Effect of improved feed conversion ratio by *Lawsonia intracellularis* vaccination on the carbon footprint

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Background and Objectives

Due to the need for climate protection, pig production also faces the responsibility for reducing greenhouse gas emissions (GHG) and, therefore, improving the carbon footprint. The aim of this report was to evaluate the impact of an improved feed efficiency after *Lawsonia intracellularis* vaccination on the reduction of GHG-emission.

Material and Methods

Performance data (i.e., feed conversion ratio; FCR) from field observations of 9 farms with a history of subclinical or clinical ileitis (Fig.1) was recorded in non-vaccinated (NV) and vaccinated (PL) (intramuscularly/intradermally Porcilis®Lawsonia/ID; at 3-11 weeks of age) batches. NV batches, used as historical control, were compared to PL vaccinated batches after implementing *Lawsonia intracellularis* vaccination to control ileitis.

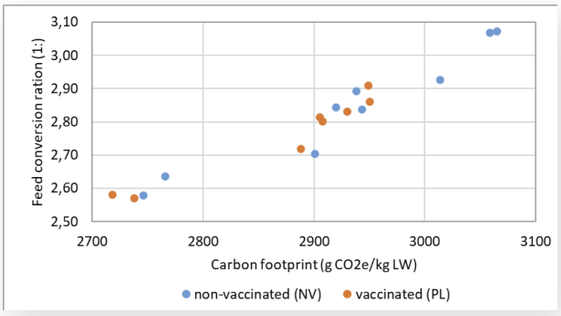
Table 1: Performance data of the 9 observed farms before (NV) and after (PL) introduction of Porcilis®Lawsonia vaccination

	Animal number	ADG	Weight Gain	Mortality	FCR
NV	64943	920.7	94.9	2.8	2.84
PL	21951	936.9	96.6	1.8	2.73

Results

Using the average performance data for both groups (NV and PL, 96kg live weight (LW) gain; FCR 2,79), TEKLa calculated a mean amount of 2891 g CO_2-e/ kg LW. The model estimated that 1594 g CO_2-e/kg LW (53-58%) belonged to feed. The mean CO_2-e proportion for produced piglets (29 kg LW), manure/digestion and energy consumption were 28.2%, 22.0%, and 2.7%, respectively, whereas 8.0% was credited due to the reuse of the organic fertilizer. In PL-vaccinated pigs, a mean improvement of -0,11 was recorded for FCR (Table 1). The model showed that non-vaccinated group emitted on average 2928 g, whereas PL-vaccinated group 2853 g CO_2-e/kg LW. In the farm with the highest improvement in feed conversion after introduction of the *Lawsonia intracellularis* vaccination (FCR -0.27), a lowering of 182 g CO_2-e/kg LW was observed (6.23%) (Fig.2). The maximum deviation regarding CO_2-e excretion between the worst and best fattening group was 12.1%.

Figure 2: Calculated carbon footprint per kg live weight in relation to feed conversion ratio in vaccinated (PL) and non-vaccinated (NV) pigs



Discussion and conclusion

Under the conditions of this report, TEKLa model calculation demonstrated a reduction of GHG-emission associated with improved feed efficiency in pigs vaccinated against *Lawsonia intracellularis*. This suggests that improved feed efficiency contributes to sustainability in pig production.

Figure 1: Pigs in the farms suffered from different clinical forms (subclinical, acute, chronic) of ileitis.

[1]Mühlen et al., 2021, Praxisdaten zu Klinik und Leistung von Porcilis® Lawsonia geimpften Tieren in deutschen Betrieben, Tierärztliche Umschau. [2]Nieberding et al., 2022 Praktische Beobachtungen zum Einsatz einer intradermalen Lawsonia Impfung, Tierärztliche Umschau. [3]Tabeling et al., 2023 Impfung von Schweinen gegen Lawsonia intracellularis i.m. oder i.d. – Kalkulation der Effekte einer verbesserten Futterverwertung auf die N- und P-Ausscheidung sowie den CO2-Fußabdruck, Tierärztliche Umschau

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