

Intradermal vaccination against *Lawsonia intracellularis* increased performance and reduced environmental impact due to antibiotic usage and emissions of N, P and CO₂

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Background and Objectives

Lawsonia intracellularis (Li) is present in most German pig farms and negatively influences health, performance, and resource-efficiency in pig production^{1,2}. In addition to economic threats, the demands from politics and society towards a more sustainable pork production are increasing. The goal of this study was to evaluate the effect of an intradermal Li vaccination on performance and economic parameters, as well as the environmental impact due to antibiotic usage, emission of N, P and CO₂.

Material and Methods

This case took place in a wean-to-finish pig farm in North-Western Germany with history of ileitis caused by Li. Piglets were vaccinated against PCV2, Mhyo and PRRSV (3 weeks of age, woa) and APP (7th and 11th woa). Performance data over two years (2020-2022) was recorded, i.e. feed conversion ratio (FCR), antibiotic usage. A historical control (3 fattening batches; oral vaccination against Li; n=9295) was compared to a subsequent period where pigs were vaccinated intradermally (ID) at 6 woa (3 fattening batches; intradermal vaccination; Porcilis®*Lawsonia* ID; n=9303). N and P excretion difference between groups was calculated with the official manual from the Lower Saxony Chamber of Agriculture using different standardized feed ratios by entering performance data to the model. The carbon footprint (CO₂-e) was calculated using the agricultural GHG Calculator "TEKLa" (based on a German-wide calculation standard) from the Lower Saxony Chamber of Agriculture³.

Results

According to the vet's and farm records, Ileitis-associated signs almost disappeared. Performance data showed an improved FCR in the intradermally vaccinated pigs (oral 2.65 vs ID 2.59) (Table 1), which means an economic benefit of 2.11 €/pig produced (mean feed price 288 €/t) (Table 2).

Table 1. Performance parameters extracted from farm records.

	Oral vacc (n=9595)	Intradermal vacc (n=9303)	Difference
Mortality %	2.05	1.75	-0.29%
Slaughter weight kg	125.00	124.44	-0.56kg
Time to slaughter, d	108.67	104.29	-4.37 days
ADWG, g/d	853.00	891.33	+38.33g
FCR 1:	2.65	2.59	-0.06

Table 2. Economic performance based on technical performance.

	Oral vacc	Intradermal vacc	Difference
Feed costs €*	70.82	68.92	-1.89
Animal losses/ pig produced in €	0.95	0.81	-0.14
Lost profit/ pig produced in €	0.57	0.49	-0.08
Total reduction of costs/ pig produced in €	72.33	70.22	-2.11

*Feed costs in 2021 288 Euro/t; mean weight gain 92,78 kg/pig produced. Vaccination costs not included;

Use of antibiotics due to clinical enteric disease was reduced (treatment days/pig: oral 4.4 vs ID 1.1; -75%, three oral batches compared to one ID batch; see figure 1), likewise emission of N (oral vs ID: range from -3.1% to -3.4%), P (oral vs ID: range from -3.2% to -3.7%) and CO₂ (oral vs ID: -1.5%) were lowered (Fig.2).

Figure 1. Antibiotic use associated with ileitis (pleuromutilins and macrolides) on case farm in different batches.

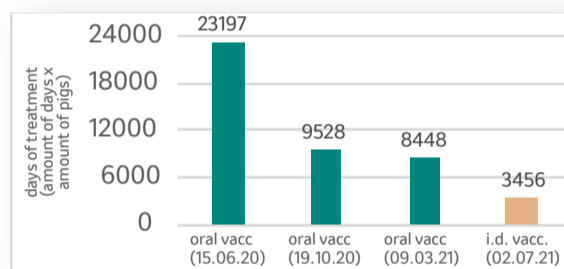
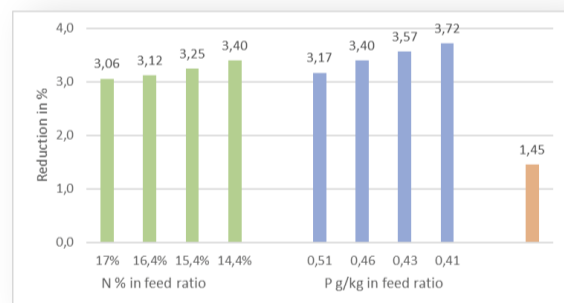


Figure 2. Calculated reduction % on N, P and CO₂e in ID vaccinated groups vs oral vaccinated ones depending on the amount of nutrients in feed ratio.



Discussion and conclusion

Under the conditions of this field observation, intradermal Li vaccination led besides the clinical and economic benefits to more resource-efficient results. This study suggests that Li vaccination may be a valuable and sustainable tool in modern pig production.

¹ Arnold et al., 2019, Prevalence of *Lawsonia intracellularis* in pig herds in different European countries, *Porcine Health Management*
² Mühlen et al., 2021, Praxisdaten zu Klinik und Leistung von Porcilis® *Lawsonia* geimpften Tieren in deutschen Betrieben, *Tierärztliche Umschau*
³ LWK NDS: Berechnung einer individuellen Stallbilanz; https://www.duengebehoerde-niedersachsen.de/duengebehoerde/news/33749_Berechnung_einer_individuellen_Stallbilanz; Retrieval date 10.07.2023