than in AB-free farms (38% vs 24% of total medical inputs costs in 2020), but this is balanced in the AB-free farms by significantly higher shares supported for vaccinations and integrators (**Tables 1** and **2**). In conventional farms, the growing trend of vaccination expenditure and the decreasing trend of pharmaceutical expenditure are also remarkable.

Table 1 – Costs of medication (% distribution) for conventional farms

Year	vaccines	pharmaceuticals	Integrators	disinfectants
2016	21	79	-	-
2017	32	49	9	10
2018	42	43	11	4
2019	43	38	13	7
2020	40	38	13	9

Table 2 – Costs of medication (% distribution) for antibiotic-free farms

Year	vaccines	pharmaceuticals	Integrators	disinfectants
2016	-	-	-	-
2017	36	32	22	10
2018	52	18	25	5
2019	52	20	20	8
2020	50	24	19	7

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 817626.

Conclusions

The study results indicate that a very important and rapid increase of AB-free production took place in the examined farms without implying significant impacts on performance indicators and production costs.

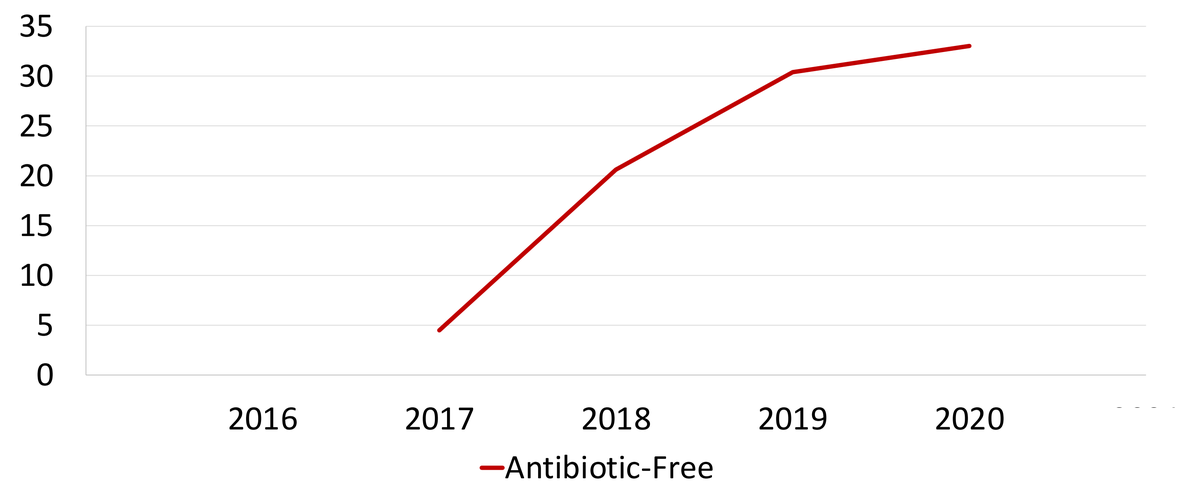

Figure 1 – Percentage of antibiotic-free production on total production in the investigated farms

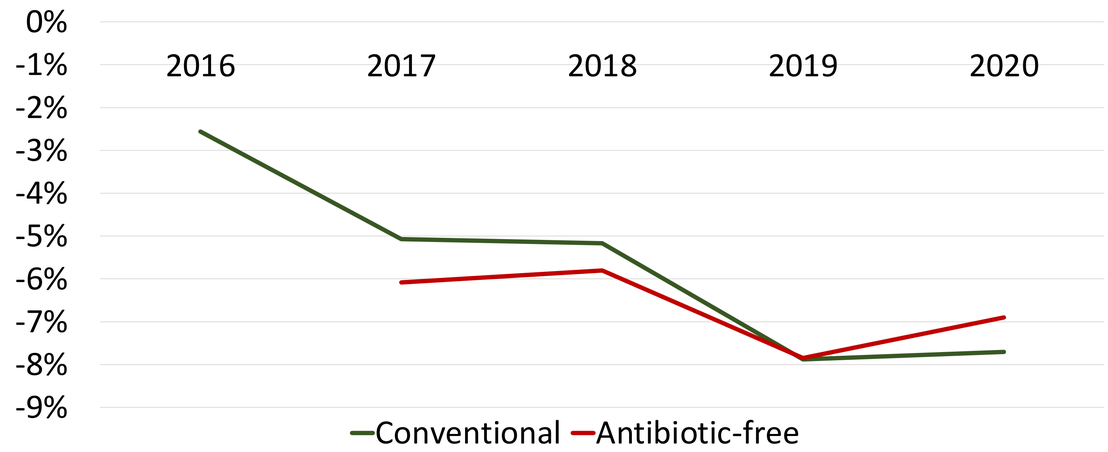

Figure 2 – Feed Conversion Ratio trends in the investigated farms (reference: data from conventional farms, 3-year mean 2011-2013)

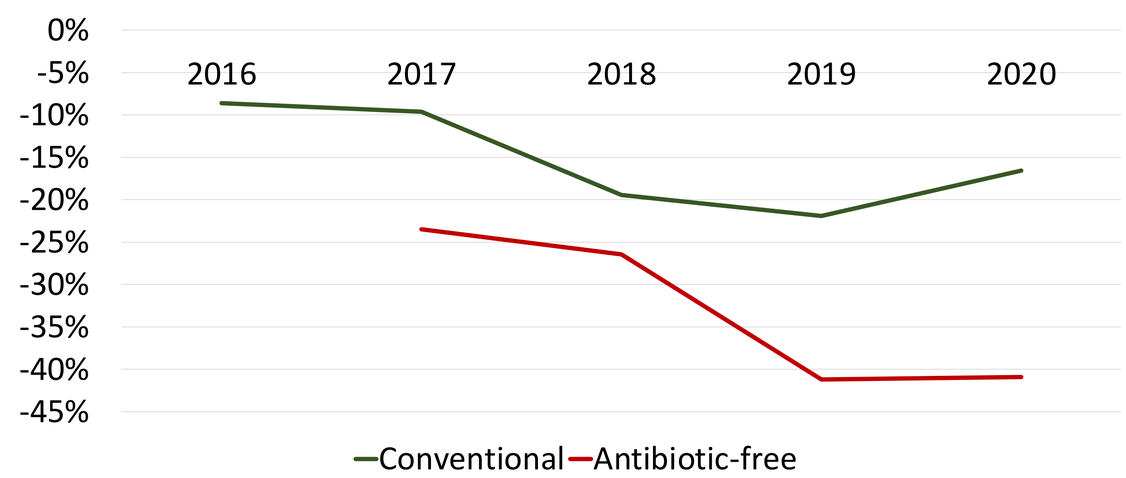

Figure 3 – Total mortality trends (reference: data from conventional farms, 3-year mean 2011-2013)

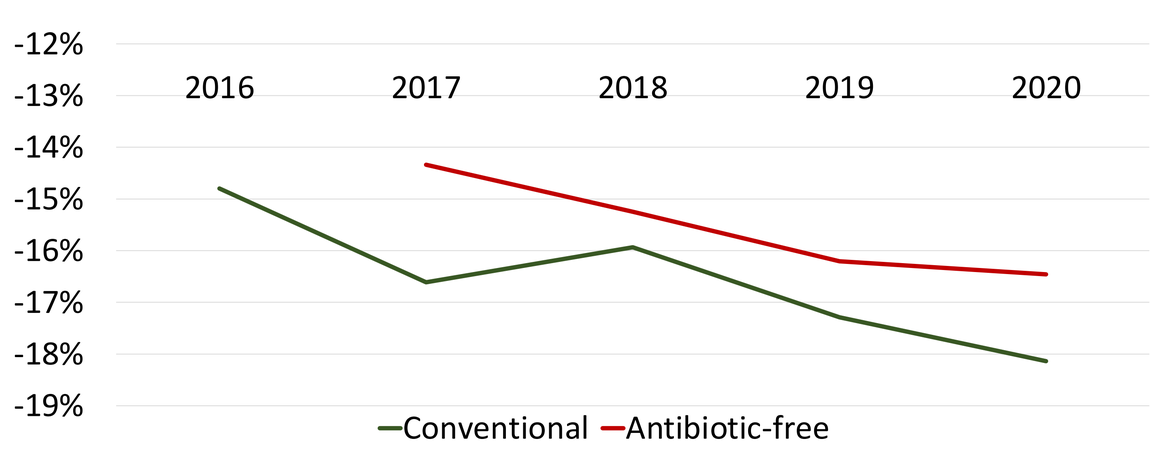

Figure 4 –Total cost (€/kg liveweight) trends (reference: data from conventional farms, 3-year mean 2011-2013)

ROADMAP
www.roadmap-h2020.eu
@ROADMAP2019

The European H2020 Project ROADMAP (Rethinking of Anti-microbial Decision-systems in the Management of Animal Production) is a research and innovation action that promotes a prudent and responsible use of antimicrobial medicines in livestock farming. ROADMAP analyses the socio-economic drivers of antimicrobial use (AMU) in farms, develops tailored strategies for change, and proposes transition and impact scenarios in diverse livestock production systems in Europe and low- and middle-income countries. Inspired by One health, the composition of the ROADMAP consortium makes it possible to build an interdisciplinary framework that combines different perspectives on AMU from the social sciences, to economics, and the animal and veterinary sciences.