

# Potential impact of antimicrobial restriction in *Lawsonia intracellularis* incidence

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## INTRODUCTION

Nowadays, the trend for the reduction of antimicrobial usage is a fact in most of the countries with a relevant swine production. There are already specific rules for antimicrobial use in regions such as North America, more specifically in the United States, and very soon the same will happen in South America, mainly in Brazil.

This scenario started to gain importance with the ban on the usage of antimicrobial growth promoters in feed in Sweden in 1986, followed by the European Union ban on avoparcin in 1997, and on bacitracin, tylosin, spiramycin and virginiamycin in 1999. Just after the banning there was a substantial increase in the therapeutic use of antimicrobials, but over time producers and veterinarians had to learn how to work with this new requirement.

For instance, in Denmark, data from DANMAP have shown that the ban of nonessential antimicrobials in feed production systems is working without major consequences on animal health.

Anyhow, the impact of the antimicrobial growth promoters and the restrictions on antimicrobial usage on pig performance, mainly considering enteric diseases, is controversial, but many studies have shown significant concerns regarding ileitis.

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The literature provides several examples on how the banning of antimicrobial growth promoters in the European Union affected the kinetics of infection of different pig diseases. By far, the most challenging condition has been the post-weaning diarrhoea caused by *Escherichia coli* and *Lawsonia intracellularis* in pigs (Verner Wheelock & Foster, 2002; Callesen, 2002; Pedersen, 2012). However, there was a clear age difference for the occurrence of these two infections. *E. coli* infection would affect post-weaned pigs of up to 6 to 7 weeks of age, while *L. intracellularis* infection would affect 7-week-old pigs or older. It is important to consider that pigs stay for longer in the nursery in Denmark, as they have to reach close to 30 kg before being taken to growing-finishing facilities.

As a result, the ban on antimicrobial growth promoters clearly induced a shift of the infection with *L. intracellularis*, allowing a faster dissemination of the infection in the nursery and earlier clinical presentations of the disease before the growing-finishing phase.

An increase of the age and weight at weaning and the use of zinc oxide in the feed had a positive effect on *E. coli* infections (Heo et al., 2010; Pedersen, 2012). However, *E. coli* is still seen associated with *L. intracellularis* in weaned pigs (Pedersen et al., 2014). Nutraceuticals, prebiotics, probiotics or symbiotics have not proved to be suitable substitutes to antimicrobials for controlling ileitis. In addition, there is no consistent information related to the use of raw materials or ingredients, different formulations or the quality of the diet with the reduction of ileitis or of the infection with the bacterium.

Consequently, the infection with *L. intracellularis* is still a challenge regarding its control, and very often requires the prescription of preventive antimicrobials, justified by the historical occurrence of the disease in specific herds. A metaphylactic approach might be an option. However, attempts to determine when (the ideal moment) to start the medication have not been conclusive.

Currently, a close clinical observation of the animals regarding the consistency of the faeces and the percentage of affected animals, this associated with qPCR results for *L. intracellularis* in faecal samples, can be an important tool in order to define when to intervene.

Based on results from the University of Minnesota, Cts equal or below 31 associated with clinical indications of ileitis are considered indicators of the need for the administration of a treatment.

However, the time elapsed between the clinical observation, the collection of samples and obtaining the results might entail a limitation.

Prevention is always better than treatment for a better control of any disease. *L. intracellularis* eradication protocols have been tested in the past (*Flo et al., 2000; Bundgaard, 2000; Johansen et al., 2001*), and some succeeded in some herds for up to two years, with a substantial improvement in growth performance (*Johansen et al., 2001*); however, every single herd became reinfected. The conclusion regarding eradication is that more epidemiological information is needed.

Consequently, we have to consider vaccination as an important strategy against *L. intracellularis* infection.

Fortunately, there are two vaccines in the market for controlling ileitis that use different approaches: an oral modified live vaccine and an injectable bacterin. Vaccines might be interesting alternatives to overcome the expected increase in the incidence of ileitis in the forthcoming years due to the restrictions imposed on antimicrobials.