

Supplementation with Probisan® reduces morbidity and mortality caused by *Lawsonia intracellularis*.

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Introduction & objective

The use of probiotics is a very interesting alternative to replace antibiotics as growth promoters. Until 2006, the use of antibiotics as growth promoters was a very common practice in livestock. Its indiscriminate use led to the development and emergence of multi-resistant pathogenic bacterial strains whose impact on human health was unknown (van der Fels-Klerx *et al.*, 2011). There was also an increasing concern about residual contamination of the food chain with these antibiotics (Vondruskova *et al.*, 2010). This triggered the adoption of new safety measures and a gradual withdrawal of antibiotics as growth promoters in pig industry. In January 2006, its use was banned in the European Union. This prohibition has stimulated an intensive research that focuses on the development of alternative strategies to maintain the health and performance of animals reducing the use of antibiotics.

Probisan® (Pentabiol S.L., Navarra) is a fermented product composed of lactic acid bacteria and yeasts, with probiotic and prebiotic (postbiotic) effects, which allow the microbiota repopulation in the digestive system in a natural way.

Our group has been evaluating the effectiveness of this product in the improvement of health and production parameters in Iberian pigs. In this particular study, we have investigated the effect of Probisan® during an outbreak of porcine ileitis after weaning, evaluating the use of this product to control this disease.

Material & Methods

This study has been carried out in an extensive Iberian pig farm located in Cáceres (Southwestern Spain). The study included 30 sows (100% Iberian breed) inseminated by natural mating with 100% Iberian breed boars. Two groups were formed:

- **Control group (n= 20 sows + 127 piglets):** Sows fed throughout lactation with a standard lactation feed and piglets from the 2nd week with a pre-starter feed, without any supplementation.
- **Probiotic group (n= 10 sows + 69 piglets):** Same type of feeding as the control group, but supplemented with 2 g of Probisan® per kg of feed.

PATHOLOGY

The disease was diagnosed after post mortem of two animals in which compatible lesions with this pathology were observed, highlighting the severe thickening of the mucosa at the level of the ileum (adenomatosis) and enlarged mesenteric lymph nodes.



Figure 1: Detail of the intestinal mucosa thickening and the strong mesenteric lymph nodes reactivity of the necropsied animals

MICROBIOLOGICAL ANALYSIS

- A DNA extraction from the mucosa of two different portions of the intestine (jejunum and ileum) of the two animals subjected to necropsy was performed.
- The presence of *Lawsonia intracellularis* was confirmed by PCR (Jones *et al.*, 1993) in the extracted DNA.

Results

- For the estimation of morbidity, animals showing significant weight loss were included. During the disease outbreak, we observed a morbidity (animals with patent thinning) of 24.4% (31/127) in the control group and 7.2% (5/69) in the probiotic group. Differences were statistically significant between the two groups ($\chi^2=8.78$, $p=0.003$).

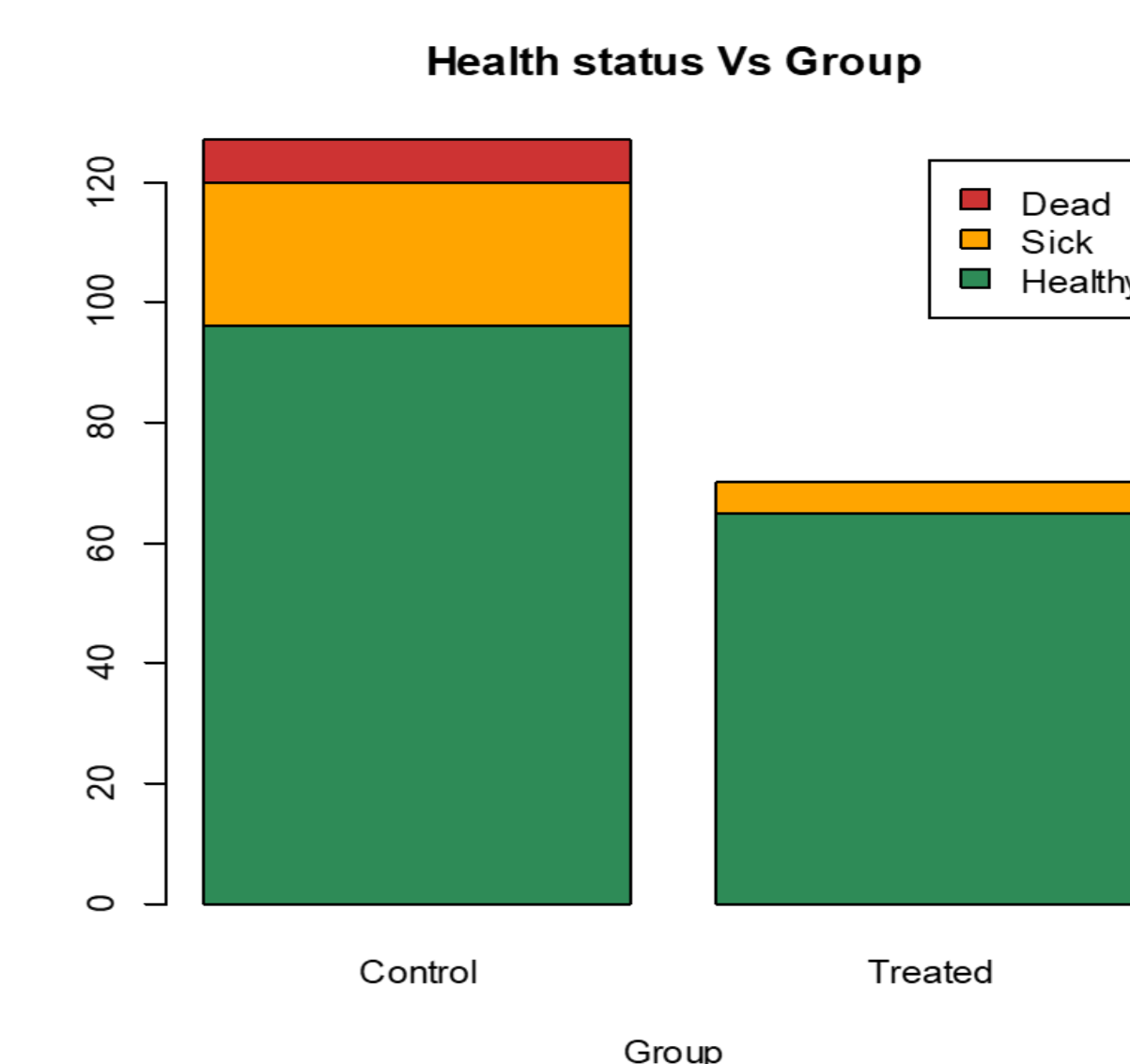


Figure 2: Animals affected by the disease and showing an important loss of body condition (red arrows). In the chart on the right the proportions of sick and dead animals within each group are shown.

- It is also worth noting that there were 7 deaths, all animals belonging to the control group.

Discussion

- ❖ Different mechanisms of action have been described by which the probiotic strains produce beneficial effects in pigs. These include stimulating the growth of beneficial intestinal bacterial, competition with enteropathogenic bacteria for nutrients and points of adhesion to the intestinal mucosa, the production of substances with antimicrobial activity (bacteriocins) or the production of acids (mainly lactic acid) that lower the intestinal pH (Simon *et al.*, 2001).
- ❖ Through these mechanisms, supplementation with Probisan® has been able to prevent or hinder the gut colonization by *Lawsonia intracellularis* in the animals of our study.
- ❖ In addition, there are evidences that probiotics can stimulate the specific and non-specific immune response. It has been observed that they can increase the activity of macrophages and immunoglobulin levels, especially the IgA levels, that play a fundamental role in the protection of the intestinal mucosa against microbial aggressions (Vitiñi *et al.*, 2000).

Conclusion

Our results show that supplementation with postbiotics (Probisan®) helps to reduce the morbidity and mortality caused by *Lawsonia intracellularis*.

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